State of Illinois
Department of Registration and Education
STATE GEOLOGICAL SURVEY DIVISION
John C. Frye, Chief

GUIDE LEAFLET

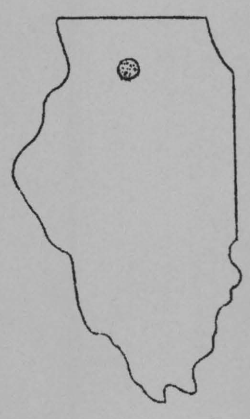
GEOLOGICAL SCIENCE FIELD TRIP

Sponsored by
ILLINOIS STATE GEOLOGICAL SURVEY

AMBOY AREA

Lee County

Amboy, Mendota, Rochelle, and Dixon Quadrangles



Leaders
Ed Odom and George M. Wilson
Urbana, Illinois
September 15, 1962

GUIDE LEAFLET 1962D

HOST: Amboy High School

To the Participants:

It has been said that the landscape is truly beautiful only when we understand the varied forces that have worked through the ages to develop it. The result of this understanding is increasing enjoyment and appreciation of the natural features about us.

The Geological Science Field Trip program is designed to acquaint you with the landscape, rock and mineral resources, and the geological processes that have led to their origin. With this program, we hope to stimulate a general interest in the geology of Illinois and a greater appreciation of the state's vast mineral resources and their importance to the over-all economy.

We encourage you to ask the tour leaders any questions that may occur to you during the trip. Discussion often clarifies points that otherwise would remain confused to many of the participants. We also invite your written comments upon the conduct of the trip so that we might improve them as much as possible.

Additional copies of this guide leaflet, as well as itineraries for trips that have been held in the past, may be obtained free of charge by writing to the Illinois State Geological Survey. Maps are available for 30 cents each.

We hope you enjoy today's trip and will come again.

THE AMBOY GEOLOGICAL SCIENCE FIELD TRIP

ABSTRACT

The Amboy region lies in the Green River Lowland, a major physiographic feature developed during the Pleistocene Epoch. This lowland carried large quantities of water from the Wisconsinan ice sheet. Sand dunes are extensively developed in the lowland and are good examples of wind action on sand deposited in the lowland by the glacial waters. Rearrangements of drainage patterns by glacial action can be seen in the area.

The Bloomington Moraine is another prominent physiographic feature and forms the south side of the Green River Lowland. Pinkish color of the till composing the moraine is characteristic of Bloomington Till in Illinois. Extensive outwash sand and gravel deposits occur along the front of the moraine.

Bedrock of Ordovician age underlies the glacial drift and outcrops in a number of places. The Galena, Platteville, and St. Peter Formations can be seen in outcrop. The Platteville Limestone is quarried extensively for use in the manufacture of cement, in construction, and for agricultural limestone.

Suggested References for Further Study of the Geology of the Field Trip Area

1. Leighton, Ekblaw, Horberg, Physiographic Divisions of Illinois, Illinois State Geological Survey Report of Investigations 129, 1948.

2. Lamar, Geology and Economic Resources of the St. Peter Sandstone of Illinois, ISGS Bulletin 53, 1927.

3. Foster, Groundwater Geology of Lee and Whiteside Counties, Illinois, ISGS Report of Investigations 194, 1956.

4. Knappen, Geology and Mineral Resources of the Dixon Quadrangle, ISGS Bulletin 49, 1926.

5. Templeton, Willman, Guidebook for Sixteenth Annual Tri-State Geological Society Field Conference, Central Northern Illinois, ISGS, 1952

THE AMBOY GEOLOGICAL SCIENCE FIELD TRIP

ITINERARY

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

0.0 0.0 Assemble on east side of Amboy High School, heading south.

0.2 0.2 Green River Valley on left.

0.2 0.4 Turn right (west).

0.1 0.5 Small knoll on right is a sand dune. House on left is on a somewhat higher dune. There are many sand dunes located in and adjacent to the Green River Valley since the Green River was a principal avenue for the escape of meltwater during Wisconsinan glaciation. Leighton, Ekblaw and Horberg, in their publication on the Physiographic Divisions of Illinois (Illinois State Geological Survey Report of Investigation No. 129), describe the Green River Lowland as follows:

> The Green River Lowland is a low, poorly drained plain with prominent sand ridges and dunes. It is bounded on the north and south by the Shelbyville moraine of the Green River lobe and on the east by the abrupt front of the Bloomington moraine (Leighton, 1923, pp. 265-281). Most of the district is modified outwash plain related to the Bloomington moraine, and it is only in the western part of the area that it merges with the Cary valley-train of the Rock River. Some of the sand ridges are in part bars on the outwash plain, but many are true longitudinal dunes with a west-northwest orientation or crescentic parabola dunes. North of Geneseo, remnants of the Shelbyville terminal moraine can be recognized. At the close of the Cary substage the lowland was a great swamp in which the two principal rivers, Rock River and Green River, flowed sluggishly along poorly defined valleys choked with outwash.
>
> The present lowland coincides in large part with a broad bedrock lowland which was occupied by the Mississippi River up to the time of Wisconsin glaciation; and a remnant of the old southern valley-wall forms a prominent bluff on the south side of the present lowland.

3.2 3.7 Longitudinal sand dune on left.

0.6 4.3 Note the sandy nature of the soil in this area. This soil is exceptionally fertile.

1.2 5.5 Turn left (south) on gravel road.

0.6 6.1 Turn right (west).

0.1 6.2 Crossing low sand dune.

0.1 6.3 Turn left (south).

0.7 7.0 Note pine trees planted on sand dune. The dunes are excellent habitats for pines, and Christmas tree plantations flourish in the area.

0.1 7.1 Crossroad. Continue straight ahead.

0.7 7.8 Slow. Bridge -- former course of Green River. The river has been straightened in this area.

0.3 8.1 Slow. Bridge over Green River.

0.2 8.3 Sand dune on left.

0.2 8.5 Turn right (west).

0.5 9.0 Turn left (south).

0.2 9.2 STOP 1. Wooded Dune Area Populated by Black Oak.

The complex of dunes in and adjacent to the Green River Valley is the work of winds during the retreat of the Wisconsinan Glacier. Your topographic map shows the nature of this dune complex.

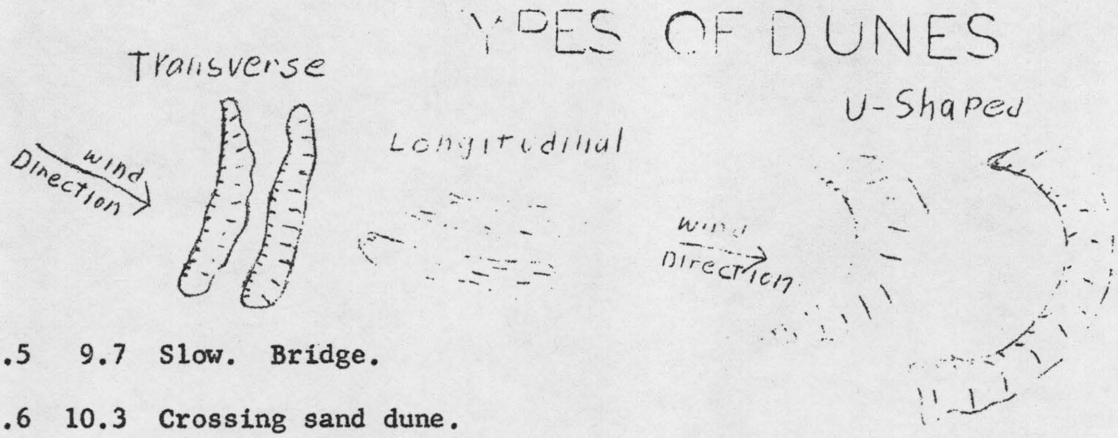
Dunes are defined on the basis of their form: Traverse dunes consist of subparallel ridges oriented at right angles to the effective wind direction. Downwind slopes are steeper than upwind slopes.

Longitudinal dunes consist of ridges paralleling the effective wind direction. They form only in very dry districts, particularly where winds are strong. This is an important factor in the interpretation of the climatic conditions at the time the Green River Valley dunes were formed.

