Technical Files

Earth History Field Trip
for High School Science Teachers
West Chicago, Illinois, Oct. 11, 1947

Sponsored by State Geological Survey
M. M. Leighton, Chief
Gilbert O. Raasch, Conference Leader

General Instructions:

1. Please be prepared to leave promptly at 9:00 a.M.

2. Cars will assemble at West Chicago High School.

3. Participants will provide themselves with lunches before starting.

4. At scheduled stops, please assemble promptly near leader to hear his discussion before scattering for individual examination of points of interest; also please be prompt to leave upon signal. This is especially desirable if the group is large.

Instructions for Car Drivers:

To expedite the trip and for safety, please

1. Identify your car by attaching one of the tags provided.
2. Have your car in line before the trip starts.
3. Follow carefully and keep fairly close to the car ahead, with due regard to safety.
4. Keep all gaps in the caravan closed, especially while traveling through the city, in order to prevent other cars from inserting themselves in the caravan or crossing the caravan at intersections.
5. Watch the cars ahead and behind for signals.
6. Keep your place in the caravan so far as possible; do not attempt to pass ahead of any in the caravan unless they drop out of line, nor to gain an advanced position at stops.
7. If for accident or other reason you drop out of line, let those following you proceed, except for such help as may be needed; in case of accident to the rear car of the caravan, signal those ahead.
8. Any car dropping out of line shall take up the rear when rejoining the caravan.
9. When parking in line at stops, draw close to the car ahead; when parking parallel, do not leave unnecessary space between cars.
10. One passenger in each car, preferably sitting beside the driver, should read the itinerary and keep the driver adequately informed with regard to stops, turns, etc.

ITINERARY.

0.0 West Chicago Community High School. S. D. Bishop, Principal. Assemble cars on east side of Joliet Street, headed north.
0.2 Stop. Geneva St.; turn left (West).
0.3 Turn right (North) on Wood St.
0.5 Turn right (East) on Washington St.
1.1 Turn left (North) on Ingalton St.
2.4 Stop. Junction with Highway 59; continue north on 59.
3.4 Stop. Cross Highway 64. Highway 59 travels more or less along the crest of the West Chicago Moraine, which marks the maximum extent of the Cary Ice Sheet of the Wisconsin Glacial Stage. Note flat country to west, which is outwash plain formed in front of the moraine. We travel along the moraine for a distance of 6 miles. The rolling topography, ponds and undrained depressions, occasional large erratic boulders are characteristic of terminal moraines. The West Chicago Moraine is part of the Valparaiso Morainic System, a very prominent topographic feature extending widely through the western Great Lakes Region.
8.1 Cross road. Turn left (West).
8.5 STOP I. Short stop to examine exposure of typical glacial till in road cut.
9.2 STOP II. West edge of West Chicago Moraine. Note till exposure and flat outwash plain lying to west of the moraine.
9.7 Caution. R. R. crossing.
11.4 Highway Junction. Turn right (North).
11.7 Stop. Highway Junction. Turn left (West).
13.1 STOP III. Gravel pit in outwash terrace (formed at West Chicago Stage). Note sorting and stratification of sand and gravel, absence of clay, better rounding of pebbles (as compared with till).
13.2 Turn right (North).
13.5 Turn left (West) and cross R. R. and Fox River.
13.9 Stop. Highway Jct. Turn left (South) on Highway 31.
16.3 STOP IV. Fox River Stone Co. Quarry. Quarry exposes about 35 foot of thin-bedded Silurian, Kankakee Dolomite, which contains fossils including corals, crinoids, hydrocorallines, bryozoa, brachiopods, gastropods, cephalopods, trilobites. At top of quarry is a "smooth surface" which widely marks the top of the Kankakee Formation. Above this may be seen a few inches of the buffy and more porous Joliet Dolomite, also Silurian in age.
16.8 SILVERGLEN: This glen cuts down through the Silurian Dolomite into the Maquoketa Shale of Ordovician Age. The shale and included dolomite layers are fossiliferous (Visit to this locality will depend on the size of the party - limited parking space only).
21.1 Stop. Turn left (East) in St. Charles.
21.3 Stop light. Turn right (South).
23.4 Stop sign. State Street, Geneva. Continue ahead.
26.2 Stop light in Batavia. Straight ahead.
26.6 Turn left into Quarry Park, Batavia.
LUNCH STOP. (V).
26.6 Leave Quarry Park and turn right (North) on Highway 31.
27.0 Stop light. Turn right (East) and cross Fox River.
27.3 Stop light. Turn right (South) on Highway 25.
27.7 STOP VI. Exposure of upper beds of Joliet Formation in quarry.

This is the upper part of this Middle Silurian formation, characterized by layers full of white chert nodules. Below this are more clayey dolomites, the bedding planes of which are marked by the furrows of unknown organisms that scavenged the ancient sea bottom.

Note conspicuous west dip.

27.7 Reverse route north on Highway 25.

28.0 Stop light. Turn left (West) and cross Fox River.

28.4 Stop light. Turn left (South) on Highway 31.

28.7 Turn right (West).

30.7 Turn left (South) on side road. Route for next two miles passes over a portion of the Marseilles Moraine. Note marshes and undrained depressions.

32.7 Turn sharp right (North).

33.8 STOP VII. Peat Deposit from extinct lake which once occupied a depression in old channel of the "Fox River Cut-off".

34.1 Stop. Turn left (West) on Black top road (Batavia Road). For next two miles to Bald Knob, route crosses Fox River Cut-off channel. (For further information see section on geologic history).

36.1 Bald Knob. Cross Sugar Grove - Geneva Road. Bald Knob is made up primarily of glacial till of Gilbert's age, but has gravel of Marseilles Age on its summit. Johnson's Mound, 2 miles northwest is a true kame of the "moulin" type. Both these features suggest that Gilbert's ice became stagnant, and portions of it melted very slowly.

