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State of Illinois
Department of Registration and Education
State Geological Survey Division

Morris M. Leighton, Chief

JOLIET AREA

Will County

Guide Leaflet 50-C

by

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PART I. ITINERARY

Joliet Quadrangle.

0.0	0.0	Joliet High School and Junior College. Caravan assembles headed south on west side of Herkimer Street.
0.0	0.0	Proceed left (E) on Jefferson Street (Route 4A)
0.1	0.1	Route turns north onto Collins Street.
0.2	0.3	Traffic light; junction with Route 30. Continue ahead (N) on Route 4A.
0.3	0.6	Traffic light; junction with Route 6. Continue ahead (N) on Route 4A.
0.3	0.9	Traffic light (Columbia Street); continue ahead (N) on Route 4A.
0.2	1.1	Railroad Crossing. American Steel and Wire Works on left.
0.4	1.5	Illinois State Penitentiary.
0.9	2.4	Carnegie - Illinois Steel Plant on left.
0.3	2.7	Old Quarry in Niagara Dolomite on left.
0.8	3.5	Gorge of Fraction Run on right. When the glacial waters of Lake Chicago poured down the Des Plaines Outlet, the main valley was rapidly deepened. Side valleys such as this had also to deepen rapidly to keep pace with the downward cutting of the main stream. Here at Fraction Run, however, the stream cutting downward through the soft glacial drift encountered a nob of limestone marking the site of an old Silurian coral reef. Back through this reef, the stream cut the narrow, rocky canyon we see today.
0.2	3.7	Enter Lockport.
1.0	4.7	Traffic Light.
0.9	5.6	Forks; take left fork onto Lemont Road.
0.2	5.8	Texas Company Oil Refinery.
0.4	6.2	STOP NO. 1 Gravel Pit opposite Texas Company Tank Farm. The continental glaciers that moved down into Illinois from Canada brought with them much earth and rock picked up over the hundreds of miles of country over which the glacier passed. When the glacier melted away, this residue of earth and stone was left behind as a blanket of "glacial drift" covering the landscape. This drift cover normally consists of a heterogeneous mixture of sand pebbles and boulders in a matrix of fine glacial clay, called "glacial till." But the melting of the glaciers, that liberated the rock and clay, also liberated great quantities of water. Where the drift has been re-worked by glacial waters, the material has been sorted into stratified layers of sand or gravel or into laminae of clay.

In the pit, fine examples both of unsorted till and of water-laid sand and gravel may be seen. The section in the pit, from top to bottom, is roughly as follows:

1) Gray to buff glacial till. Note glacial striae on faceted pebbles. 20 feet
2) Coarse gravel and boulders with some interstratified sand. Some portions cemented to conglomerate, especially at top. Note roughly rounded rocks and absence of glacial striae. 13 feet
3) Clean, coarse, ochre stratified sand with beds of inclined laminae dipping south. 12 feet
4) Gray till with few pebbles. The top few inches have been oxidized by groundwater circulation. 6 feet
5) Niagara Dolomite; bed rock.

Groundwater circulates freely through the porous and permeable sand and gravel, but the underlying clayey till is relatively impervious. Where the sand-till contact zone is present in a bank, it is marked by a spring line, such as that which causes the quicksand in this pit.

Interpretation of the Glacial Deposits

The till at the top of the pit has been dated as belonging to the Rockdale glacial advance, which came from the east and left its terminal (border) moraine west of the Des Plaines River. The advancing glacier cut down into the underlying sand and gravel (which may not have been solidified at that time) as is evidenced by the fact that the till lies directly in the sand in the west part of the pit, with the gravel missing.

The fact that the waterlaid deposits have the finest sediments toward the bottom and terminate with very coarse bouldery conglomerate, suggests that they originated as deposits washing out from the front of an advancing glacier (the Rockdale). When the ice still stood at some distance from this spot, the waters were able to transport only sand this far, but as the ice got closer, the boulders, rolled and washed out from the ice front, came to rest here. Finally, the ice front passed this point, to halt about five miles to the west.

The till under the sand is earlier of course and may represent the Minooka Glacier which halted about 12 miles to the west, or it may represent a still earlier (Tazewell Stage) of glaciation.

A half mile east of the pit, the country rises steeply in a high moraine that marks the west edge of the Valparaiso Glacier, which will be discussed later in the day.

0.0 6.2 Continue ahead (N).

