EARTH SCIENCE FIELD TRIP

GUIDE LEAFLET

WILMINGTON AREA

GRUNDY AND KANKAKEE COUNTIES

WILMINGTON, DWIGHT, MORRIS, HERSCHER QUADRANGLES

Leaders
George M. Wilson, I. Edgar Odom

Urbana, Illinois
May 16, 1959

GUIDE LEAFLET 1959C
HOST: WILMINGTON HIGH SCHOOL
WILMINGTON FIELD TRIP ITINERARY

0.0 0.0 Leave the parking lot of Wilmington High School. Turn right.
0.2 0.2 Stop. Continue ahead.
0.3 0.5 Caution in entering Route Alternate 66. Turn left.
0.1 0.6 Corner of Water and Main Streets.
0.1 0.7 Turn over a bridge over part of the Canal system, installed about 1840 in an attempt to develop river transportation.
0.2 0.9 Bridge over Kankakee River.

Note the spoil pile on the right-hand side from a mine in the No. 2 coal. Note also an outcrop of Maquoketa shale on the right-hand side and south bank of the river.

0.4 1.3 Turn left (south) on Route 1138.
0.3 1.6 Note the sandy nature of the soil in the river valley. This sand is a result of the Kankakee Torrent which came at the close of Valparaiso Time. Note far to the south the spoil piles of a stripping operation in the No. 2 coal.

Reference has been made to the Kankakee Torrent, and we feel that an explanation of some sort is necessary before you can properly appreciate its significance. The material that comprises the soil in most of Illinois is of glacial origin whether it is a soil developed in glacial drift, outwash material, or loess, a wind-blown material of glacial origin. In any event, the soils of northern Illinois are developed in material transported by continental glaciers which invaded the North American continent, in fact the Northern Hemisphere, at least at four major times during the Pleistocene or "Ice Age."

The earliest glaciation was the Nebraskan stage, followed by the Kansan, then the Illinoian, and the last stage, with which we will be primarily concerned today, called the Wisconsin. Within the Wisconsin stage of glaciation alone, we have record of at least thirty-four or thirty-five separate advances as they are recorded in the morainic hills which you find in going north or south along Route 45 or Route 47. The farthest advance of the Wisconsin stage of glaciation reached as far south as Paris, Shelbyville, and Decatur; and reached as far west as the Rock Island area. After each advance, for some reason, the ice would retreat and oftentimes great lakes or ponds would develop behind the moraine and in front of the melting ice. Today we actually will be working on or near the Minooka Moraine and the backslope of the Marseilles moraine which lies to the south and west of us. A large lake, called Wauponsee, once existed in this area between the Marseilles and Minooka moraines at the time of the Kankakee Torrent.
The Kankakee Torrent resulted when a break in the Valparaiso Moraine to the northeast suddenly released a great torrent of water down the Kankakee River Valley. We will discuss this further at Stop 1.

0.8 2.4 Note the terrace on the left-hand side of the road. This terrace has developed since the Kankakee Torrent.

0.7 3.1 Note the elongate sandbar on the right-hand side of the road.

0.4 3.5 Stop. Continue ahead.

1.3 4.8 Descending from upland terrace. Note the sand and gravel between five and ten feet above the level of the highway on the right.

0.3 5.1 Cross Horse Creek.

0.2 5.3 Slow, caution, railroad crossing.

0.5 5.8 Outcrop of Silurian dolomite on right.

0.6 6.4 Slow. Turn right. Note the sandy nature of this black soil but also note the number of large glacial erratic boulders which are to be found on this very flat upland.

1.6 8.0 Note the very sandy nature of the soil. This is part of the Kankakee Torrent area.

0.7 8.7 Turn right (west).

0.1 8.8 Note the sand dunes on left.

1.0 9.8 Turn left.

0.7 10.5 Note the small outcrop on right-hand side of the road in the ditch. This is of lowermost Silurian Age.

1.0 11.5 Note the sandy subsoil on the left in the ditch and the subsequent oxidation of the subsoil with the discoloration of iron. Also note the very rapid erosion that takes place.