U-shaped dunes consist of U-shaped ridges, convex downwind and with steepest slopes facing downwind. U-shaped dunes are the commonest dune type in Pleistocene deposits. They form in semi-arid and in moist districts and are usually clothed with vegetation even while they are being built.

By far the largest percentage of the dunes in the Green River Lowland are U-shaped, although a few longitudinal dunes occur. Since the points of the dunes are directed toward the southeast, it is obvious the prevailing wind direction (the effective wind direction) was from the northwest.

The area of Stop 1 is a large dune complex consisting of several U-shaped dunes apparently formed at different times. As new ones formed, parts of the older ones were destroyed. The dunes of this region are not older than 17,000 years. Their origin is related to the melting of the Wisconsinan Glacier at the time the Bloomington Moraine was formed along the south side of the lowland.



0.5	9.7	Slow. Bridge.
0.6	10.3	Crossing sand dune.
0.2	10.5	Turn left at East Grove Union Church.
0.8	11.3	Bloomington Moraine on far right.
0.7	12.0	T-road south. Continue ahead.
0.1	12.1	Caution. Bridge.
0.4	12.5	STOP 2. Gravel Pit in Bloomington Outwash Plain.

The distribution of Wisconsinan moraines in northern and northeastern Illinois is shown in the accompanying illustration.

The Bloomington Moraine, which crosses this area, is one of the larger Wisconsinan moraines. In front of the moraine, throughout its extent, is a broad sand and gravel plain representing the coarse material of the till of which the moraine is composed. Most of the sand and all the clay components of the till was carried into and down the Green River Valley. The sand was extensively worked by the wind to form the many dunes.

The gravel in this deposit contains a wide variety of rocks, many not native to our state but occurring in Canada, Michigan, and Wisconsin. Red jasper can be found, a stone used by lapidaries for jewelry.

A thorough knowledge of the glacial history of Illinois can be used for the benefit of Illinois citizens and industry. Maps in the files of the Illinois State Geological Survey show the location of potential sources of sand and gravel throughout this area. Much of this information was collected 30 years ago. Now that the demand for these resources has increased, the information is quite valuable.

The section is as follows:

Sand (dune) with well developed soil profile	6 ft.
Sand and gravel containing pods of pink Bloomington Till	20 ft.
Lake level	

Note the location of the gravel deposit in the small valley which heads on the Bloomington Moraine. This valley was here during the time the moraine was being formed, and it carried meltwater which concentrated the gravel as the water entered the Green River Lowland.

0.4 12.9 Ascending sand dune.

0.2 13.1 Turn right (south).

0.1 13.2 Note large erratic boulders on left.

0.3 13.5 T-road east. Continue ahead (south).

0.4 13.9 Caution. Bridge.

0.4 14.3 Ascending front slope of Bloomington Moraine. The glacial till composing this moraine is mantled by a thick veneer of sand derived from the Green River Lowland.

0.3 14.6 STOP. Turn left (east) on blacktop road. Note sandy material in roadcut on right and small pines planted on dune.

0.3 14.9 Note sand exposed in dune on right.

0.7 15.6 T-road north. Continue ahead.

0.3 15.9 Maytown School on left.

0.3 16.2 Road is gradually ascending front of Bloomington Moraine.

0.1 16.3 Note pink Bloomington Till exposed on left. The pinkish color is characteristic.

0.4 16.7 T-road.

0.1 16.8 STOP 3. Bloomington Till Overlain by 2½ Feet of Pinkish Loess.

Identification of the successive moraines of the Wisconsinan Stage of glaciation is not an easy matter in many instances, especially where they occur close together or one overrides another. In the case of the Bloomington, the task of identification is made easier by the pink till composing the moraine. The reason for the pinkish color is not clear since other moraines formed by the same ice mass do not contain pink till. In any event, the geologist has been given a break by nature and a tool to help him decifer the glacial history.

Glacial till consists of a mixture of clay, sand, pebbles, and sometimes boulders. The mixture contains many different types of rocks, consisting of a variety of minerals. Such a mixture is an ideal parent material for soils. Glacial till covers most of Illinois, and the soils which have formed in it are among the richest in the world. Illinois agricultural production amounts to approximately 2 billion dollars annually.

Geological processes have been extremely favorable to Illinois in terms of creating valuable mineral resources, also. Mineral fuels -- coal and petroleum, metals, and non-metals -- limestone, sand and gravel, etc., occur in the state. Illinois annual mineral production totals more than 600 million dollars -- as a comparison, more than 12 times the annual United States gold production.

Note the numerous erratic boulders in the small stream on the north side of the road. This stream, which entered the Green River Lowland at Stop 2, superbly illustrates how water sorts rock materials by sizes. Large boulders have been concentrated in the upstream area, sizes in the gravel range were concentrated at Stop 2, and much of the sand components was deposited in the Green River Lowlands. The clay fraction of this till was probably transported many miles downstream as far as the Gulf of Mexico. A portion of the fine silt and clay was redeposited in this area by the wind. Wind-blown deposits are called loess. Note that the loess overlying the Bloomington Till is also pink, direct evidence that it was derived from Bloomington outwash material.

The section is as follows:

Pinkish loess with soil profile, leached	2½ ft.
Bloomington Till, pink, leached in upper few inches	6 ft.

0.2 17.0 Note Bloomington Till exposed on left.

0.2 17.2 Bloomington Till on right.

0.7 17.9 Sand dune here has an elevation of 950 feet, or approximately 200 feet higher than the high school at Amboy. This dune is on a high part of the Bloomington Moraine. Note that the moraine is mantled throughout with a heavy covering of sand.

0.9 18.8 Blacktop road ends, continue ahead on gravel road.

0.7 19.5 Turn left (north) at crossroad. This point is near the crest of the moraine.

1.0 20.5 There are numerous dunes in this area along the crest of the moraine.

0.1 20.6 Jog left.

0.4 21.0 We are now near the top of the moraine. Note relatively large lake on left. The irregular distribution of dunes underlain by glacial till is favorable to lake development.

0.3 21.3 The Green River Lowland can be seen on the horizon.

0.3 21.6 Sand, underlain by glacial till, exposed on right and left.

0.7 22.3 A good view of Green River Lowland to the north. We are descending the front of the Bloomington Moraine.

1.5 23.8 T-road west. Continue ahead (north).

0.3 24.1 Note large dune complex covered with oak.

0.8 24.9 Bridge over Green River.

0.1 25.0 Turn right.

0.7 25.7 Entering Amboy.

0.4 26.1 Amboy High School on left.

0.3 26.4 Caution. Railroad crossing.

0.1 26.5 Amboy Business District.

0.1 26.6 STOP. Highway 52. Continue ahead on East Main Street.

0.5 27.1 Turn right on City Park Street.

0.2 27.3 STOP 4. Lunch. Amboy City Park. Park is located on a terrace.

0.2 27.5 STOP. Turn right on East Main Street.

0.1 27.6 Caution. Railroad crossing.

0.5 28.1 Turn right. Bridge over Green River.

0.1 28.2 Ordovician Platteville Dolomite outcropping in river bank on left.

1.9 30.1 Crossing sand dune.

0.5 30.6 Crossroad. Continue ahead on blacktop road.

0.1 30.7 Note sand dunes on right and left.

0.8 31.5 Outwash gravel exposed in cut on right.

0.6 32.1 Turn left (north).

0.9 33.0 Sand dune. Note blowout (wind erosion) on right about 300 yards from highway.

0.8 33.8 Bridge.

0.1 33.9 Slow. Turn left (northwest).

0.4 34.3 STOP 5. Donald Butler Quarry. Forty to Fifty Feet of Platteville Dolomite. Very Fossiliferous.

Limestone is an important mineral resource in northwestern Illinois. The stone is used in construction, road building, for the manufacture of cement, and as agricultural limestone. One of the four cement plants in Illinois is located at Dixon.

