GUIDE LEAFLET

GEOLOGICAL SCIENCE FIELD TRIP

Sponsored by
ILLINOIS STATE GEOLOGICAL SURVEY

DEKALB-ELYRON AREA

DeKalb, Ogle, and Winnebago Counties
DeKalb, Kirkland, Dixon, and Kings Quadrangles

Leader
William E. Powers
Urbana, Illinois
May 22, 1954
The DeKalb-Byron Geological Science Field Trip

Part 1

ITINERARY

0.0 0.0 Assemble at Science Building, Northern Illinois State Teachers College, DeKalb.

0.3 0.3 Turn west on U.S. 30. For the next 10 miles we cross drift of Bloomington age.

9.7 10.0 STOP 1. Road cut in typical Bloomington till. Till is pinkish tan, clayey, sticky, with few large stones. Leached of primary carbonates to depth of 3-3½ feet below surface.

1.2 11.2 Crest of highest Bloomington ridge just west of Creston. Turn north (right).

0.5 11.7 Roadside ditches show pinkish tan Bloomington till.

0.5 12.2 Jog east ½ mile. Continue north.

0.9 13.1 Valley of east branch Killbuck Creek is broad and mature. Erosion cycle is more advanced in older Wisconsinan drift (i.e., Woodfordian substage here) than in younger Wisconsinan drift nearer Lake Michigan (such as Valparaiso drift, Upper Woodfordian substage).

4.4 17.5 Descend outer slope of Bloomington moraine on to flat outwash plain of Wisconsinan age sand and gravel. This was pre-Illinoian valley of Rock River.

0.6 18.1 State Highway 64. Turn west (left).

2.9 21.0 Leave outwash plain and ascend slope of till plain of pre-Bloomington early Wisconsinan drift, called by Bretz the White Rock Moraine of the Belvidere glacial lobe. (Probably equivalent to Shelbyville moraine of central Illinois.) Primary carbonates are leached to depth of 4-4½ feet in this till.

3.0 24.0 Descend from Belvidere lobe drift to Illinoian till plain. The boundary is not clearly defined and topography differs little in the two areas. However, Illinoian drift is deeply weathered to gumbotil on little-eroded divides.

7.3 31.3 STOP 2. Road cut in Illinoian till. This cut has not been dug down previously but will presumably show deep leaching of carbonates and the development of a gumbotil zone in which most original silicate minerals are decomposed to clay minerals and only silicious pebbles remain.

0.2 31.5 Turn south (left) off of Highway 64.

5.1 36.6 Turn west (right) on Carthage road.

1.8 38.4 Turn north (right).

0.8 39.2 Turn west (left) into lane at mailbox marked "H. J. Campbell."
Cross creek and park in barnyard.

STOP 3. Old quarry in Oneota Dolomite lies just north of farm buildings on slope to creek. Quarry in Platteville dolomite lies 800 feet north of Oneota quarry, in NE 1/4 NW 1/4 NE 1/4 sec. 31, T. 23 N., R. 11 E.

In latter quarry, lower Platteville strata dip up to 10° to north. Rock strata exposed are as follows, from top downward:

**Grand Detour Formation:**

2' 0" Dement member - dolomite, non-shaly.

**Mifflin Formation:**

10' 0" Briton member - dolomite, argillaceous, thin-bedded;
   2" Calc. shale at base.

6' 8" Hazelwood member - dolomite, non-shaly, medium bedded;
   6" bed at base.

2' 1" Establishment member - dolomite, argillaceous and shaly,
   thin-bedded.

1' 9" Brickeys member - dolomite, slightly argillaceous, non-shaly.

3' 3" Boarman member - dolomite, argillaceous, green shale partings, very fossiliferous.

**Pecatonica Formation:**

11' 0" Medusa member - dolomite, wavy shale partings, chert nodules in lower part, strong ferruginous pitted corrosion surface on top. Top makes bench.

3' 2" New Glasus member - dolomite, pure, cherty, thick-bedded.

14' 3" Dane member - dolomite, cherty, thick-bedded; argillaceous next to bedding surfaces; strong bedding break at top.

Quarry floor lies about 350 feet higher stratigraphically than Oneota Dolomite in quarry to south. Sandwich Fault may pass between quarries, with upthrow on south.

0.0 39.8 Follow land east to main road.

0.5 40.3 Turn north (left). Follow road north and northwest.

4.1 44.4 Turn west (left) at "Watertown" T-road.

1.5 45.9 Turn north in Daysville.

2.0 47.9 Highway 64. Turn west (left). St. Peter Sandstone shows in roadside cuts along Highway 64 both west and east of here.

0.8 48.7 In Oregon, turn south (left) on Highway 2.

