GUIDE LEAFLET
GEOLOGICAL SCIENCE FIELD TRIP

Sponsored by
ILLINOIS STATE GEOLOGICAL SURVEY

GEORGETOWN AREA

Vermilion County
Danville S. E., Danville S. W., and Fithian Quadrangles

Leaders
Edgar Odom and George M. Wilson

Urbana, Illinois
September 23, 1961

GUIDE LEAFLET 1961E

HOST: Georgetown High School
THE GEORGETOWN GEOLOGICAL SCIENCE FIELD TRIP

ITINERARY

Suggestion: Have someone read the guide as you travel through the countryside so that the driver will be able to learn the geology of the area, also.

Abstract

The Georgetown area is crossed by the Urbana Moraine of the Wisconsinan Stage. South of the moraine the surface is mantled by till of Champaign age. The morainic area and the area north to the Bloomington Moraine are underlain by Urbana till overlain by Bloomington outwash sands and silts. Kames are numerous on the Urbana Moraine. One kame is examined in an abandoned gravel pit.

The bedrock is of Pennsylvanian age and belongs to the McLeansboro and Kewanee Groups. The McLeansboro Group includes the Livingston Limestone, of economic importance in the Fairmount area. The Kewanee Group contains the Danville (No. 7) Coal, the Grape Creek (No. 6) Coal, and the Indiana III Coal. There are several active strip mines in the area working the No. 7 and No. 6 beds. Three underground mines also produce from these beds.

Along the Vermilion River Valley are several terraces of sand and gravel believed to correlate with post-Bloomington advances of the Wisconsinan glacier. The full sequence of events leading to the terrace formation and the time of formation are not well known. An abnormally wide area in the present valley is believed to correlate with the position of a wide place in the pre-glacial Vermilion Valley.

0.0 0.0 Assemble in front of Georgetown High School. Heading east on West Street.

0.0 0.0 Continue east of West West Street.

0.2 0.2 STOP. Turn left (north) on North Main Street and Highway 1.

1.0 1.2 On the far left note the waste pile which was the site of the U. S. Steel Mine and the one on the far right, the site of another mine. The No. 6 Coal in this area is between 5 and 6½ feet thick at a depth of more than 160 feet. Considerable coal of minable thickness is still available to the west as well as to the south. On the right-hand side is coal at strippable depths, which may become of value in the future.
1.6 2.8 This is the site of the Peabody Coal Company's mine of several years ago. It was abandoned after the company mined all the coal acreage they owned, not because of lack of coal.

1.8 4.6 SLOW. Entering the town of Westville. The road crosses the Urbana Moraine in the vicinity of Westville.

0.4 5.0 SLOW. Eastern Illinois Railroad crossing.

0.1 5.1 Intersection. Turn right (east) on East Main Street.

0.2 5.3 CAUTION. Illinois Central Railroad crossing.

0.1 5.4 Note the shale dump pile from the old mine works. This pile of waste has been here for many years. It is now being hauled from the Danville area as far as Decatur to be used as fill material, because it is cheaper than other materials which could be used as fill.

0.5 5.9 The farmland to the left has No. 7 Coal at a depth of about 50 feet.

0.1 6.0 Stop 1. Park along roadside. Discussion of Urbana Moraine.

This stop on the Urbana Moraine affords an opportunity to discuss the topography of east-central Illinois. The other moraines lying to the area immediately south of this region are the Champaign, West Ridge, and farther south, the Cerro Gordo and the Shelbyville. To the north in the immediate area are the Bloomington, Normal, and the Cropsey Moraines.

When the glacier began to recede, melt-waters generally accumulated in local ponds or small lakes between the ice-front and the end moraines, except where there were channels cutting through so that the melt-waters could drain off. In some instances large lakes were formed before draining was sufficiently developed to carry away the waters.