1.2 7.4 Spoils banks in distance on left. This material was excavated from the bedrock floor of the valley in constructing the Chicago Sanitary and Ship Canal.

1.0 8.4 Stop sign. Romeo road.

1.1 9.5 Globe Oil Refinery on left.

2.2 11.7 Enter LEMONT.

0.4 12.1 Stop Sign. Continue ahead (E).

0.2 12.3 Stop Sign. Continue ahead (E).

0.2 12.5 Stop Sign. Continue ahead. (E).

0.4 12.9 Turn left (N) on road to quarry and cross R.R.

0.3 13.2 Cross Illinois-Michigan Canal.

0.2 13.4 STOP NO. 2. Quarries in Niagaran, Waukesha Formation of Silurian age. The Waukesha rock is a magnesian limestone or "dolomite," which has a high proportion of clayey impurity. At present it is much sought for landscaping and flagging uses, but formerly was an important building stone. Large blocks were also quarried in this vicinity and transported via the canal for use about Lake Michigan in piers and breakwaters.

The limestone was deposited in the waters of the ancient Silurian sea which once covered all of the Chicago region. Sea life was abundant here and good specimens of trilobites, cephalopods, and other creatures may still be found.

0.0 13.4 Reverse route.

0.5 13.9 Stop Sign. Turn right (W) on Route 4A.

0.3 14.2 Enter LEMONT.

0.3 14.5 Stop Sign.

0.2 14.7 Stop Sign.

0.2 14.9 Stop sign. Continue ahead (W) past numerous flagstone quarries.

3.3 18.2 Romeo Road. Turn right (W) and cross Alton (Gulf, Mobile & Ohio) R.R. Travel is over rock floor of Desplaines Valley, which was scoured to bedrock by the waters that drained Lake Chicago, which occupied the site of the lower end of Lake Michigan late in the Ice Age. Limestone boulders along fences are all that is left of the glacial till which filled the valley here before the break-through of the Lake Chicago outlet.

0.4 18.6 Cross Illinois-Michigan Canal, loop over Sante Fe R.R. (ROMEO STA.) and cross Chicago Sanitary and Ship Canal.

0.3 18.7 STOP NO. 3. Spoil banks of Niagaran, Romeo dolomite excavated from Chicago Sanitary and Ship Canal.

Upper Desplaines Valley-Gateway to the Southwest

Among the score, more or less, of industrial centers that are the heart of our industrial civilization, the Chicago region holds high rank. An important factor in the development of this industrial and transportation center is the Lower Desplaines Corridor which runs from the west end of Chicago southwest to Joliet and the Illinois Valley.

This broad valley through the rough glacial ridges was cut long ago when Lake Michigan's predecessor, Lake Chicago, drained southwestward to the Mississippi. The great river carried a vast volume of water which was fed to the lake by the melting glacier that lay in the upper end of the Lake Michigan Basin and that blocked the present outlet, by way of the St. Lawrence. When this glacier melted away, the lake waters found the lower outlet, via the St. Lawrence to the Atlantic, and the water surface dropped from a maximum of 635' to its present elevation of 580' above the sea.

The French traders and explorers were the first white men to use the corridor, where they transferred their canoes across the low portage between the Chicago River and the DesPlaines. Long before railroads were thought of, a canal was planned here to connect the Great Lakes Waterway with the Mississippi and by 1848 this channel, from Chicago to Peru, was completed. Lockport was the headquarters of this historic canal and the old building still is standing on Route 4A there.

The railroads were quick to see the advantage of this easy corridor which today carries the main lines of the Santa Fe and the Alton systems. Before the turn of the century the old canal could no longer meet modern transportation requirements. In 1900, the new Chicago Sanitary and Ship Canal was completed. This is 160 feet wide, 24 feet deep, and 34 miles long. Much of it had to be excavated in solid dolomite bedrock, which still remains a high ridge paralleling the canal.

Industries early saw the advantage of locating in this transportation corridor which furnished ready access both by rail and water. The two steel plants and the two great oil refineries passed on the morning route furnish outstanding examples of the close relations between geological features, mineral resources, and industrial might.

The spoil piles have furnished many fine fossil specimens during the intervening half century. The rock at the present stop came from the top of the Silurian, Joliet formation.

0.0 18.7 Continue ahead (W).

0.3 19.0 Cross DesPlaines River.

0.2 19.2 Cross DesPlaines River.