The Platteville Limestone is widely distributed in this area, but there are only a few areas where the overburden of glacial drift is thin enough for economical exploitation. The Donald Butler Quarry is one of the largest in the area. Approximately 40 feet of Platteville Limestone is exposed here.

The Platteville is overlain by the Galena Dolomite. The Galena, too, is quarried extensively, but its uses are restricted to road building, construction, and sometimes, since it has a higher magnesium content than the Platteville, as agricultural limestone.

In the present classification of the Ordovician rocks of Illinois, the Platteville Formation is divided into four members. These are, in ascending order, the Pecatonica, Mifflin, Magnolia, and Spechts Ferry.

A new classification, based upon detailed study of the Ordovician rock section in Illinois by Dr. H. B. Willman, will be published soon by the State Geological Survey. In the new classification the Platteville Formation becomes the Platteville Group and the previously recognized members are given formation status as shown below.

GALENA GROUP

-- Unconformity --

PLATTEVILLE GROUP

Quimbys Mill, ± 12': dolomite, argillaceous and chalky, yellow buff, thin- to thick-bedded, with shale partings in middle.

Nachusa, ± 18': dolomite or limestone, pure except for argillaceous unit in middle, cherty, fucoidal, thick-bedded, with Foerstephyllum, Lichenaria, and Tetradium.

Grand Detour, ± 50': dolomite or limestone, alternately pure and argillaceous, partly cherty, thin- to thick-bedded, with some red shale partings. More dolomitic, less argillaceous and shaly, and thicker-bedded than underlying Mifflin formation.

Mifflin, ± 25': limestone or dolomite, alternately pure and argillaceous, non-cherty, thin- to thick-bedded, with gray-green shale partings.

Pecatonica, ± 30': dolomite and limestone, relatively pure, locally cherty, finely crystalline, and thick-bedded; is slightly argillaceous and has weak shale films in middle. Ferruginous corrosion surface at top; diastem and phosphatic nodules at base.

The Platteville Formation is overlain by the Galena Dolomite and underlain by the Glenwood and St. Peter Formations. We will examine St. Peter Sandstone strata at Stops 7 and 8.

Platteville Strata are very fossiliferous at this location. Brachiopods and gastropods are especially abundant.

The Dixon area is underlain by about 3,700 feet of sedimentary strata. The lower 2,800 feet is Cambrian resting on pre-Cambrian granite, and the upper 900 feet is Lower and Middle Ordovician. This sequence of strata was deposited in ancient seas during the period of 500 million to 375 million years ago.

0.3 34.6 Turn right (north).

0.6 35.2 Excellent view of Green River Lowland on right.

0.7 35.9 STOP. Highway 30. Turn right. Caution.

0.1 36.0 Slow. Turn left (north). Caution.

0.1 36.1 STOP 6. Discussion of Shelbyville Moraine, Green River Lowland, and Bloomington Moraine.

Drainage in the Amboy region is toward the Rock River which joins the Mississippi at Rock Island. The preglacial Rock River, however, ran southward from Rockford to the vicinity of Princeton where it joined the southeast-trending ancient Mississippi River.

The preglacial Rock Valley, which lay about 25 miles east of Dixon, had three major eastward-flowing tributaries which followed the present valleys of the Pecatonica, Leaf River and Stillman's Run, and the Kytee River. Thus, in preglacial time the drainage system in the region was drastically different than at present. The present drainage system represents adjustment due to glacial action, primarily during the last two glacial stages. An outline of Illinois glacial history is given below.

Little is known about the glacial history of this region prior to the Illinoian, or third, Stage of glaciation, but we know the entire region was glaciated by the Illinoian ice sheet. Many of the preglacial valleys were severely affected due to filling with glacial drift which caused alteration of courses or complete reversals in drainage directions.

The earliest Wisconsinan glacier, the Winnebago, probably did not reach the Dixon area and probably had little effect on area drainage. The next pulse of Wisconsinan ice, called the Shelbyville, advanced to this locality and formed the low Shelbyville Moraine here. During the retreat of the Wisconsinan Glacier to the northeast, successive moraines were formed. One of these, the Bloomington, can be seen to the southeast.

In this area, the Green River Lowland is between the Bloomington and Shelbyville Moraines. Large volumes of water discharged down the lowland when the Wisconsinan Glacier stood at the position of the Bloomington Moraine and at later times, also. The Shelbyville advance is largely responsible for the present Rock River joining the Mississippi at Rock Island. And it was this glacier that established the Mississippi in its present course diverting it from the pre-Wisconsinan course southeast from Rock Island to Hennepin.

Summary of the Pleistocene History of Illinois

Tens and hundreds of thousands of years ago most of Illinois, together with most of northern North America, was covered by huge glaciers. These glaciers expanded from centers in central and eastern Canada. They developed when the mean annual temperatures were somewhat lower than now, so that not all of the snow that fell during the winters melted during the summers. The snow residues accumulated year after year until a sheet of ice was formed so thick that, as a result of its weight, it began to flow outward, carrying with it the soil and rocks on which it rested and over which it moved. The process continued until the glacier extended into our country as far south as Missouri and Ohio Rivers.

Moderation of temperatures halted the glacier. For a while the melting of the ice balanced its accumulation and expansion, so that its margin remained stationary. Later the melting exceeded the accumulation and expansion, and the ice-front gradually melted back until the glacier disappeared entirely.

It is now commonly known that there were four major periods of glaciation during the Pleistocene or Great Ice Age (see accompanying illustration), and that between each there was a long interglacial period in which conditions were much as they are today. It is also commonly known that during each major glaciation there were a number of retreats and readvances. This was particularly true during the last, or Wisconsinan, glacial stage.

A complete discussion of Pleistocene (Ice Age) history would require a sizable volume, in fact, the story is still not fully known. Present facts indicate that this era of geologic history began about one million years ago when the Nebraskan Glacier advanced over the area. This oldest glacier is named Nebraskan because the typical Nebraskan glacial deposits are best developed in the state of Nebraska. Nebraskan deposits are not abundant in Illinois, probably because weathering during the Aftonian interglacial stage after the retreat of the Nebraskan glacier destroyed them.

The next glacial episode produced the Kansan Glacier which again advanced from the west. Thick deposits of till and outwash sand and gravel were deposited in Illinois when the Kansan Glacier withered away.

The Kansan stage was followed by the Yarmouthian interglacial stage during which erosion carved valley and hills in the Kansan deposits.

The third glacial stage, the Illinoian, is important to the residents of Illinois. It covered 80 percent of Illinois, reaching southward to Carbondale and Harrisburg. In contrast to the preceding glacial advances, the Illinoian came from the east rather than the west.

After several thousands of years, climatic conditions caused the melting away of the Illinoian ice sheet. During this warm stage, the upper part of the Illinoian till was weathered and soil developed, just as in the case of the preceding Yarmouthian interval. However, this action did not take place to the degree it did during the Yarmouthian, so that the post-Illinoian (Sangamonian) interval is estimated to have lasted only about 150,000 years. The Sangamon soil resembles present day soils in color, texture, and depth of development. This fact lends support to theory that the climate existing during interglacial times was similar to the present climate. The theory that we are living in an interglacial interval has been advocated by numerous glacial geologists. We should not brush this thought aside for it is estimated that a drop of only five degrees in the average annual temperature would bring another glacier down upon us.

The last and most recent glacial stage was the Wisconsinan. This glacier advanced southward from the Lake Michigan Basin to the present sites of Shelbyville, Charleston, and Peoria where it formed a terminal moraine that geologists call the Shelbyville Moraine. The Shelbyville Moraine was built by the Wisconsinan Glacier approximately 20,000 years ago.

As the Wisconsinan Glacier retreated, withdrawals and readvances created a complex sequence of deposits in northeastern Illinois, the most outstanding of which are the moraines. More than fifty separate moraines were formed by this glacier in Illinois alone. The major ones are shown on the accompanying glacial map of northeastern Illinois.

To appreciate the significance of the Pleistocene Epoch, we need to consider only the rich soils formed from the glacial deposits and the abundant deposits of sand and gravel. We would not have these treasures had the glaciers missed Illinois.