On the left-hand or east side of the road, a kame was developed at the edge of the Urbana Moraine. The deposit is as much as 50 feet thick, practically all gravel. The soil profile here is derived from the weathering of glacial materials, whether loess, silt or glacial till.

Thousands of years ago much of northern North America was covered by huge glaciers. These glaciers, which advanced from centers in eastern and central Canada, developed when the mean annual temperatures were a few degrees lower than they are now, and the winter snows did not completely melt during the summers. After many years a sheet of ice accumulated that was so thick its weight caused it to flow outward, carrying with it the soil and rocks on which it rested and over which it moved.

The Pleistocene Epoch or "Great Ice Age" began about one million years ago and ended about five thousand years ago. During this epoch, there were four major ages of glaciation, each followed by a long interglacial age characterized by climatic conditions much as they are today.
The oldest glacial age is the Nebraskan, named after the state of Nebraska where extensive Nebraskan deposits are buried beneath the younger glacial deposits. In Illinois the Nebraskan deposits are also buried. A warm climatic interval, called the Aftonian (interglacial) Age, followed the retreat of the Nebraskan glacier.

The next glacial climate produced the Kansan glacier which left thick deposits of fine rock materials and outwash sand and gravel in Illinois when it melted away. The Kansan Age was followed by the Yarmouthian (interglacial) Age. During this age erosion carved valleys and hills, and soils were formed in the Kansan deposits.

The third glacial age, the Illinoian, is particularly important to the residents of Illinois. It covered 80 percent of the state, reaching southward to Carbondale and Harrisburg. After several thousand years, a warm age caused the Illinoian ice sheet to melt. During this warm age, the Sangamonian, the upper part of the deposits left by the glacier was weathered and soil developed, as in the preceding Yarmouthian interval. These ancient Sangamonian soils resemble present-day soils in color, texture, and depth, suggesting that the climate during interglacial times was similar to our present climate.

The last and most recent glacial age in Illinois was the Wisconsinan, which began about 70,000 years ago. The Wisconsinan comprised three major glacial advances--the Altonian, the Woodfordian, and the Valderan. Little is known about the extent of the Altonian glacier, as its deposits were overridden by later glaciers, except in northern Illinois. The Woodfordian glacier advanced southward from the Lake Michigan basin to the present sites of Shelbyville, Decatur, Charleston, and Peoria. The Valderan glacier reached its maximum extent near Milwaukee, Wisconsin, and did not enter Illinois.

When the glaciers melted, they released the rock materials they had picked up as they advanced. These materials are called "glacial drift." Some of the glacial drift was washed out with the meltwaters. The coarsest material carried by the meltwater was deposited nearest the ice front, and the finer material was carried farther away, with the finest clay possibly carried all the way to the ocean. Where the outwash material was spread widely along the front of the glacier, it formed an outwash plain. Where the outwash was restricted to the stream valleys, it formed valley train deposits.

Glacial drift deposited directly by the ice is called till. It is unsorted and unstratified and consists of a mixture of all kinds and sizes of rock fragments. As the Wisconsinan glacier retreated, the ice withdrawals and readvances created a complex sequence of till deposits in northeastern Illinois, the most outstanding of which are end moraines. More than 50 successive end moraines were formed by the Wisconsinan glacier in Illinois alone. The major ones are shown on the accompanying glacier map of northeastern Illinois.

An end moraine is an accumulation of drift at the ice margin when the rate of advance and the rate of melting of a glacier are essentially in balance. As more and more rock debris is brought to the edge of the glacier, it piles up and forms a ridge.
The surface relief of end moraines is generally greater than that of the surrounding area and is referred to as swell-and-swaie or knob-and-kettle topography. At some places there are large gaps in the drift. The flatter areas behind end moraines are called ground moraines or till plains.

At times, especially in the fall and winter, the meltwaters subsided, exposing the valley trains. The wind picked up silt and fine sand from their surfaces and dropped them on the bluffs and uplands to form deposits of loess. Loess mantles most of Illinois. Near the large river valleys it may be as much as 60 to 80 feet thick. It thins away from the valleys.