0.0 11.5 STOP 1. Contrasting the sandy soil against the peaty soil which has developed in this particular zone. Here the soil is an accumulation of peat that has accumulated in this bog.

The Marseilles Moraine, which is a very large moraine in the northeast central portion of Illinois, advanced down the Illinois River Valley and a great quantity of water was ponded behind this Marseilles Moraine as the Marseilles ice retreated. There are some outlets which one encounters that developed with the breaching of the moraine when the level of the lake water reached a sufficient level to flow over the lowest points. Later, with readvance of the ice, the Minooka Moraine was
developed within this basin which we shall call the Morris basin. However, much of the Minooka Moraine was swept away by the Kankakee Flood or Kankakee Torrent. The Kankakee Flood occurred when the ice melted from the Valparaiso Moraine. The Valparaiso Moraine, too, was a very large, high moraine and a great quantity of water was ponded behind it. Meltwaters from many miles of ice front was concentrated in the Kankakee Valley. At the same time, great floods came down the Des Plaines and DuPage valleys. These floods scoured the bedrock intensively and in some areas formed bars of bouldery gravel. Later in the day we will see some of this bouldery gravel which has accumulated in channels which were cut during the time of this flood. At the peak of the flow into the Morris basin, the outlet through the Marseilles Moraine at Marseilles was inadequate. The water spread over the entire region behind the Moraine forming Lake Wauponsee at a water level of 640 feet above sea level.

With the retreat of the Valparaiso ice, the waters declined and Lake Wauponsee was drained. The outlet through the Marseilles Moraine was cut down and Lake Chicago formed behind the Valparaiso and Tinley moraines. At a time when the St. Lawrence River was blocked by glaciers, most of the Great Lakes discharged through the Chicago outlet into the Des Plaines Valley. The outlet river had a broad lake-like expansion in the Morris basin and eroded the distinctive ridges which have been called the Cuyler Lake beach ridges at a level of 540 feet. Kankakee River Valley is only slightly entrenched within the floor of the ancient glacial rivers.

0.1 11.6 Turn right (west). In some areas the elongate sandbars have a base of very coarse rubble, which would indicate that these bars accumulated at times of extremely high and fast-moving water.

1.0 12.6 Caution. T-road north over Horse Creek. Turn right.

0.2 12.8 Turn left (south). Note the glacial till lying on top of pockets of gravel.

0.1 12.9 Note the large amount of dolomite gravel in the recently dug drainage ditch.

0.7 13.6 Note the large sand dune which we are crossing.

Slow. Entering the village of Essex.

1.1 14.7 Stop. Continue ahead.

0.1 14.8 Danger - railroad tracks, three sets.

0.1 14.9 Turn half left.

0.3 15.2 Turn half right. Continue ahead (south). We are still on the Kankakee Torrent Plain.

0.7 15.9 Note the extreme flatness of the ground here and also note the strip mine spoil piles on the right and left.

0.3 16.2 Cross small stream.
0.7 16.9 Cross Granary Creek.
0.3 17.2 Turn left into Peabody Strip Mine.
1.0 18.2 Turn left.
0.3 18.5 Turn right.
0.6 19.1 STOP 2. Descend into the strip pits of the Northern Illinois Coal Co. Here some 40 to 50 feet of glacial drift lies on top of the Coal Measures. Then some five feet of shale, then two to three feet of coal, and from six inches to two feet of shale parting the upper coal from the lower coal. The lower coal is here some three feet thick, with about ten feet of silty underclay and 10 to 15 feet of shale overlying the lowermost coal which is here some two to three feet thick. The section is as follows:

<table>
<thead>
<tr>
<th>Layer Description</th>
<th>ft.</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glacial till overlying the Coal Measures</td>
<td>40-50</td>
<td></td>
</tr>
<tr>
<td>Shale, gray, thinly laminated</td>
<td>0-15</td>
<td></td>
</tr>
<tr>
<td>Limestone, light gray, dense, occurs as a layer of nodular limestone masses</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Shale, light gray, calcareous, poorly bedded</td>
<td>0-6</td>
<td></td>
</tr>
<tr>
<td>Coal - relatively dull, thin shale bed 2 inches from base</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Shale, black, very carbonaceous, numerous coaly streaks, pyritic</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Shale, gray, slightly carbonaceous, poorly laminated</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Limestone, light gray, dense, hard, may be fossiliferous, basal contact irregular</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Shale, light grey, pyritic</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Shale, gray to dark gray, carbonaceous</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Coal, &quot;Cardiff coal&quot;</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Shale, gray, carbonaceous, thinly laminated</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Shale, light grey, thinly laminated, contains coalified plant remains</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Shale, similar to above but not as thinly laminated, many plant fossils</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Coal - No. 2 coal</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