As the glacier melted, all of the soil and rocks which it had picked up as it advanced were released. Some of this material or drift was deposited in place as the ice melted. Such material consists of a thorough mixture of all kinds and sizes of rocks and is known as till. Some of the glacial drift was washed out with the melt-waters. The coarsest outwash material was deposited nearest the ice-front and gradually finer material farther away. The finest clay may have been carried all the way to the ocean. Where the outwash material was spread widely in front of the glacier it forms an outwash-plain; where it was restricted to the river valleys it forms valley-trains.

A moraine represents the accumulation of drift at the ice-margin while the advance and melting were essentially in balance, when more and more material was being brought to the edge of the advancing ice. With the exception of the Shelbyville Moraine which marks the maximum advance of the Wisconsinan Glacier, a moraine marks the position to which the ice-front readvanced after a recession.

The surface relief of moraines is generally greater than that of the drift-plains and is referred to as swell-and-swale, on some moraines knob-and-kettle, topography. Generally, the outer slope and edge of the moraines is interrupted by valleys and re-entrant angles marking the courses of glacial rivers. At some places, there are gaps in the moraines where subglacial streams presumably carried away most of the drift.

As a glacier began to recede, melt-water gradually accumulated in local ponds or lakelets between the ice-front and the moraine last formed except where there were drainage channels through the moraine. Where such drainage channels are absent, it may be presumed that as the ice-front continued to recede the local ponds and lakelets gradually merged into one large lake which remained until a channel formed through which it could drain.

At times, especially in the winters, the out-wash plains and valley-trains were exposed as the melt-waters subsided, the wind picked up silt and fine sand from their surfaces, blew it across the country, and dropped it to form deposits of what is known as loess. Glacial loess mantles most of Illinois. Near the large river valleys it may be as much as 60 to 80 feet thick. Far from the valleys it may measure only inches, if it can be identified at all.

0.3	36.4	Note St. Peter Sandstone outcropping in road cut on right and left. Abandoned sand pit 200 yards to left.
0.4	36.8	Ascending Shelbyville, or White Rock, Moraine.
0.7	37.6	Turn left (west).
0.8	38.3	Caution, crossroad. Continue ahead.
1.0	39.3	Caution, crossroad.
0.5	39.8	Caution, crossroad. Continue ahead.
1.6	41.4	Turn right (north) on blacktop road to Franklin Grove.

4.0 45.4 Bridge over Franklin Creek.

0.1 45.5 Gravelly glacial till exposed on right is called the Winnebago Drift.

0.2 45.7 Entering Franklin Grove.

0.4 46.1 STOP. Turn left (north). Franklin Grove School on right.

0.2 46.3 Franklin Grove business district.

0.1 46.4 Caution. Railroad crossing.

0.2 46.6 STOP. Route Alternate 30. Caution. Continue straight ahead.

0.1 46.7 Slow. Turn left (west).

0.1 46.8 STOP. Turn right (north).

0.0 46.8 Turn left (west) on east-west road at north edge of Franklin Grove.

1.2 48.0 Turn right, then left. Continue ahead on gravel road.

1.2 49.2 Slow. Descend steep hill.

0.1 49.3 Lower beds of the Platteville Formation outcrop on right and left. These beds consist of limestone with interbedded sandstone. Some beds are ripplemarked.

0.2 49.5 Bridge over Franklin Creek.

0.1 49.6 Turn right.

0.4 50.0 Turn right (north).

0.1 50.1 STOP 7. Crossbedded St. Peter Sandstone on Franklin Creek.

The St. Peter Sandstone is widely distributed in the Mid-West. In Illinois, it is economically important because of the high purity quartz sand of which it is composed and the large quantities of fresh water obtained from it.

The St. Peter is exposed at the surface in three areas of Illinois: the Oregon-Dixon, Ottawa-LaSalle, and near Hardin in Calhoun County. Silica sand has many industrial uses, such as for glass making, for molding sand in steel foundries, in the hydraulic fracturing of oil wells, and as a "flour" to be used in scouring compounds, enamel, porcelain and tile, and as a filler in paint. It is mined extensively in this area and in the Ottawa-LaSalle area.

This exposure is near the crest of the LaSalle Anticline, shown on the accompanying illustration, "Major Structural Features of the Dixon-Oregon Area."

The quartz sand grains composing the St. Peter are frosted, a property which results from wind action. Since sand composing dunes in desert regions have this property, we believe the St. Peter sand was derived from a region of dunes or at least was frosted by wind action prior to deposition. The St. Peter is not a dune type deposit. Cross bedding present in the formation is not of the type observed in dunes but does match that observed in deposits laid down in water.

The St. Peter ranges from 30 to 180 feet thick in this region. Historically, the name is derived from St. Peter's (now called, "Minnesota") River near St. Paul, Minn.

0.7 50.8 T-road. Turn left (west).

0.8 51.6 Bridge over Franklin Creek. Outcrop of St. Peter Sandstone near the crest of the LaSalle Anticline. Note that the rocks dip gently to the west.

1.0 52.6 Rock River Valley on distant right.

0.3 52.9 Caution. Crossroad.

0.3 53.2 Crossing Chamberlain Creek.

0.4 53.6 Ascending the Grand Detour Esker.

Russell Knappen describes the Grand Detour Esker in his publication, The Geology of the Dixon Quadrangle, of 1926. This is a remarkable feature since it is the only known esker in Illinois formed by the Illinoian Glacier and still preserved. Based on present-day esker development, it is believed eskers mark the position of a stream which flowed under the ice mass.

The Grand Detour Esker trends in a northwest direction through Dixon and Nachusa Townships. It consists of well-washed sand and gravel containing pebbles up to two inches in diameter. According to Knappen, the esker formed Rock River to the northwest, making the "grand detour" which gave the neighboring town its name. More about the Grand Detour at the next stop.

0.4 54.0 Caution, crossroad. Continue ahead on blacktop road.

1.0 55.0 STOP. Turn right on Illinois Highway 2.

1.1 56.1 Note sandstone outcropping in road cut on left.

0.5 56.6 Note St. Peter Sandstone outcropping in road cut on right and left.

0.1 56.7 Slow. Turn left on gravel road on south of the Rock River Bridge.

0.2 56.9 Grand Detour Esker parallels the road on the left. This esker blocks a former valley of the Rock River and figured prominently in the diversion of the river, forming the Grand Detour.

0.2 57.1 Low hill on left is the Grand Detour Esker.

0.6 57.7 Turn right.

0.4 58.1 Turn left. Follow gravel road along edge of Rock River Valley.

0.1 58.2 Note St. Peter Sandstone outcropping on left.

0.2 58.4 STOP 8. Outcrop of St. Peter Sandstone and Discussion of Grand Detour. Twenty feet of St. Peter Sandstone Exposed.

The topographic map well illustrates the feature called the Grand Detour, a large horseshoe shaped bend in the Rock River. The feature is attributed to the occurrence of the Grand Detour Esker which formed a dam across a pre-glacial stream course extending south through Secs. 24 and 26, T. 22 N., R. 10 E., causing diversion of the river to the west. The Rock also occupied another valley through Secs. 14 and 22, T. 22 N., R. 10 E., but only for a short time.

Although the Grand Detour Esker probably was a factor in the formation of the Grand Detour, there seem to be other factors involved. One is the occurrence of the LaSalle Anticline with the numerous bedrock exposures along the south wall of Rock Valley. And, although difficult to evaluate, the Wisconsinan Glacier probably played a part. The Grand Detour lengthens the course of Rock River more than five miles.

0.3 58.7 St. Peter Sandstone exposed on right and left.

0.3 59.0 Turn left. Ascend hill.

0.5 59.5 Turn left (south).

0.7 60.2 T-road west. Continue ahead.