The importance of the Pleistocene Epoch is emphasized by the rich soils formed from the glacial deposits and by the abundant deposits of sand and gravel. The state would not have these valuable resources if the glaciers had not invaded Illinois.

The section of soil and glacial drift exposed here is as follows:

<table>
<thead>
<tr>
<th>Zone</th>
<th>Description</th>
<th>Ft.</th>
<th>In.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Dark, silty, humic soil</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>Deeply weathered till, brown grading to yellow, non-calcareous, no lime pebbles</td>
<td>3-5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kamic gravel</td>
<td>30-50</td>
<td></td>
</tr>
</tbody>
</table>

Rocks and minerals suffer changes when they are exposed to the weather. These physical and mineralogical changes, although slow, become evident when earth deposits remain undisturbed for long periods of time. This happens in the development of a soil profile.

Following the practice established about 30 years ago by the Russian Glinka, soil scientists usually consider that the soil or weathering profile consists of 3 zones, designated A, B, and C from the top down. The A zone is the "soil" zone, which is normally black or gray in color. The B zone is the "subsoil" zone, and the C zone is the unaltered parent material.

The zonal effect results because the four principal processes which effect soil weathering all progress with the downward movement of groundwater but at different rates. These processes, listed in order according to their rate of progress, beginning with the most rapid are: (1) oxidation, (2) leaching of carbonates, (3) decomposition of more resistant minerals, and (4) accumulation of humus.

As a result, in the A zone, in which the humus material derived from decaying plants has accumulated, the rocks are oxidized, leached, and decomposed. In the upper part of the B zone, they are oxidized and leached, while in the lower part of the B zone they are only oxidized. The oxidation zone is shown by the reddish or yellowish color resulting from the oxidation of iron minerals. The leached zone is determined by the absence of carbonates, as revealed by tests with a solution of hydrochloric acid.

Of special interest here are sizeable chunks of coal which would indicate that this coal was transported only a short distance.
SLOW. Turn left. On the far west, there are several other kames of the same vintage as the one we have just left.

On the right is an abandoned coal mine in the No. 6 Coal, which occurs at a depth of about 40 feet.

Note the zone of till overlying a gravel deposit. The gravel is 15-18 feet thick. On the right-hand side of the roadway the outcrops are completely covered by glacial drift, but occasionally you will see outcrops of coal on the east side.

SLOW. Turn left (north). The Hawbuck Creek Valley.

Entering the Vermilion River Valley. This particular area is called the Langley Bottoms, a large area in which the valley is very wide and may be the zone where the earlier glaciers entered this section.

Grape Creek. A short distance to the left, or west, the No. 6 as well as the No. 7, Coals have been mined by underground and strip mining. Note the gravel on the left-hand side of the road. This is one of the terraces on the Vermilion River. Two terraces are clearly developed.

The town of Grape Creek. Crossing the Eastern Illinois Railroad.

Note the terrace on the east side of the road.

Chicago Eastern Illinois Railroad crossing.

Note the sand and gravel on the east side of the road.

Bridge over the Vermilion River.

SLOW. Turn right (southeast).

Note the flatness of the valley on right and left.

SLOW. Bridge.

Stop 2. Outcrop of Wisconsinan till.

This is a well exposed section of Wisconsinan glacial deposits, some 50 to 60 feet thick consisting of clay, pebbles, and a few large boulders. The top of the deposit shows a well developed soil profile. The A zone is light gray and only a few inches thick. The B zone is 5 to 10 feet in thickness, and heavily oxidized. The C zone is 15 to 35 feet thick and constitutes all of the deposit below the B zone horizon.

This is typical of the Wisconsinan tills that underlie northeastern Illinois. This till was deposited less than 18,000 years ago by the Champaign and Urbana glacier, small lobes of the huge Wisconsinan ice sheet.