0.5 19.6 Back at the roadway. Note the soil profile on the right.

0.4 20.0 STOP 3. A and B zone is developed in the sandy alluvium with a coarse rubble band some 6 to 18 inches thick at the base and followed by a C zone of glacial till that is quite firm but pebbly with many dolomitic pebbles.

0.2 20.2 Turn left (west).

1.0 21.2 Note the gravelly till on the left. The abandoned red spoil piles on the landscape are in general the result of underground long-wall operations which took place nearly a half-century ago.
0.8 22.0  Slow. Enter village of East Brooklyn.
0.2 22.2  Enter village of South Wilmington.
0.7 22.9  Turn right (north). Elevation of 590. The obvious effects of the Kankakee Glacial Torrent seem not to be present.
2.1 25.0  Turn left (west). Note the thin edge of coarse gravelly material lying on the glacial till and the B zone in the soil profile on the left.
0.5 25.5  Stop. Turn right, entering Route 66 Alternate, with caution.
0.5 26.0  Cross Mazon River. It was on the banks of Mazon River some fifteen miles west of here that the world-famous Mazon Creek fossils were originally found. These fossils are found in the shale overlying the No. 2 coal.
1.5 27.5  Slow. Enter the village of Braceville.
0.8 28.3  Danger. Railroad crossing.
1.7 30.0  Note the elongate sand ridges roughly right angles to the highway.
1.1 31.1  Railroad crossing. Railroad inoperative.
0.2 31.3  Slow. Enter the village of Braidwood.
0.3 31.6  Stop. Crossing 113S. Continue ahead on Route 66A.
0.9 32.5  Note the strip-mined area on right and left.
2.3 34.8  Note the boulder-strewn pasture on the left, indicating that the surficial material has been washed away from these boulders during the Kankakee Flood.
0.5 35.3  Note the sand-digging operation in the large bar on the left.
0.6 35.9  Again crossing the Kankakee River.
0.4 36.3  Traffic lights.
1.1 37.4  Slow. Turn right.
0.3 37.7  Stop. Continue ahead.
0.2 37.9  STOP 4. LUNCH. Wilmington High School.
0.3 38.2  Stop. Continue across No. 113N. T-road east.
0.2 38.4  Continue ahead. Road continues ahead - take road, however, half right.
0.2 38.6  Slow. Caution. Cross locks of old canal.
0.3 38.9  Fossiliferous limestone - a member of the Maquoketa shale on left at river's edge.
0.2 39.1 Stop. Turn right (north) entering Route 66 Alternate.

0.1 39.2 Turn left (west) entering Island Park. Bear right.

0.2 39.4 STOP 5. Here another limestone member of the Maquoketa shale is fossiliferous. Across the stream from us is a waste pile from a mining operation in the No. 2 coal, yet at river level there are fossiliferous limestone stringers in the Maquoketa shale. The contact between the Pennsylvanian and the underlying Maquoketa is very close; that is to say that if rocks of Silurian, Devonian, and Mississippian ages did exist here, they were long since eroded away before the deposition of the No. 2 coal. Almost certainly Silurian rocks did cover this territory for only a very short distance away, less than a quarter of a mile to the east, Silurian rocks are to be found.

In earliest Paleozoic times, the sea spread widely over the interior of the North American Continent, and in the northern Illinois region sediments were deposited which later became sandstone, shale, and dolomite. Only a few of the Cambrian sediments outcrop in Illinois. But with the beginning of Ordovician times, the seas again covered much of the North American Continent and most of the limestone sediments in this particular region were deposited on a platform much like the Bahama Banks at the present time, except on a much larger scale. However, there were occasionally sediments which were introduced as well as the limestone. Of these the St. Peter Sandstone and the New Richmond Sandstone are in particular significance in Northern Illinois.