2.5 51.2 STOP 4. Devils Backbone. St. Peter Sandstone here is soft and poorly cemented. Cross beds dip north but formation dips to south. Pit is owned by Mr. Clyde Myers, who trucks sand to National Silica Company two miles northwest.
Delomite, pure, nonshaly, weathered to thin beds.

Delomite, argillaceous, moderately shaly, thin-bedded; 2" calcareous shale at base.

Delomite, pure, nonshaly, medium-bedded; prominent 6" bed at base.

Delomite, moderately argillaceous and shaly, thin-bedded. Delomite, slightly argillaceous nonshaly, thin- to medium-bedded. Delomite, argillaceous, thin bedded, with green shale partings; very fossiliferous.

Delomite, in medium beds with weak wavy shale partings, few chert nodules in lower part; strong ferruginous pitted corrosion surface at top.

Delomite, pure, cherty, thick-bedded.

Delomite, moderately argillaceous next to bedding surfaces, pure elsewhere, cherty, thick-bedded; strong bedding-break at top.
East of road in low gravel terrace of Wisconsinan age is gravel pit operated by Mr. Clyde Myers. Gravel is rather fine, mostly under one inch, and is overlain by 2-2¼ feet of sand with very thin humus zone at top. This gravel may have come from glacial lobe of Cary substage in Wisconsinan. The deposit forms a valley train terrace.

0.0 51.2 Return to Oregon and continue north on Highway 2.

4.0 55.2 Mason's Manor. LUNCH STOP. Outside tables are available for those who have brought their lunches. A view is obtained of the Blackhawk Statue by Lorado Taft, on opposite side of river.

0.0 55.2 After lunch, continue north on Highway 2. Rock River Valley here is narrow, with bedrock showing in many road cuts. The road follows low outwash terraces of Wisconsinan glacial age. This part of the river valley as far north as Camp Grant is post-Illinoian. Before the Illinoian, the Rock River south of Camp Grant flowed a little east of south, along the line of the present Killbuck Creek, passing between Monroe Center and Davis Junction. The Illinoian glacial lobe, from the east, forced Rock River to cut the new course from Camp Grant past Byron and Oregon, which it still holds. The ancient Troy River, parallel to the Rock, flowed southward in the present Kishwaukee River course past Cherry Valley, and continued southward along the present South Branch, Kishwaukee River, as far as Kirkland, whence it continued southward into the area now built up by Bloomington moraine. The Illinoian glacier destroyed the Troy River by filling parts of its valley, but the Kishwaukee River succeeded the Troy, and probably flowed westward just north of the Ogle-Winnebago County line to join lower Killbuck Creek and the Rock River south of Camp Grant.

The Belvidere glacial lobe of early Wisconsinan age advanced from the east and very probably crowded the lower Kishwaukee River out of this westward course so that it overflowed westward and cut the bedrock gorge through the upland east of New Milford (See STOP 7).

9.3 64.5 Byron. Turn north (left) in center of town.

0.9 65.4 STOP 5. Quarry in Platteville Dolomite. The members of the Platteville Series represented here have not been identified by the writer. About 12 feet of fresh till, presumably Illinoian in age, overlies about 60 feet of highly jointed blocky dolomite. Beds are from 2 to 12 inches thick. Color is mostly brownish buff but irregular blue-gray beds appear near middle of face. Fossils are sparingly present. Structure is nearly horizontal.

0.0 65.4 Return to Byron. Town is on gravel terrace of Wisconsinan Age. A large old gravel pit in northeast part of town has been made into a recreational park, with a small lake.

1.0 66.4 Continue south on Highway 72 after crossing Highway 2. Cross Rock River and continue east on Highway 72.

3.3 69.7 Cross low ridge marking outer limit of Belvidere lobe drift of early Wisconsinan age.
0.8 70.5 Stillman Valley. Turn north (left).

2.0 72.5 Turn east (right). Ridge across valley on south is Little Mound Esker.

1.5 74.0 Turn south (right) and park in pit in esker.

0.2 74.2 STOP 6. Gravel pit in esker. This gravel ridge was dropped by a sub-glacial stream at base of Belvidere glacial lobe. Gravel is moderately coarse. Lower part of pit shows coarse conglomerate cemented by calcium-carbonate and stained with iron rust. 4 to 6 feet of leached clay with stones at top of pit face resembles till but is probably wash from top of esker into a pit.

0.0 74.2 Go north from pit.

2.2 76.4 Turn east (right).

2.8 79.2 Cross Killbuck Creek. This is approximate position of pre-Illinoian course of Rock River.

3.4 82.6 Turn north (left) at Kinson School.

0.5 83.1 Turn east (right).

0.5 84.6 Turn north (left) into Camp Rotary.