Note that the till is composed of a wide variety of rocks. The dark, igneous rocks stand out conspicuously in the till. However, if the rock content were carefully analyzed it would become obvious that
most of the rocks are of rather local origin, perhaps from less than 100 miles distant. The apparent abundance of igneous rocks reflects their resistance to erosion. They remain long after more abundant but less resistant varieties have disintegrated.

Note that this side of Langley Bottoms is composed of till. We will see later that the west side and the east side of the valley north of Langley Bottoms is lined by gravel terraces. The history of Langley Bottoms is not fully understood. The sequence of events may be interpreted in different ways. First, the bedrock map of this area shows a widening of a pre-glacial valley in the vicinity of Langley Bottoms. During the Kansan and Illinoian glaciations, this pre-glacial valley was filled with glacial deposits. During the Wisconsinan, when the present Vermilion River Valley was under development, the area of Langley Bottoms was excavated in the relatively weak glacial deposits which previously filled the valley. The widened pre-glacial valley and its relationship to the present position of Langley Bottoms is shown in the illustration on the following page. The constriction of the Vermilion Valley at the south end of Langley Bottoms, where the valley is eroded in bedrock, greatly assisted in the creation of the Bottoms by serving as a partial dam and undoubtedly causing the river to meander back and forth. The weak glacial fill permitted the widening and the peculiar present shape of the Bottoms. Later events in the history of this valley are outlined in the discussion of the gravel terraces at the next stop.

0.7 12.9  Turn left (north).
1.3 14.2  SLOW. T-road east.
0.5 14.7  STOP. Turn left (northwest). Entering Releysburg Road.
0.9 15.6  Surface of highest terrace elevation is 620 feet. At 590 feet elevation is a second terrace zone, and at 550 feet, a third.
0.2 15.8  SLOW. Turn left (south). Atherton Cemetery on the right.
0.6 16.4  Turn left. Entering the Lewis Gravel Pit.
0.1 16.5  Stop 3. Lewis sand and gravel pit.

Note the Pleistocene conglomerate beside the roadside. The gravel has been cemented by calcium carbonate and limonite from percolating groundwater. At the surface, the soil A zone is thin, only an inch or so in thickness. The B zone is three to four feet in thickness. Beneath the B zone is sand and gravel. Note the cemented layers interbedded in the unconsolidated sand and gravel. The sand and gravel terrace is 15 to 25 feet in thickness, underlain by light gray till with an irregular upper surface. Towards the east the terrace thins like a wedge, and the underlying till is well exposed.

The valley occupied by Stony Creek is an abandoned valley of the Vermilion River. The high terraces along the side of this valley were probably formed in post-Bloomington time, but there is evidence that pre-Bloomington terraces may also be present. There definitely were several stages of terrace development.
End Moraines in East Central Illinois
The sequence of terraces relative to time of origin is not well understood. This emphasizes the fact that there is still much to be done on the geology of Illinois.

When the Bloomington glacier stood a few miles to the north, meltwater flowed out over this area more or less unrestricted to definite valleys. This region was part of the outwash plain in front of the Bloomington ice sheet. The Vermilion River probably was not re-established until late Bloomington time. This reasoning is based on the occurrence of widespread outwash sand and gravel deposits stretching as a thin sheet from the Bloomington Moraine in places to the Urbana Moraine. There is evidence that the Salt Fork, Middle Fork and North Fork of the Vermilion River were cut into these outwash deposits late in Bloomington time. If these streams had existed throughout the Bloomington ice stand, we would expect to find gravel terraces of this age along the valley sides. However, there are none.