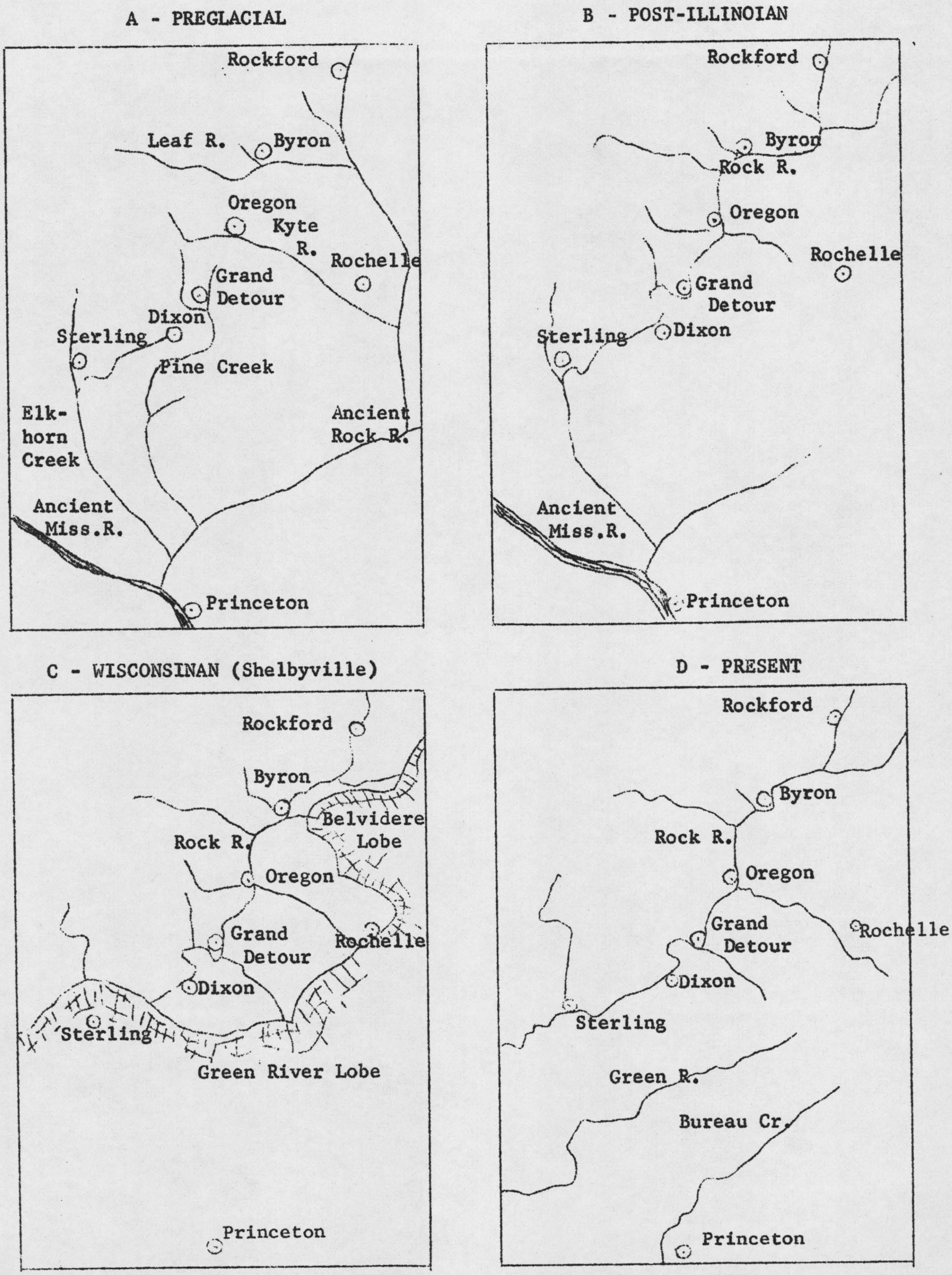
0.4 60.6 STOP 9. Abandoned Quarry in Platteville Formation.

This is the stone used for making cement at Dixon. It is part of the Platteville Formation, and this particular zone is very pure limestone.

Many fossils, including brachiopods, corals, snails, clams, and trilobites, can be found. Have fun.

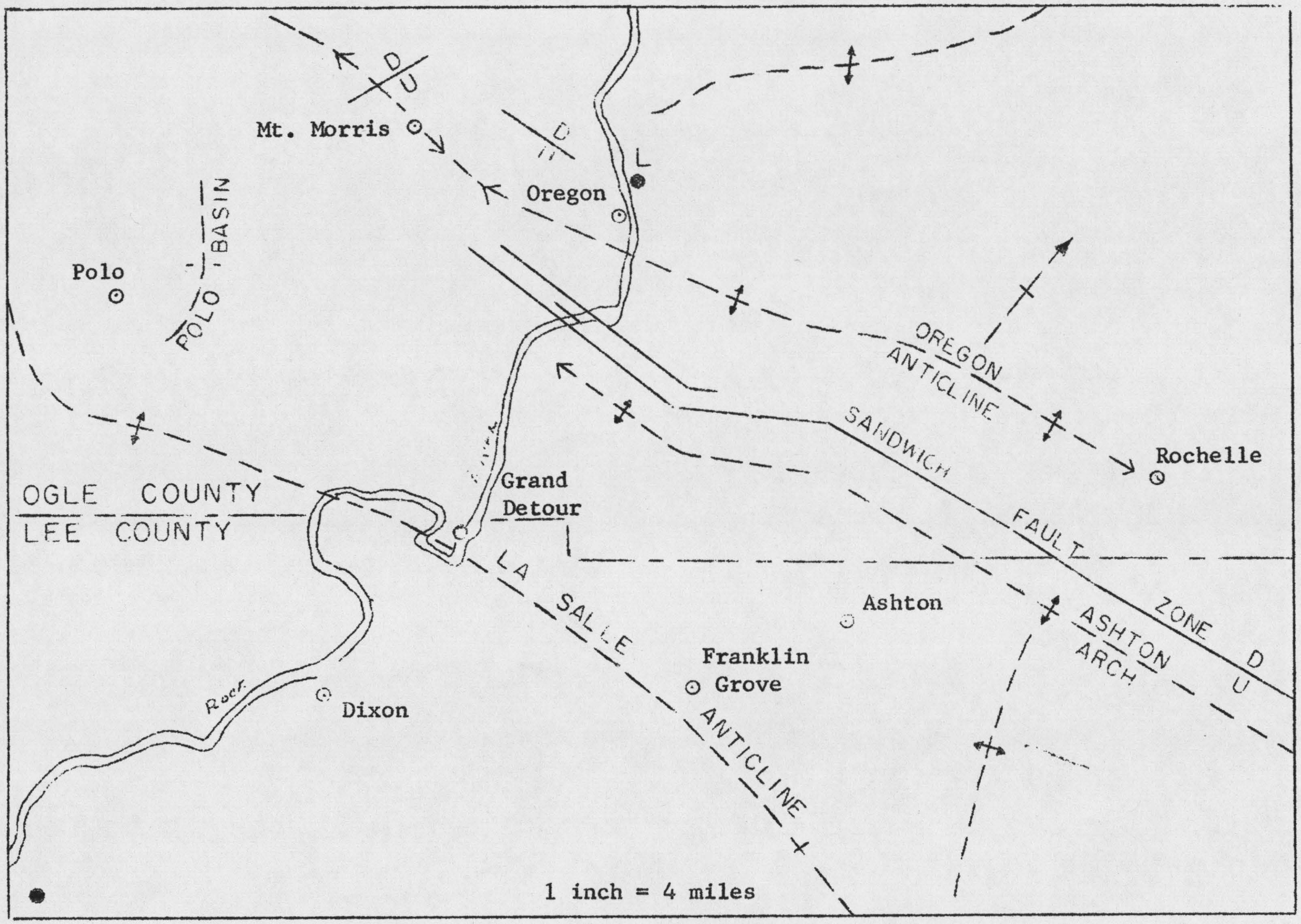
(Continue ahead on blacktop road to Dixon.)

Thanks for coming. See you at Neoga September 29.