At the end of Lower Ordovician time there was a period of emergence during which some of the previously formed limestone sediments were removed. In Middle Ordovician time a thick sequence of sand was deposited over much of the Mid-Continent area which we now call the St. Peter Sandstone. The St. Peter outcrops on the crest of the LaSalle anticline in the vicinity of Starved Rock. Near the close of Middle Ordovician time there was once again active deposition of limestone. Limi sediments were the principal type laid down in the area well into the upper portion of Ordovician, and now form the Plattville and Galena formations. Later, however, the sediments changed to mud interrupted here and there by limestone deposits. These muds and sporadic limestones now make up the Maquoketa formation, the youngest Ordovician formation. At various places during Maquoketa time unusual ecologic conditions permitted the growth of abundant animal life. For instance, in many Maquoketa limestone members, such as this one, you can often find beautifully preserved Brachiopods and other fossils.

Although we often speak of the LaSalle anticline when discussing the geology of this region, we properly should apply the name monocline to this notable structure because the west side of the structure dips or slopes much steeper than the east side. The Wilmington area is on the east or gently dipping side of the structure, thus the rocks dip or slope very gently to the east.

In the Pennsylvanian or Coal Measures Period, the first rocks to cover the exposed Ordovician in this section of the country were these associated with the No. 2 Coal, that you can see here across the Kankakee River. Note here that the coal is in very close proximity to the Maquoketa Shale.
Down the Illinois River in the vicinity of Buffalo Rock the condition is similar except that the No. 2 coal at Buffalo Rock lies directly on the St. Peter Sandstone.

0.2 39.6 Stop. Turn left, re-entering Route 66A.

0.2 39.8 Traffic lights. Continue ahead.

0.1 39.9 Turn left (west).

0.1 40.0 Stop. Continue ahead.

0.2 40.2 Caution: Three sets of tracks. Two more sets of tracks.

0.1 40.3 Fossil collecting spot in the Maquoketa shale on Jordan Creek is now rather inaccessible. Excellent fossils are to be found here.

0.5 40.8 Stop. Turn left (south). Follow winding river road. River road is quite rough with many small holes worn out of the blacktop.

0.8 41.6 Note the high terrace level here.

0.4 42.0 Note the lower terrace level developed in the Kankakee River valley.

1.5 43.5 STOP 6. (Leave hammers in the cars.)

This stop is used to show you the contact between the Kankakee and the underlying Niagaran. A smooth surface between rocks of different lithology, such as we have here, is one of the criteria used by geologists for dividing a rock sequence into formations. Another criteria is a change in fossil content or a zone of a particular kind of fossil. About 15 inches below the smooth surface is a zone of large Silurian Brachiopod which we call the "Sticklandia zone." This zone is very characteristic of these rocks over a large portion of the state.

0.9 44.4 Stop. Use extreme caution in entering Route 66. Turn left (south).

0.1 44.5 Crossing Kankakee River on Route 66. A four-lane highway. T-road west. Caution.

1.3 45.8 Again note the extreme flatness of this upland surface.

1.2 47.0 Slow. Turn left on 113S.

0.8 47.8 Caution. Railroad crossing.

0.2 48.0 Stripped over acreage in No. 2 coal stripping operations.

0.8 48.8 Slow. Coal City road. Turn right.

2.1 50.9 Junction with Coal City road. Overpass over Route 66.
Turn hard right.

Turn half left on blacktop road paralleling Route 66.

Nearing the property of the Greer Technical Institute which specializes in teaching the method used in earth-moving equipment.

Turn right in the parking area.

Turn left.

Turn right and left.

Turn left. Continue ahead for nearly one-half mile for best plant fossil collecting.

STOP 7. Anywhere along the area where you have parked should be satisfactory for the collection of plant fossils. The plant fossils are in brown ironstone concretions. The procedure is to turn them on edge, split them open and hope that you have a good fossil. The fossils that you can find range from plant fossils of very ordinary design to seed cones, to fishes, spiders, crustaceans, trilobites. True, most of the specimens which you find are plant fossils, but the others are sufficiently numerous to make it worthwhile to try to collect them.