During the stands of the Cropsey glacier, the story was considerably different. Meltwater from the Cropsey and Chatsworth glaciers flowed down the Middle Fork and North Fork through the Bloomington Moraine. These waters were carrying sand and gravel down the valley occupied by Stony Creek. The valley was alluviated (built up) by deposition of these deposits in the valley to the level of the highest terrace. These terraces are mere remnants of the sand and gravel that once filled the entire valley to the level of the terraces. The highest terraces are probably of Cropsey and Chatsworth Age. The lower terraces may correspond to deposition from meltwater flowing from the Iroquois Moraine and, much later in the Wisconsinan from flood water from glacial Lake Watseka.

0.3 16.8 Turn right.
0.1 16.9 Note upper crossbedded sand and gravel underlain by a 5-8 foot zone of faintly laminated clay and sand and 5-8 feet of coarse, comparatively clean gravel containing numerous coal fragments. Essentially this same section is repeated in the next pit to the south.
0.1 17.0 Note the flat river bottom.
0.1 17.1 Crossing terrace at 550-560 feet.
0.1 17.2 STOP. Turn left (west).
0.4 17.6 The sand and gravel on the right was taken from Stony Creek itself. This gravel zone extends some 60 feet below the level of the highway.
0.4 18.0 Entering Danville. This road is at the level of the highway terrace, 590-600 feet.
0.4 18.4 Note the abandoned strip mine immediately on the left as well as abandoned strip mines in Grape Creek Coal on the west side of the river.
0.5 18.9 STOP. Turn right. Turn into McGrennels Street.
0.2 19.1 Turn left into Florida Street.
0.1 19.2 Turn right into Douglas Park. Follow the winding park road.

0.0 19.2 **Stop 4. LUNCH. Douglas Park.**

0.2 19.4 **Stop. Turn right (south).**

0.2 19.6 Turn right on Texas Street.

0.3 19.9 **Stop. Turn left on Perrysville Road.**

0.7 20.6 Continue straight ahead on Perrysville Road.

0.6 21.2 **SLOW. One-way bridge.**

0.9 22.1 **Stop 5. Discussion of the terrace zones in the Danville area.**

Two terraces, one at 560 feet and another at 580 feet, are plainly visible at the end of the narrow ridge that separates the wide Stony Creek Valley from the present Vermilion River Valley. These terraces correspond to the two upper terraces seen at Stop 3.

Note that the valley of the Vermilion River is smaller than that of Stony Creek. As was partially explained at Stop 2, this only means that a river, probably larger than the present Vermilion, once occupied Stony Creek Valley. All that needs to be added here is that the present Vermilion River Valley is relatively young and that likely it was pushed from its former course (the valley of Stony Creek) due to filling of this valley with glacial outwash.

Terraces are of two main types, erosional or depositional. These terraces are depositional. They represent remnants of a valley fill and were isolated along the sides of the valley when the valley was later re-excavated. An erosional terrace is a cut terrace and is usually underlain by bedrock or other material from which it was carved.

Since they are our major sources of sand and gravel, the Pleistocene depositional terraces along Illinois rivers are of great economic importance.

0.3 22.4 Turn right (south).

0.7 22.6 **SLOW. Bridge over the Vermilion River.**

0.1 22.7 **Chicago Eastern Illinois Railroad.**

0.7 23.4 **SLOW. Turn right. Go up hill. Winding road.**

0.4 23.8 Turn right (north) and then left (west).

0.7 24.5 **STOP. Turn right (north).**

0.1 24.6 **T-road. Continue ahead (north).**

0.4 25.0 Turn right (east).

The Illinois No. 6 Coal, in this area called the Grape Creek Coal, is being stripped. The coal is overlain by gray shale and a variable sequence of Pleistocene deposits. There are several strip mines in the Danville area where the No. 6 and Danville No. 7 Coals occur at a stripable depth. There is also one active underground mine in the No. 6 Coal and two in the No. 7 Coal in the area.

The estimated reserves of the Grape Creek Coal in Vermilion County is approximately 702 million tons. Reserves of the No. 7 Coal are estimated at 1,700,000,000 tons. The Indiana III Coal also occurs in the area, and was mined many years ago at Tilton. Coal III is 200 or more feet below the surface, and contains an estimated reserve of 45,000,000 tons. All the above reserves include only the coal in beds more than 28 inches in thickness.