1 inch = 16 miles

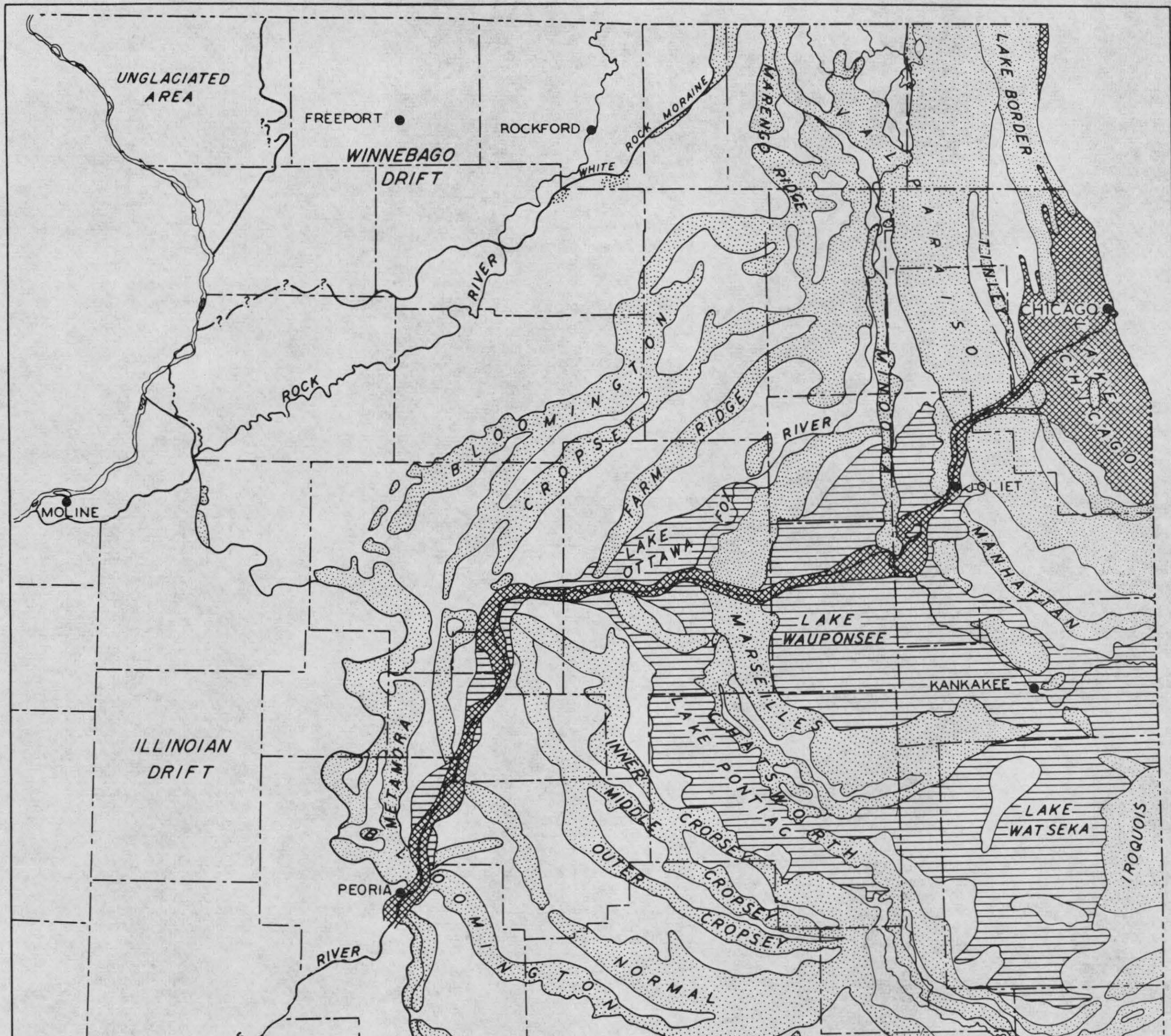
PLEISTOCENE HISTORY OF ROCK VALLEY



MAJOR STRUCTURAL FEATURES OF THE DIXON-OREGON AREA

Time Table of Pleistocene Glaciation
(after M. M. Leighton and H. B. Willman, 1950, J. C. Frye and H. B. Willman, 1960)

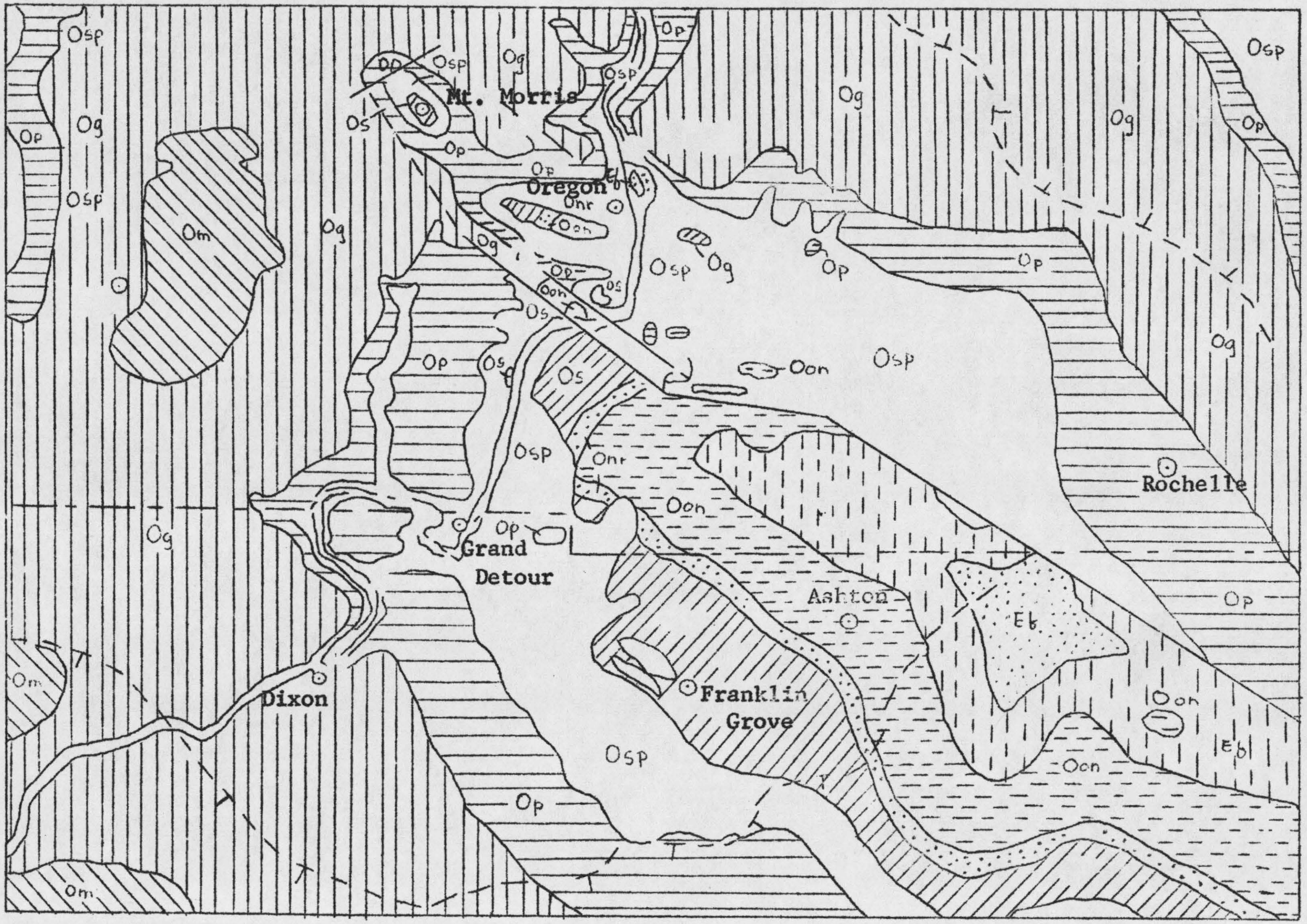
Stage	Substage	Nature of Deposits	Special features
Recent		Soil, youthful profile of weathering, lake and river deposits, dunes, peat	
	5,000 yrs.		
Wisconsinan	Valderan	Outwash	Glaciation in northern Illinois
	11,000 yrs.		
	Twocreekan	Peat, alluvium	Ice withdrawal, erosion
	12,500 yrs.		
	Woodfordian	Drift, loess, dunes lake deposits	Glaciation, building of many moraines as far south as Shelbyville, extensive valley trains, outwash plains, and lakes
	22,000 yrs.		
	Farmdalian	Soil, silt and peat	Ice withdrawal, weathering, and erosion
	28,000 yrs.		
	Altonian 50,000 to 70,000 yrs.	Drift, loess	Glaciation in northern Illinois, valley trains along major rivers, Winnebago drift
Sangamonian (3rd interglacial)		Soil, mature profile of weathering, alluvium, peat	
Illinoian (3rd Glacial)	Buffalohartan	Drift	
	Jacksonvillian	Drift	
	Paysonian (terminal)	Drift	
	Lovelandian (Pro-Illinoian)	Loess (in advance of glaciation)	
Yarmouthian (2nd interglacial)		Soil, mature profile of weathering, alluvium, peat	
Kansan (2nd glacial)		Drift Loess	
Aftonian (1st interglacial)		Soil, mature profile of weathering, alluvium, peat	
Nebraskan (1st glacial)		Drift	