0.3 84.9 STOP 7. Hills in Camp Rotary give view of east end of bedrock gorge of Kishwaukee River, eroded during and since Belvidere glacial advance. Gorge is in Galena Dolomite (see notes above).

0.0 84.9 Return to road and continue east.

0.3 85.2 Turn south (right) at Powell School.

0.7 85.9 Cross valley probably marking pre-Belvidere drift course of Kishwaukee River which flowed westward.

4.3 90.2 Monroe Center. Turn east (left) on Highway 72.

3.3 93.5 Fairdale. Between here and Kirkland we cross pre-Illinoian valley of ancient Troy River, which flowed south. High ridge south and southeast of Kirkland is Bloomington moraine.

8.4 101.9 Turn south (right) at Stuartville School.

1.5 113.4 Highway 30. Turn east (left) into DeKalb.

0.6 114.0 Entrance to Northern Illinois State Teachers College.

END OF LOG
Part II

Earth History of DeKalb-Byron Area

A few thousand years ago, a great continental glacier was retreating northward from southern Wisconsin, 50 miles north of Oregon. Meltwater from this wasting ice mass flowed down the Rock River carrying great quantities of gravel, sand, and clay brought from as far north as the interior of Canada. The murky waters carried the clay onward to the Gulf of Mexico, but much of the sand and gravel was dropped along the course of Rock River in the Oregon-Dixon area.

Just a few thousand years earlier, this same glacier covered the Oregon-Dixon area as well as most of northeastern Illinois. On the uplands are deposits left by the glacier when it melted, but they are very different from water-laid deposits in the Rock Valley. Geologists call these deposits till—to indicate a mixture of clay, sand, pebbles, and boulders deposited directly from the ice. Its structure is heterogeneous in contrast to the bedded nature of the valley train deposits of later age.

The low, sinuous ridges numerous in the area were also formed by this ice mass. They are piles of till heaped up when the advance and retreat of the glacier were approximately equal.

Two substages of Wisconsinan glaciation are involved in the glacial geology of this area. The Altonian advance covered the area and extended far to the west. The Woodfordian advance, the outer moraine of which is the Shelbyville, approached the Rock Valley from the southeast but did not cross it in the Dixon-Oregon area. However, it did cross the Rock in the Moline area. The numerous moraines to the east are Woodfordian in age.

During the previous (Illinoian) stage of glaciation, however, all of the state of Illinois disappeared temporarily beneath the grinding ice of a continental ice sheet. When the Illinoian glacier melted away, great masses of earth and stone were left behind to block the old valley below Rockford, and the restored Rock River was forced to cut a new channel which it still follows today from Byron to Rock Island.

A mild climate interval of some 100,000 years intervened between the disappearance of the Illinoian ice sheet and the coming of the Wisconsinan ice sheet. Vegetation returned to the region, soils developed, and rain waters, descending into the glacial deposits, dissolved the lime from the upper portion and carried it downward beyond the reach of plants. When the Illinois glacier was retreating and also when the Wisconsinan glacier was advancing, much dust was blown up from the river flats by the wind and deposited over the upland as a powdery earth called loess.

Earlier in the Ice Age (Pleistocene Period), two other continental ice sheets (the Nebraskan and the Kansan) invaded Illinois, but there is no evidence that either of them entered the Oregon-Dixon area.
THE LOST INTERVAL

Before the Ice Age we enter a long "lost interval," during which the Oregon-Dixon area stood at moderate elevations above the sea. Under these conditions, the land was slowly eroded and the wastage of the land was carried off by the streams and deposited as sediment in distant seas. Therefore, no rocks were formed in the region and no fossils preserved to record events in the days of the dinosaurs (Mesozoic Era) and of the strange mammals which succeeded them (Tertiary Period).

Before the time of the dinosaurs, coal-bearing deposits of the Pennsylvanian Period and reef limestones of the Silurian seas were most likely laid down over the Oregon-Dixon area. But, if so, erosion has removed them long ago and stripped away the bedrock down to the very ancient Ordovician and Cambrian limestones and sandstones.

If the cover of glacial debris could be stripped off the hilltops, it would be seen clearly that the ridges all rise to a level skyline lying around 800 feet above the sea. Between these ridge tops, valleys have since been carved, but once the whole region lay at the level of the ridge tops.

In those days this level represented a low plain, close to the level of the sea. Such a plain, cut by erosion of the strata down to base level, is called a peneplain. Later, sea level dropped some hundreds of feet and streams, entrenching again down into the bedrock, carved the region into a network of ridges and valleys.