Pennsylvanian sediments are unlike older sediments in Illinois in that they consist of many different rock types, the outstanding type being coal. In Illinois, coals are commonly overlain by black sheety shale ("roof slate") followed by limestone with marine fossils. The limestone is usually overlain by gray shale also containing marine fossils.

Beneath the coal there is an underclay, in turn sometimes underlain by an underclay limestone or shale, then sandstone. This type of rhythmic succession of different kinds of strata is repeated in much the same sequence some 50 times where the Pennsylvanian rocks are thickest. Each rhythmic succession of Pennsylvanian rocks is called a cyclothem.

The many different rock types in the Pennsylvanian System indicate many rapid changes of environment which took place repeatedly. At that time rivers were bringing sediments from the north and east, possibly as far away as the present Atlantic coast and the region south of Hudson Bay. The Mid-West was subject to frequent marine invasions as the land rose or sank, or the sea level raised or lowered.

That these conditions existed is evident from the nature of the sediments. Many of the shales, limestones, and ironstones above the coals contain marine fossils. The coals are believed to have formed in broad fresh-water marshes somewhat like the Dismal Swamp of Virginia. Most of the sandstones, conglomerates, underclays, underclay limestones, and some shales probably accumulated in fresh-water environments such as river valleys, lagoons, lakes or lowland plains. There is no area in the world today that has conditions like those that existed during "Coal Measures" time.

The plants and trees that grew in "Coal Measures" time grew in lush profusion. In the jungle-like growths the plants most common were huge tree ferns that had fronds five or six feet long and grew to a height of more than 50 feet. Along with them were seed ferns, now extinct, giant scouring rushes, and large scale trees, which grew to heights of 100 feet or more.
The large scale trees we find preserved in the coals do not have growth rings. The luxuriant growth and lack of growth rings probably indicate that the climate that prevailed at this time was warm and without seasonal change. As the plants fell into the swampy waters they were partially preserved, buried by later sediments and converted into coal.

0.4 25.8 STOP. Continue ahead on the United Electric Coal Company's hauling road.

0.7 25.5 Turn right (north).

0.8 26.3 Turn left (west).

0.8 27.1 Stoplight on Highway 1.

0.4 27.5 STOP. CAUTION. Crossing the Wabash Railroad.

0.2 27.7 Entrance to Catlin road.

0.3 28.0 Stop and go lights.

0.3 28.3 Notice the general refractory plant on the right. This plant uses clay shipped from Indiana. There are no accessible refractory clays in the Danville area. For the past several miles leaving Tilton we have been going across an extremely flat expanse of the till plain of the Urbana Moraine.

3.0 31.3 Notice the abandoned coal mine in the Grape Creek (No. 6) Coal. The coal here is more than 6 feet in thickness whereas the No. 7 Coal is only about three feet in thickness and some 60 to 70 feet above No. 6 Coal.

0.6 31.9 SLOW. Turn left (east) City of Catlin.

0.1 32.0 Caution in crossing the Wabash Railroad.

1.0 33.0 SLOW. Turn right (south).

0.7 33.7 Stop 7. Large kame 1 mile to the west on edge of Urbana Moraine.

This kame is similar to the one seen at Stop 1 except much larger. Well records indicate that it is composed of sand and gravel.

A shallow coal mine southwest of this kame had considerable water trouble. It is suspected that the large water holding capacity of the sands and gravels in this kame was largely responsible for the excess mine water.

This kame is at the back of the Urbana Moraine. The Urbana has many associated kames, indicated by at least three other smaller kames in this immediate area.

0.4 34.1 SLOW. Turn right (west).
1.0 35.1 STOP. Turn right (north). Note the abandoned coal dump pile on the lefthand side beside the kame. This kame could conceivably be an adequate water supply for Catlin. The kame is 40 feet high.