0.3 19.5 Slight rise marking edge of the old Lake Chicago Outlet channel. Note huge boulders, too heavy for the Chicago Outlet river to carry off, as it cut away the rest of the drift cover, down to bedrock.

0.2 19.7 CAUTION. Stop for Route 66A. Continue ahead (W), and ascend low Rockdale Moraine.

2.4 22.1 Four corners. Turn right (N).

0.2 22.3 STOP NO. 4. Lily Cache Slough.

From Lockport, Romeo, and Naperville east is a great morainic belt 10-12 miles wide, known as the Valparaiso Morainic System. As the Valparaiso ice front slowly receded across this wide tract, waters from the melting ice cut substantial valleys through the morainic hills. One of these streams flowed just north of us. Today the valley here has no stream, and is known as Lily Cache Slough.

When Lake Chicago rose until it topped the morainic barrier to the west, the waters found this pre-existing valley and for a short time the lake waters flowed past this point and probably also broke into the valley of Mink Creek to the south. Later the outlet torrents cut away a divide farther south and were diverted to a lower course, which eventually passed by the site of Joliet and became the main outlet valley and finally the DesPlaines Corridor.

0.0 22.3 Continue ahead (N) across Lily Cache Slough.

0.8 23.1 CAUTION. Stop, and cross Route 66.

2.5 25.6 Road turns right (E).

0.4 26.0 Turn sharp left (NW) on blacktop road.

1.2 27.2 STOP NO. 5. View of Valparaiso Moraine front and glacial discharge channel. The high hills rising to the east mark the west edge of the 10-12 mile wide morainic belt known as the Valparaiso Morainic System.

When a glacier advances until it reaches a zone where melting back balances forward motion, the ice front there remains stationary. Meanwhile the forward-moving ice continues to bring up great quantities of earth and rock, which are dropped along the line where the glacier makes its stand. When the climate turns suddenly milder, the ice front rapidly melts back and leaves behind a series of ridges, or "terminal moraines," to mark the line of its farthest advance.

Back of the moraine front, the water from the melting ice accumulates and may eventually break through the moraine line at one or at many points. Here we see a place where a stream (the present East Branch of the DuPage) thus cut a deep valley through the morainic tract, when the glacier stood near the east edge of the wide morainic belt.

Outcrop of typical glacial till in road cut in foreground.

0.4 27.6 Cross East Fork.

0.6 28.2 Outwash gravel along roadside and bank of West Fork.

0.1 28.3 Cross West Fork of DuPage River and turn right (N).

0.2 28.5 STOP NO. 6. West Fork here flows parallel to the edge of the moraine front. A terrace here was built up out of gravel washed out from the moraine as the ice melted. The present stream is in the process of cutting and widening its valley below the outwash terrace level.

Remainder of Route north to Naperville follows west bank of river along west edge of the moraine. The till plain of the Minooka Glacier lies on the left and extends westward some 6 miles to the Minooka Moraine.

2.7 31.2 PIONEER PARK. Site of an old mill, with low ledges of Silurian dolomite along stream.

1.3 32.5 Junction with Route No. 65 in NAPERVILLE.
Outcrops of Silurian dolomite in river banks and old quarries in Naperville.

End of Conference. Bon Voyage!

Recommended for Further Information:

Bulletin No. 51, Illinois State Geological Survey, "Geology and Mineral Resources of the Joliet Quadrangle," D. J. Fisher, 1925.

Bulletin No. 65, Illinois State Geological Survey, "Geology of the Chicago Region," J. Harlen Bretz, 1939.

Bulletin No. 27, Illinois State Geological Survey, "Geography of the Upper Illinois Valley," Carl O. Sauer, 1916.

Price 50 cents each. Free to Illinois schools, scout troops, and other civic organizations.

Illinois State Geological Survey
Urbana, Illinois

PART II. GEOLOGIC HISTORY OF JOLIET REGION

DEEPLY BURIED FORMATIONS

The oldest bedrock which comes to the surface in the Joliet Region is magnesian limestone of Silurian age. From the included "geologic column," it can be seen that those beds, lying below the middle of the Paleozoic System, are very ancient. Deep well borings show that beneath them are shales, limestones, and sandstones of still greater age, belonging to the Ordovician and Cambrian periods. Where these layers come to the surface to the west and northwest, fossils of sea-living animals have been found in many of the strata, showing that the rocks formed as sheets of sediments on the floors of ancient seas.