The rocks of the Coal Measures or the Pennsylvanian System cover some 35,000 square miles in the state. One of the unusual features of the Pennsylvanian rocks is that at many places they overlap the underlying formations which range in age from Mississippian to at least Ordovician.

The Caseyville group of the Pennsylvanian System is composed primarily of sandstones, underclays, thin coals, and silty shales; whereas, the Tradewater, Carbondale, and McLeansboro groups are subdivided in a fashion which has been idealized to contain ten members called a cyclothem. The members of a cyclothem go in this fashion from bottom to top: sandstone, shale, limestone, underclay, coal, shale, limestone, shale, limestone, and shale. In only a few instances does one find a cyclothem to be complete in itself. Normally, there are only seven members or less present. During the Pennsylvanian, it has been visualized by the Pennsylvanian stratigraphers or the theorists that much of eastern North America was a vast inland swamp. At which times the water levels were particularly critical only a few inches of change in water levels could cause the difference in the deposition of siltstones, sands, underclays, coaly materials, or limestones.

At Stop 7 we are dealing with the No. 2 coal which is near the base of the Pennsylvanian in this region, though in southern Illinois in many instances there are 1200 feet of sediments. The underclay beneath the No. 2 coal is used extensively as a source of ceramic material, and, in fact, only a short distance to the west Goose Lake clays have been used by the Illinois Clay Products Company for many years in the manufacture of ceramic materials, especially fire brick which are used in the iron and steel industry. The No. 2 coal is the most extensive coal
in the state, covering virtually all of the 35,000 square miles of coal-bearing rocks. Although the coal is never very thick, seldom exceeding five feet and more, often between two and three feet thick, the reserves of this coal are extensive. Where we are today, gentle folding associated with the formation of the LaSalle anticline has brought the No. 2 coal at or near the surface, and as a result many square miles of this coal have been mined by the stripping methods, leaving vast amounts of gray shale which overlies the coal in the long sinuous spoil heaps which you see. Within this shale we find brown ironstone concretions which were originally siderite or iron carbonate, but through processes of weathering their exterior has been altered to a hydrated iron oxide which we will call limonite. Within these concretions, are often found impressions of various sorts, such as stems of the fossil plants which grew during Pennsylvanian time, some 200 or more million years ago. Often leaves, of various sorts, are preserved, and more rarely the fruiting bodies are found. Rarely, we find such things as fossil spiders, fossil worms, fishes, horseshoe crabs, and things of this sort.

I ask your particular indulgence today to take care that we will be welcome to return to this fossil collecting spot again for much of the stripped over ground has been closed to the general public.


With this I bid you adieu for the spring of 1959. We will see you again this fall.
### GEOLOGICAL COLUMN - WILMINGTON AREA

<table>
<thead>
<tr>
<th>ERAS</th>
<th>PERIODS</th>
<th>EPOCHS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proterozoic</td>
<td></td>
<td></td>
<td>Referred to as &quot;Pre-Cambrian&quot; Time.</td>
</tr>
<tr>
<td>Archeozoic</td>
<td></td>
<td></td>
<td>Metamorphic and crystalline rocks.</td>
</tr>
<tr>
<td>Paleozoic</td>
<td>Age of Amphibians</td>
<td>Silurian</td>
<td>Dolomite.</td>
</tr>
<tr>
<td>&quot;Ancient Life&quot;</td>
<td>and Early Plants</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Devonian</td>
<td>Not present in Wilmington area.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mississippian</td>
<td>Iowa (Lower Mississippian)</td>
<td>Not present in Wilmington area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chester (Upper Mississippian)</td>
<td>Not present in Wilmington area.</td>
</tr>
<tr>
<td></td>
<td>Pennsylvanian</td>
<td>Carbondale</td>
<td>Present in Essex area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tradewater and Caseyville</td>
<td>Shale, coal, underclay, sandstone, siltstone - in sinks</td>
</tr>
<tr>
<td>Mesozoic</td>
<td>Age of Reptiles</td>
<td>Permian</td>
<td>Probably not present in Wilmington area.</td>
</tr>
<tr>
<td>&quot;Middle Life&quot;</td>
<td></td>
<td>Not present in Illinois</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Triassic</td>
<td>Not present in Illinois</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jurassic</td>
<td>Not present in Illinois</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cretaceous</td>
<td>Not present in Wilmington area.</td>
<td></td>
</tr>
<tr>
<td>Cenozoic</td>
<td>Age of Mammals</td>
<td>Quaternary</td>
<td>Recent post-glacial stage Wisconsin drifts</td>
</tr>
<tr>
<td>&quot;Recent Life&quot;</td>
<td></td>
<td>Pliocene</td>
<td>Not present in Wilmington area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Miocene</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Oligocene</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>Eocene</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Paleocene</td>
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Proterozoic
Archeozoic
"Early Life"
"Pre-Cambrian" Time.
OUTLINE OF THE PHYSIOGRAPHIC AND GLACIAL HISTORY
of the
MARSEILLES-OTTAWA AREA