1.0 36.1 CAUTION crossing Wabash Railroad tracks.

0.1 36.2 SLOW. Turn left (west).

0.1 36.3 STOP. 4-way. Continue ahead.

1.5 37.8 Road continues ahead on the flat Wisconsinan Ground Moraine.

5.6 43.4 CAUTION. Turn left (south) and enter the Fairmount road.

0.7 44.1 SLOW. Entering the town of Fairmount.

0.4 44.5 Wabash Railroad. Crossing 2 sets of tracks. CAUTION.

0.0 44.5 Continue south on Fairmount road.

0.8 45.3 A number of years ago a coal mine in the town of Fairmount was developed in the No. 7 Coal at a depth of about 150 feet. The coal was about 5 feet in thickness.

0.9 46.2 The Fairmount Quarry entrance. Continue ahead (south).

1.2 47.4 Notice the spoils on the righthand side where the quarry has been operating.

0.3 47.7 SLOW. Turn right (west) on the south wide of the Fairmount Quarry.

0.7 48.4 Stop 8. South end of Fairmount Quarry.

The quarry is in Livingston Limestone of Pennsylvanian age, which is younger than any of the beds seen previously. The limestone is of marine origin and good fossils may be collected. These are principally brachiopods, but bryozoa, cup corals, and crinoidal remains also occur. The floor of the quarry is greenish gray marine shale with fossils.

The Pleistocene ice sheets passed over the upper surface of the limestone and smoothed and striated it. The limestone is overlain by clayey glacial till full of pebbles of many kinds, some transported from the far north. Many show very conspicuous glacial striations.

Only a small area in this vicinity is underlain by the Livingston Limestone. This limestone is the youngest bedrock in the area and is preserved in the Sidell Syncline. A syncline is a down fold in the rocks. The youngest rocks are always found in the center of synclines.

End of Trip

Revised & Reprinted, Nov. 1965
<table>
<thead>
<tr>
<th>ERA</th>
<th>SYSTEM</th>
<th>SERIES OR GROUP</th>
<th>REMARKS</th>
</tr>
</thead>
</table>
| Cenozoic | Quaternary | Pleistocene      | Recent (post-glacial)  
Sangamonian (interglacial)  
Illinoian (glacial) |
|       |          | Pliocene          | Not present in the Georgetown area                                      |
|       |          | Miocene           |                                                                           |
|       |          | Oligocene         |                                                                           |
|       |          | Eocene            |                                                                           |
|       |          | Paleocene         |                                                                           |
| Mesozoic | Cretaceous |                 | Not present in the Georgetown area                                      |
|        | Jurassic  |                  | Not present in Illinois                                                  |
|        | Triassic  |                  | Not present in Illinois                                                  |
|        | Permian   |                  | Not present in Illinois                                                  |
|        |          | McLeansboro       | Livingston (Fairmount)  
Limestone  
Lonsdale Limestone |
|        | Pennsylvanian | Kewanee         | Danville (No. 7) Coal  
Grape Creek (No. 6) Coal |
|        |          | McCormick         | In deep wells only                                                       |
| Paleozoic | Mississippian | Valmeyeran    | Chiefly shales found in deep wells in Georgetown area                      |
|        | Devonian  |                  | Dark shales and limestones in deep wells                                 |
|        | Silurian  |                  | No data available                                                        |
|        | Ordovician |                 | No data available                                                        |
|        | Cambrian  |                  | No data available                                                        |
|        | Referred to as Precambrian. |          | No data available                                                        |
# Time Table of Pleistocene Glaciation