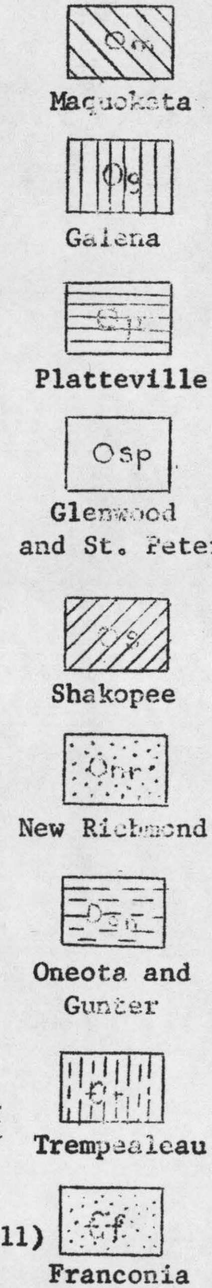


GLACIAL MAP OF NORTHEASTERN ILLINOIS

GEORGE E. EKBLAW
Revised 1960

(47669—15M—11-61)





GENERALIZED BEDROCK MAP OF THE DIXON-OREGON-ROCHELLE AREA

Scale

0 1 2 3 4 Miles

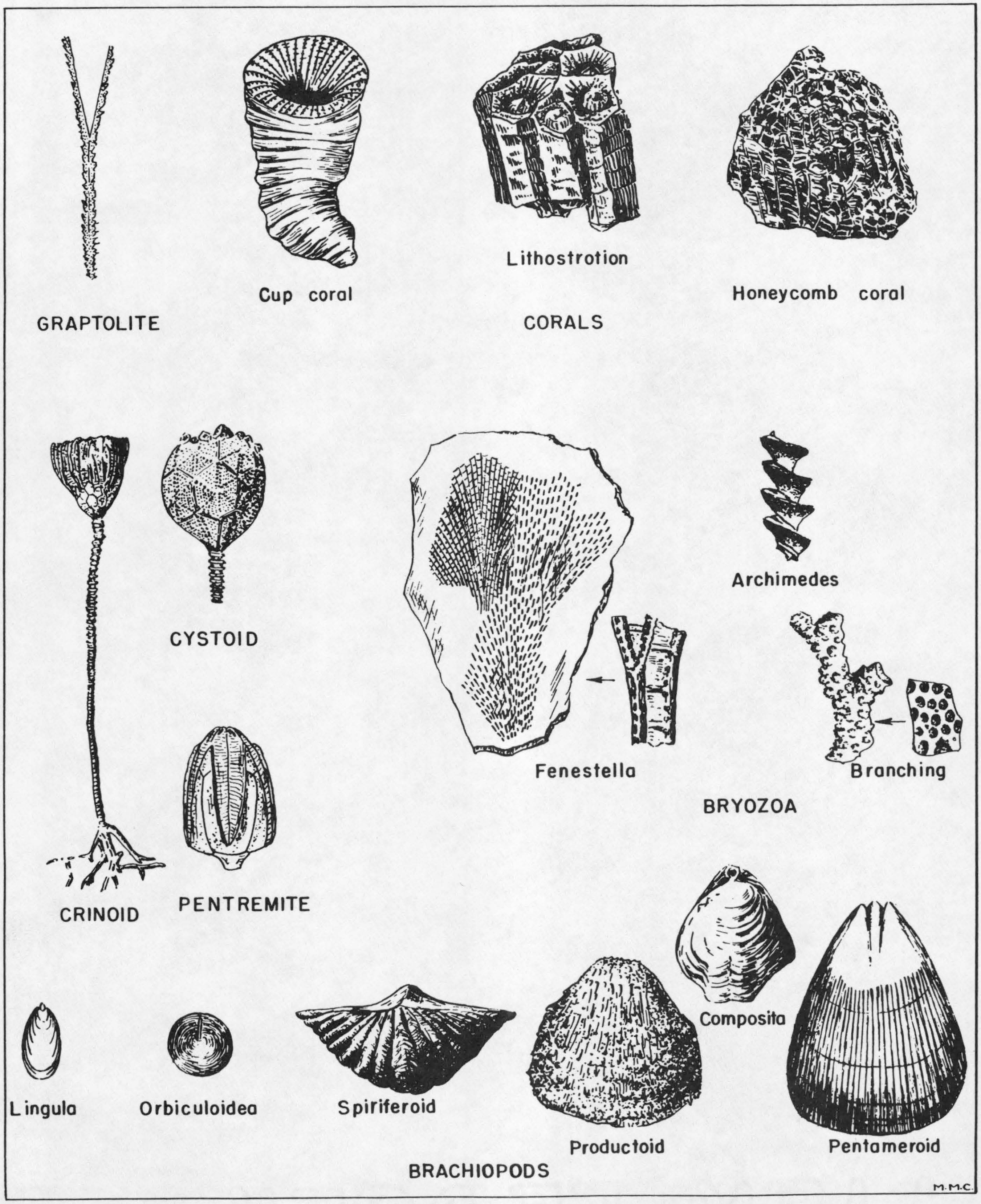
Fault

Boundary of Shelbyville (Tazewell) till

Generalized Geologic Column - Dixon Area
Prepared by the Illinois State Geological Survey

ERAS			PERIODS	EPOCHS	REMARKS
Cenozoic	"Recent Life"	Age of Mammals	Quaternary	Pleistocene	Recent post-glacial stage Wisconsinan glacial stage Sangamonian interglacial stage Illinoian glacial stage Earlier glaciations not represented by deposits in Dixon Area.
			Tertiary	Pliocene Miocene Oligocene Eocene Paleocene	Not present in the Dixon Area.
Mesozoic	"Middle Life"	Age of Reptiles	Cretaceous		Not present in the Dixon Area
			Jurassic		Not present in Illinois
			Triassic		Not present in Illinois
Paleozoic	"Ancient Life"	Amphibians & Early Plants	Permian		Not present in Illinois
			Pennsylvanian		Not present in Dixon Area.
			Mississippian		Not present in Dixon Area
		Age of Fishes	Devonian		Not present in Dixon Area
		Age of Invertebrates	Silurian		Not present in Dixon Area
			Ordovician	Upper Ordovician	Not present in Dixon Area
				Middle Ordovician	Galena Dolomite Decora Dolomite Platteville Dolomite Glenwood Shale St. Peter Sandstone
				Lower Ordovician	Shakopee Dolomite New Richmond Sandstone Oneota Dolomite
			Cambrian	St. Croixan	Trempealeau Dolomite Franconia Greensand Galesville Sandstone Eau Claire Shale, etc. Mt. Simon Sandstone
Proterozoic Archeozoic			Known as "Pre-Cambrian Time"		In deep wells only