These horizontal layers of sedimentary rock rest on a foundation of still older rock, mainly crystalline gneiss, schist, granite, and gabbro. Some of these rocks were once sediments that have been twisted and altered by heat and pressure deep in the crust (metamorphic rocks); others were molten rock that flowed deep underground into the twisted mass and there solidified (igneous rocks). Although these rocks do not come to the surface close to Illinois, we find many examples among the glacial boulders and pebbles brought down from the Lake Superior country and Canada by the glaciers of the Ice Age.

SILURIAN BEDROCK

All of the bedrock which crops out in the Joliet region is Silurian in age, and was deposited in a seaway which extended from the Gulf of Mexico through the Mississippi Valley to the Arctic. Except for extremely rare evidences of primitive fish, the life of the Silurian sea was limited to backboneless shell fish, trilobites, corals, crinoids, etc. The Lemont area is especially famous for the pretty trilobite Calymene celebra, but the cephalopods, relatives of the living Pearly Nautilus, also grew to large size, some with straight, chambered shells, others with curved or coiled shells.

THE LOST INTERVAL

After Silurian time, there is reason to believe that later seas of Mississippian, Pennsylvanian, and possibly Devonian age, extended over the Joliet Region, but if so, all of the rock of those periods was removed during the long period of erosion which extended through the hundreds of millions of years involving the Age

of Reptiles (Mexozoic Era) and the Age of Mammals (Tertiary Period). During this whole span of time, the region was above the sea and exposed to the erosive action of the weather and the streams. These removed an unknown thickness of strata and carried away the detritus to be deposited as sediment in remote regions. Not until a scant million years ago, with the coming of the glaciers, do we have any direct record of the events in the Joliet area, beyond the evidence that the erosive action went on.

THE GLACIAL PERIOD

Continental glaciers from the far north invaded northeast Illinois during the Ice Age not once but probably three distinct times. After each invasion the glacial ice melted away and mild climatic conditions returned. Vegetation cloaked the land, and animal life returned to the woods and fields, and to the lakes and streams. These intervals endured for time-spans measurable in hundreds of thousands of years.

The last, or Nebraskan ice advance is not thought to have reached the Joliet area. Of the 2nd and 3rd, Kansan and Illinoian invasions, there is no direct evidence, presumably because the glacial deposits of these early invasions were destroyed or buried by the action of the last, or Wisconsin glacier.

The Wisconsin glaciation covered all of northeastern Illinois and extended as far south as a line Paris-Shelbyville-Decatur and to the west reached the Mississippi in a limited area north of Rock Island. The retreat of the ice sheet from this line was not continuous and steady. After a long retreat, the ice sheet might readvance for a limited distance, and each time this took place a frontal moraine was built. Three such moraines cross the Joliet region, the Minooka, Rockdale, and Valparaiso moraines.