*After J. C. Frye and H. B. Willman, 1960*

<table>
<thead>
<tr>
<th>Stage</th>
<th>Substage</th>
<th>Nature of Deposits</th>
<th>Special Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recent</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Years Before Present</td>
<td>Soil, youthful profile of weathering, lake and river deposits, dunes, peat</td>
<td>Outwash along Mississippi Valley</td>
</tr>
<tr>
<td>RECENT</td>
<td>5,000</td>
<td>Valderan Outwash</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11,000</td>
<td>Twocreekan Peat and alluvium</td>
<td>Ice withdrawal, erosion</td>
</tr>
<tr>
<td></td>
<td>12,500</td>
<td>Woodfordian Drift, loess, dunes, lake deposits</td>
<td>Glaciation, building of many moraines as far south as Shelbyville, extensive valley trains, outwash plains, and lakes</td>
</tr>
<tr>
<td><strong>Wisconsin</strong></td>
<td>22,000</td>
<td>Farmdalian Soil, silt and peat</td>
<td>Ice withdrawal, weathering, and erosion</td>
</tr>
<tr>
<td>(4th Glacial)</td>
<td>28,000</td>
<td>Altonian Drift, loess</td>
<td>Glaciation in northern Illinois, valley trains along major rivers, Winnebago drift</td>
</tr>
<tr>
<td></td>
<td>50,000 to 70,000</td>
<td>SANGAMONIAN Soil, mature profile of weathering, alluvium, peat</td>
<td></td>
</tr>
<tr>
<td><strong>Sangamonian</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(3rd interglacial)</td>
<td>Buffalo Hart</td>
<td>Drift</td>
<td>Glaciers from northeast at maximum reached Mississippi River and nearly to southern tip of Illinois</td>
</tr>
<tr>
<td></td>
<td>Jacksonville</td>
<td>Drift</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liman</td>
<td>Drift, loess</td>
<td></td>
</tr>
<tr>
<td><strong>Illinoian</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3rd glacial)</td>
<td></td>
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</tr>
<tr>
<td><strong>Yarmouthian</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2nd interglacial)</td>
<td></td>
<td>Soil, mature profile of weathering, alluvium, peat</td>
<td></td>
</tr>
<tr>
<td><strong>Kansan</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2nd glacial)</td>
<td></td>
<td>Drift, Loess</td>
<td>Glaciers from northeast and northwest covered much of state</td>
</tr>
<tr>
<td><strong>Aftonian</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1st interglacial)</td>
<td></td>
<td>Soil, mature profile of weathering, alluvium, peat</td>
<td></td>
</tr>
<tr>
<td><strong>Nebaskan</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1st glacial)</td>
<td></td>
<td>Drift</td>
<td>Glaciers from northwest invaded western Illinois</td>
</tr>
</tbody>
</table>
GLACIAL MAP OF NORTHEASTERN ILLINOIS

GEORGE E. EKBLAW
Revised 1960
AN IDEALLY COMPLETE CYCLOTHEM

(Reprinted from Fig. 42, Bulletin No. 66, Geology and Mineral Resources of the Marseilles, Ottawa, and Streator Quadrangles, by H. B. Willman and J. Norman Payne)
GEOLOGIC MAP OF ILLINOIS

showing

BEDROCK BELOW

THE GLACIAL DRIFT

1961

KEY

- Tertiary
  (Pliocene omitted)

- Cretaceous

- Pennsylvanian
  (Above No. 6 Coal)

- Pennsylvanian
  (Below No. 6 Coal)

- Mississippian
  (Upper)

- Mississippian
  (Middle and Lower)

- Devonian

- Silurian and Devonian

- Silurian

- Ordovician

- Cambrian

- Fault

- Complex faulted area

MILES
BRYOZOANS

Rhombopora

ARCHIMEDES

BRACHIOPODS

Archimedes

Pentremites

CRINOIDS

Pterocrinus

PLATYCORNUS

BLASTOIDS

Pentremites

CORALS

Leptoeno

SPIRIFERINA

COMPOSITA

Spirifer

Pugnoides

GIRYELLA

Orthotetes

Schuchertella

Echinoconchus