ANCIENT SEAS OF ILLINOIS

Many of the Ordovician bedrock layers that have been uncovered by erosion during the "lost interval" and since the "Ice Age" contain fossils of sea animals. These tell us that the strata were, for the most part, laid down over the floors of ancient seas that covered much of the interior of the continent. The most advanced animals of those days were the somewhat crab-like trilobites, and shellfish called cephalopods. Present-day cephalopods include octopus, squids, and cuttlefish, but the Pearly Nautilus (hero of Oliver Wendall Holmes' famous poem) is the living cephalopod most like those of Ordovician days. Then, some 350 million years ago, some of Nautilus' ancestors built chambered shells that were coiled, others curved like a horn, others straight and many feet long.

Besides these creatures were snail-like gastropods, clam-like pelecypods, the oldest true corals, sponges, and a large number and variety of brachiopod shells and moss-like bryozoan colonies. The bryozoans are minute animals, which, like corals, build colonies of living stone.

Up-folding and up-thrusting of the strata in the Oregon area in places has brought still older Cambrian formations to the surface. These take us back over 400,000 years to a time before pelecypods, corals, and bryozoans existed with cephalopods almost unknown. The quarries in Cambrian rocks of the Oregon area yield chiefly trilobites and gastropods, some coiled and some cap-like.

THE PRECAMBRIAN FOUNDATION

Wells in the Oregon-Dixon area do not penetrate deeper than the Cambrian, but we know from study farther north that below this there is a "foundation" of very ancient, twisted and altered crystalline rocks—some of these as molten masses deep underground or extruded to the surface as lava flows. The Precambrian rocks are the most ancient known to man.

Reprinted 1962
Generalized Geologic Column - Oregon Area
Prepared by the Illinois State Geological Survey

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<th>PERIODS</th>
<th>EPOCHS</th>
<th>REMARKS</th>
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<td>Proterozoic</td>
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<td>&quot;Recent Life&quot;</td>
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<td>&quot;Tertiary&quot;</td>
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**PERIODS**
- Quaternary
- Tertiary
- Cretaceous
- Jurassic
- Triassic
- Permian
- Pennsylvanian
- Mississippian
- Devonian
- Silurian
- Ordovician
- Cambrian

**EPOCHS**
- Pleistocene
- Pliocene
- Miocene
- Oligocene
- Eocene
- Paleocene
- Upper Ordovician
- Middle Ordovician
- Lower Ordovician
- St. Croixan

**REMARKS**
- Recent post-glacial stage
- Wisconsinan glacial stage
- Sangamonian interglacial stage
- Illinoian glacial stage
- Earlier glaciations not represented by deposits in Oregon Area
- Not present in the Oregon Area
- Not present in Illinois
- Not present in Oregon Area
- Not present in Oregon Area
- Not present in Oregon Area
- Not present in Oregon Area
- Galena Dolomite
- Decorah Dolomite
- Platteville Dolomite
- Glenwood Shale
- St. Peter Sandstone
- Shakopee Dolomite
- New Richmond Sandstone
- Oneota Dolomite
- Trempealeau Dolomite
- Franconia Greensand
- Galesville Sandstone
- Eu Claire Shale, etc.
- Mt. Simon Sandstone
- In deep wells only

Known as "Pre-Cambrian Time"
A - PREGLACIAL

B - POST-ILLINOIAN

C - WISCONSINAN (Shelbyville)

D - PRESENT

1 inch = 16 miles  Illinois State Geological Survey

PLEISTOCENE HISTORY OF ROCK VALLEY
<table>
<thead>
<tr>
<th>Stage</th>
<th>Substage</th>
<th>Nature of Deposits</th>
<th>Special features</th>
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<td>Recent</td>
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<td>Soil, youthful profile of weathering, lake and river deposits, dunes, peat</td>
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<td>Wisconsin</td>
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<td>Ice withdrawal, erosion</td>
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<td>Twocreekan</td>
<td>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>
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<td>12,500 yrs.</td>
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GLACIAL MAP OF NORTHEASTERN ILLINOIS

GEORGE E. EKBLAW
Revised 1960
COMMON TYPES of ILLINOIS FOSSILS

CUP CORAL
LITHOSTROTION
HONEYCOMB CORAL

CORALS

GRAPTOLITE
CUP CORAL
LITHOSTROTION
HONEYCOMB CORAL

CORALS

CYSTOID
PENTREMITE

BRYOZOA

CRINOID
PENTREMITE

BRACHIOPODS

LINGULA
ORBICULOIDEA
SPIRIFEROID
PRODUCTOID
PENTAMEROID

M.M.C
COMMON TYPES of ILLINOIS FOSSILS

PELECYPODS

"Clam"  "Scallop"

PELECYPODS

Curved cone
Coiled cone (Nautilus)

GASTROPODS

High-spired
Low-spired
Flat-spired

CEPHALOPODS

Straight cone

OSTRACODS (greatly enlarged)

TRILOBITES

Calymene (coiled)
Calymene (flat)

Bumastus