by H. B. Willman

(Based largely on studies by M. M. Leighton, George E. Ekblaw, Leland Horberg, and H. B. Willman)

Pliocene Epoch

Development of the Central Illinois peneplain with a relatively flat surface across the La Salle anticline.

Deposition of chert gravel in channels, as near Ottawa.

Pliocene and/or Pleistocene Epochs

Dissection of the peneplain leaving a north-south divide on the La Salle limestone on the west slope of the La Salle anticline.

Drainage west from the divide to the Ancient Mississippi River which then was flowing east from the Rock Island region to the present course of Illinois Valley below the "big bend" at Bureau. Drainage east to a south-flowing river near Morris.

Pleistocene Epoch

Nebraskan Glacial Stage

Invasion of western Illinois by an ice sheet from the Keewatin center. Weathering in the La Salle area.

Aftonian Interglacial Stage

Weathering in the La Salle area.

Kansan Glacial Stage

La Salle area covered by an ice sheet moving southwestward from the Labradorian center. Diversion of east-flowing streams westward across the La Salle anticline and erosion of Ticona Valley, a few miles south of the present Illinois Valley, to a depth of over 200 feet.

Yarmouth Interglacial Stage

Deep weathering and erosion of Kansas drift. Drainage along Ticona Valley, to the Ancient Mississippi Valley.

Illinoian Glacial Stage

La Salle area again covered by Labradorian ice and the earlier drift eroded except along the valleys. Major valleys not completely filled with drift so that on retreat of the ice, rivers were re-established in the Ancient Mississippi and Ticona Valleys.

Sangamon Interglacial Stage

Deep weathering of Illinoian drift. Local accumulation of peat and alluvium.

Wisconsin Glacial Stage

Farndale Substage

Deposition of loess probably from a valley-train along Ancient Mississippi Valley, followed by a short interval of weathering.
Valley-train along the Ancient Mississippi Valley from the Keewatin ice sheet which crossed Iowa to the Mississippi Valley. Deposition of loess in the La Salle area.

Ice advanced from Labradorean center, crossed the La Salle area and deposited the Shelbyville moraine. Mississippi River diverted westward to the present channel. On retreat of the Shelbyville glacier, the Ancient Mississippi Valley was blocked at Peoria by the Shelbyville moraine forming Lake Kickapoo which extended up Ticona Valley into the La Salle area.

Repeated readvance and retreat of the ice, building several moraines behind the Shelbyville moraine in east central Illinois, filling Ticona Valley, and leaving the lowest drainage channel at the present position of Illinois Valley.

Readvance of the ice and deposition of the Bloomington-Normal moraines, again blocking drainage at Peoria and forming Lake Illinois at an elevation of 600 feet A.T.

Building of deltas in Lake Illinois by melt-waters from the retreating ice-front.

Repeated readvance and retreat of the ice-front depositing, consecutively, the Cropsey moraines west of La Salle and the Farm Ridge and Marseilles moraines east of La Salle. Deltas formed in Lake Illinois.