COMMON TYPES of ILLINOIS FOSSILS



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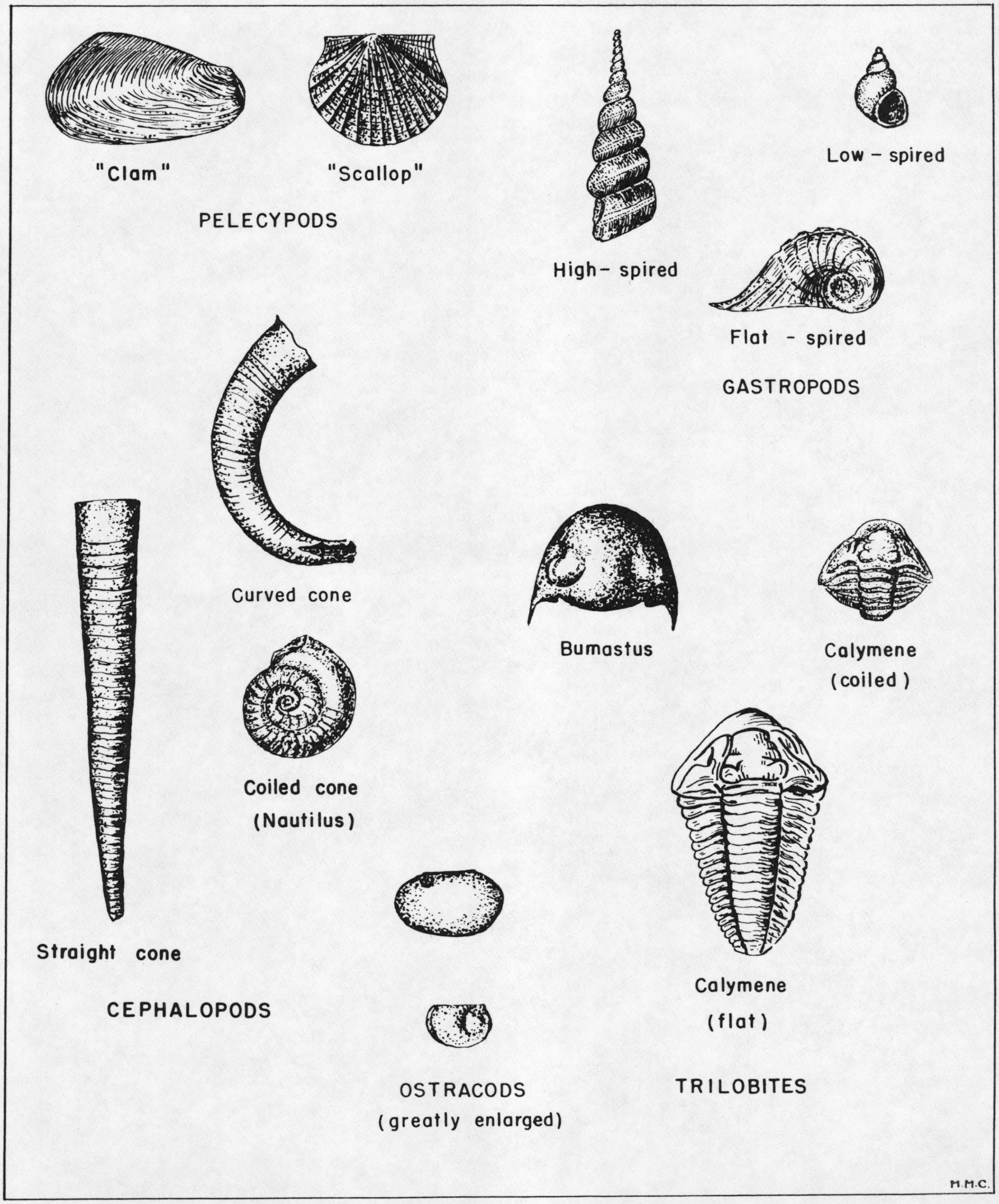
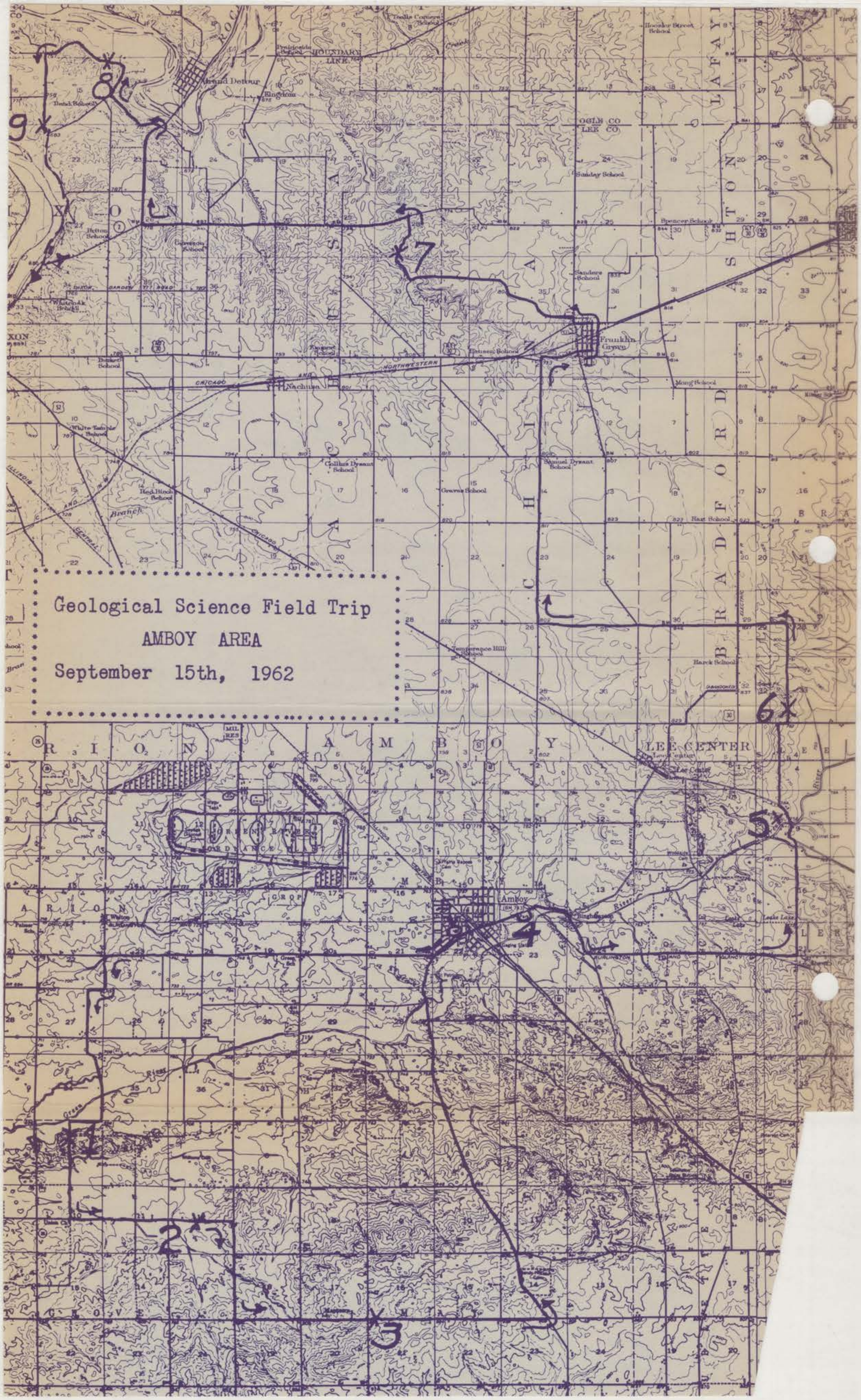
COMMON TYPES of ILLINOIS FOSSILS



(55757—25M—5-62)


Geological Science Field Trip
AMBOY AREA
September 15th, 1962
Grand Detour
Franklin Grove
Nachusa
Amboy
LEE CENTER
OGLE CO
LEE CO
CHICAGO AND NORTHWESTERN
Sanders School
Spencer School
Samuel Dysant School
Graves School
Temperance Hill School
Harck School
White Temple School
Red Brick School
A M B O Y
B R A D F O R D
1
2
3
4
5
6
7
8
9