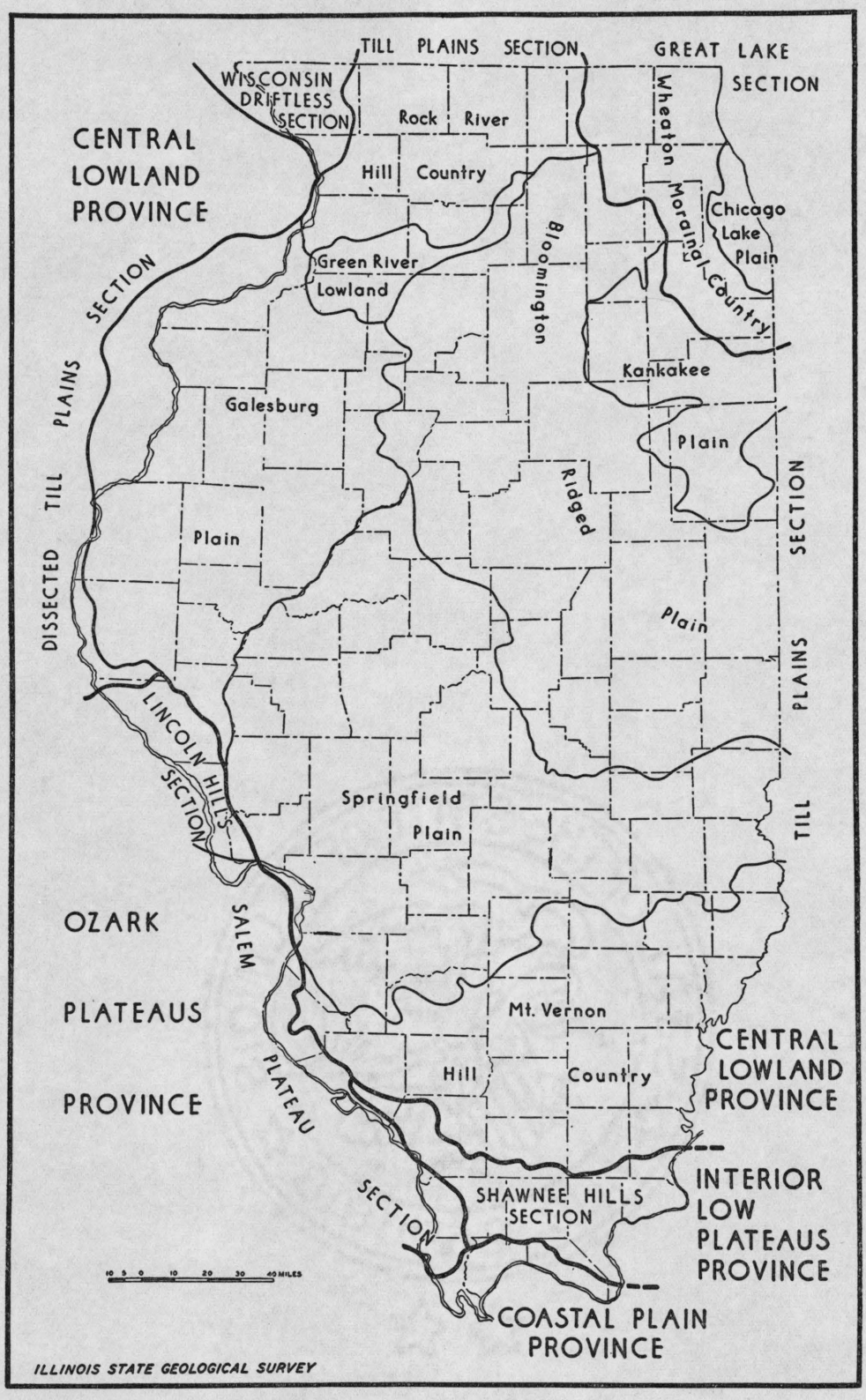
Later, as the glacier retreated up the basin of Lake Michigan, the normal outlet of the lake, via the St. Lawrence, was blocked by the ice masses. The waters in the open south end of the lake basin rose until they flowed over the barriers made by the morainic ridges to the west. The channel cut by this outlet of "Glacial Lake Chicago" is the great valley which today runs from southwest Chicago past Chicago past Sag Bridge, Lemont, Lockport, and Joliet.

In modern times, man has restored the old glacial outlet route for the lake waters by cutting the Chicago Sanitary and Ship Canal. As a result, Lake Michigan today drains in two directions, to the North Atlantic via the St. Lawrence and to the Gulf of Mexico via the Illinois and Mississippi rivers.