Retreat of the ice front from the Marseilles moraine. Fox Valley Torrent eroded the dam of Lake Illinois at Peoria and drained the lake.

Readvance of the ice and deposition of the Minooka, Rockdale, and Valparaiso moraines.

The Kankakee Torrent, at the beginning of Valparaiso retreat, discharged a larger volume of water into Illinois Valley than the valley could carry, and the water spread widely over the uplands forming lakes between the moraines at a maximum elevation of about 650 feet. Upland surfaces were channeled and benches were eroded, especially where the waters were concentrated through the moraines, as north of Split Rock.

Declining waters of the Kankakee Torrent eroded channels as low as 540 feet, the top of Buffalo Rock and Starved Rock.

Readvance of the ice and deposition of the Tinley moraine behind the Valparaiso. On retreat of the ice-front, Lake Chicago was formed between the ice and the moraine. Outlet along Des Plaines and Illinois Valleys.

Overflow from Lake Chicago (Outlet River) eroded Illinois Valley to the level of the Ottawa terrace, the rock bench which covers all the valley floor at Ottawa except the narrow channel occupied by Illinois River. Tributary valleys were left hanging, resulting in development of canyons, as in Starved Rock Park.
During the late stages of Lake Chicago channels were eroded in the Ottawa terrace and coarse gravel, consisting largely of Niagaran dolomite from the Chicago region, was left in the channels, as near Buffalo Rock.

Outlet River covered the valley from bluff to bluff and a small falls or cascade half a mile east of Buffalo Rock was retreating headward when the Chicago outlet was abandoned.

The declining waters of Lake Chicago eroded only a narrow channel in the Ottawa terrace east of Utica where the terrace is underlain by St. Peter sandstone and the Shakopee and Platteville dolomites. Farther west the relatively soft Pennsylvanian rocks were easily eroded and only remnants of the terrace remain. Recent alluvium covers the entire valley floor.

(For further details and references see Illinois Geological Survey Bulletin 66, pp. 140-180, 204-230.)
Shale, gray, sandy at top; contains marine fossils and ironstone concretions especially in lower part.

Limestone; contains marine fossils.

Shale, black, hard, laminated; contains large spheroidal concretions ("Niggerheads") and marine fossils.

Limestone; contains marine fossils.

Shale, gray; pyritic nodules and ironstone concretions common at base; plant fossils locally common at base; marine fossils rare.

Coal; locally contains clay or shale partings.

Underclay, mostly medium to light gray except dark gray at top; upper part noncalcareous, lower part calcareous.

Limestone, argillaceous; occurs in nodules or discontinuous beds; usually nonfossiliferous.

Shale, gray, sandy.

Sandstone, fine-grained, micaceous, and siltstone, argillaceous; variable from massive to thin-bedded; usually with an uneven lower surface.

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)
COMMON TYPES of ILLINOIS FOSSILS

- **GRAPTOLITE**
- **Cup coral**
- **Lithostrotion**
- **Honeycomb coral**

- **CORALS**
- **Archimedes**
- **Fenestella**

- **CYSTOID**
- **Branching**

- **CRINOID**
- **PENTREMITE**

- **BRYOZOA**
- **BRACHIOPODS**
- **Lingula**
- **Orbiculoidea**
- **Spiriferoid**
- **Productoid**
- **Pentameroid**

- **M. M. C.**
COMMON TYPES of ILLINOIS FOSSILS

PELECYPODS

"Clam"  "Scallop"

PELECYPODS

Low-spired

High-spired

Flat-spired

GASTROPODS

Curved cone

Coiled cone (Nautilus)

CEPHALOPODS

Straight cone

OSTRACODS (greatly enlarged)

TRILOBITES

Bumastus

Calymene (coiled)

Calymene (flat)
GLACIAL GEOLOGY OF NORTHEASTERN ILLINOIS
George E. Ekblaw
Revised 1957
GEOLOGIC MAP OF ILLINOIS
showing
BEDROCK BELOW
THE GLACIAL DRIFT
1961

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

0 10 20 30 40 50

ILLINOIS STATE GEOLOGICAL SURVEY, URBANA

(47669-15M-11-61)