GEOLOGICAL COLUMN - JOLIET AREA

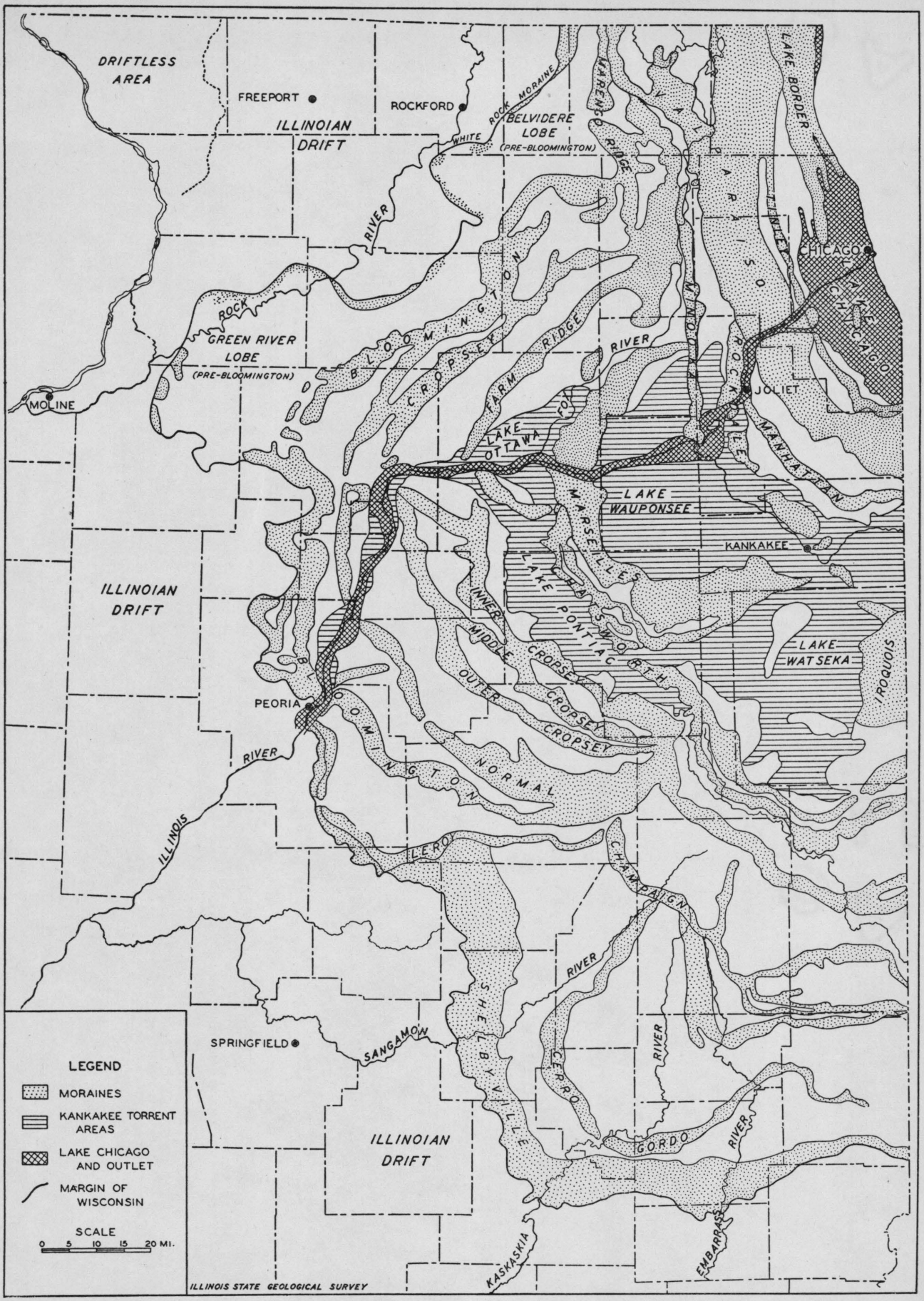
Eras		Periods	Epochs	Remarks
Cenozoic "Recent Life"	(Age of Mammals)	Quaternary	Pleistocene	Wisconsin Glacial Stage Lake Chicago Drainage Channels Valparaiso Glaciation Rockdale Glaciation Minooka Glaciation Illinois Glacial Stage Kansas Glacial Stage
		Tertiary	Pliocene Miocene Oligocene Eocene Paleocene	Not present in the Joliet area
Mesozoic "Middle Life"	(Age of Reptiles)	Cretaceous		Not present in the Joliet area
		Jurassic		Not present in Illinois
		Triassic		Not present in Illinois
Paleozoic "Ancient Life"	Age of Amphibians and Early Plants	Permian		Not present in Illinois
		Pennsylvanian		Not present in Joliet area
		Mississippian		Not present in Joliet area
	Age of Fish	Devonian		Not present in Joliet area
	Age of Invertebrates	Silurian	Cayugan	Not present in Illinois
			Niagaran	Niagaran dolomites
			Alexandrian	Kankakee dolomite Edgewood dolomite
		Ordovician	Upper	Maquoketa shale
			Middle	Galena dolomite Platteville limestone Glenwood sandstone St. Peter sandstone
			Lower	Prairie du Chien Form.
		Cambrian	Upper	Trempealeau Formation Franconia ss. & dol. Galesville sandstone Eau Claire ss. & sh. Mt. Simon sandstone
			Middle	Not present in Illinois
			Lower	
Proterozoic Archeozoic		Referred to as Pre-Cambrian Time		No data available

Found in deep wells only



PHYSIOGRAPHIC DIVISIONS OF ILLINOIS

(Reprinted from Report of Investigations No. 129, Physiographic Divisions of Illinois, by M. M. Leighton, George E. Ekblaw, and Leland Horberg)



GLACIAL GEOLOGY IN NORTHEASTERN ILLINOIS

Compiled by George E. Ekblaw from data furnished by the Survey

January 1, 1942

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