36.6 Junction with road north to LaFox. Continue west. Route for next two miles over Gilbert's ground moraine, in places overlain by Marseilles outwash.

39.2 STOP VIII. Gravel pit in kame. A number of kames were formed along the small east-west valley here, indicating it was a drainage channel under the Gilberts glacier.

39.4 Stop. Highway 47. Turn left (South) on 47.

41.8 Turn right (West), leaving highway 47.

42.5 Cross Kaneville Esker. Deep gravel pit on left.

42.8 Turn left (Southeast). Kaneville Esker on left.

44.0 Stop. Junction with Highway 47. Continue ahead on Highway 47. Kaneville Esker on left.

44.8 Turn left (Northeast) and cross creek.

45.0 STOP IX. Gravel Pit in Kaneville Esker.

This Esker marks the channel of a glacial stream which flowed between ice walls under the Gilbert's Glacier. This is the largest esker in Illinois. It extends 5 miles northwest from this pit and 2 1/2 miles easterly. In the latter direction it was over-ridden by the ice of the Marseilles Glacier which advanced almost to this point.

Sugar Grove is two miles south; Aurora 6 miles east.

BON VOYAGE!

GENERALIZED GEOLOGIC COLUMN
FOR WEST CHICAGO AREA
Prepared by the Illinois State Geological Survey

ERAS		PERIODS	EPOCHS	FORMATIONS
Cenozoic "Recent Life" (Age of Mammals)		Quaternary	Pleistocene	*Recent post-glacial stage *Wisconsin glacial stage *Sangamon interglacial stage *Illinoian glacial stage Yarmouth interglacial stage Kansan glacial stage Aftonian interglacial stage Nebraskan glacial stage
		Tertiary	Pliocene Miocene Oligocene Eocene	Not present in West Chicago Area
Mesozoic "Middle Life" "Age of Reptiles)		Cretaceous		Present in extreme southern Illinois only
		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 West Chicago Area
		Mississippian	Upper Lower	Not present in West Chicago Area
	Age of Fishes	Devonian		Not present in West Chicago Area
	Age of Invertebrates	Silurian	Upper Middle Lower	 Joliet dolomite Kankakee dolomite Edgewood dolomite
		Ordovician	Upper Middle Lower	Maquoketa shales & limestones Dolomites & sandstones lying 200 feet below surface
		Cambrian		Sandstones and dolomites lying over 1000 feet below the surface
Proterozoic Archeozoic		Referred to as "Pre-Cambrian" time.		

Oct., 1947 RWE

* Deposits present in West Chicago Area.

GEOLOGIC HISTORY OF THE AREA

DEEPLY BURIED FORMATIONS

The oldest bedrock which comes to the surface in the field trip area is shale and limestone of late Ordovician age. From the accompanying geologic column, it can be seen that these beds, lying low in the Paleozoic System, are very ancient. Deep well borings show that beneath them are older dolomites and sandstones of Ordovician age, under which lies a thick series of Cambrian sandstones, dolomites, and shales. Deepest borings reveal red sandstones belonging to the very ancient pre-Cambrian complex. Many of the Cambrian and Ordovician layers contain abundant fossils of marine animals. These show clearly that ancient seas covered Illinois and the interior of the North American Continent.

ORDOVICIAN STRATA

The Upper Ordovician shales and limestones which outcrop beneath jutting ledges of Silurian dolomite along the Fox River belong to the Maquoketa Formation. The beds contain an abundance of fossils, notably brachiopod shells and the coral-like bryozoa. Because the shales are soft and weak and the overlying Silurian dolomite is strong and firm, this combination of strata has caused small cascades to develop in the rocky glens along the Fox from Elgin to St. Charles.

SILURIAN STRATA

The Silurian strata that lie above the Maquoketa Formation are dolomites belonging to the Edgewood, Kankakee, and Joliet Formations, in that ascending order. These formations range from Lower to Middle Silurian in age and are distinguished from one another by differences in character of the dolomite and of the fossil content. These dolomites are a valuable mineral resource quarried for building stone, crushed to use for roads and concrete, and ground for agstone to sweeten the soil.

YOUNGER PALEOZOIC STRATA

The Silurian strataare the youngest bedrock layers present in the area, but it most is most probable that younger strata, of Mississippian Age once covered the region, with a possibility that Devonian and Pennsylvanian strata also were once present.

LONG INTERVAL OF EROSION

Whether or not any or all these beds existed in the area, there has been ample time for their subsequent removal by the wearing-down forces of erosion. From late in the Paleozoic Era until the present day, the region has been a land area, from which earth and stone have been worn away by water and wind. As a result of these circumstances, there remains little or no direct evidence of the geologic events that took place during those hundreds of millions of years of geologic time. Not until the geologic yesterday, when the glacial ice sheets moved down from the arctic, do we again find deposits, in the form of glacial debris, which can be used as evidence in the reconstruction of the area's geologic history.

GLACIAL PERIOD

To the geologist, the Glacial, or Pleistocene, Period merges insensibly with the present. A mere 25,000 years or so has elapsed since the last ice sheet melted away, and in that short span, erosion has only just begun to strip away the glacial deposits. Thus we can work out the Pleistocene history in very considerable detail. We know, for instance, that during the Ice Age, there were four separate major advances of continental glaciers, with warm climate intervals between. These intervals were far longer in duration than has been the length of time since the last ice sheet, the Wisconsin, disappeared from this region. Before the Wisconsin Ice Sheet, was the Illinoian, preceded by the Kansan, and that in turn by the Nebraskan.

We do not know, through lack of evidence, whether all four of these ice sheets covered the present area; but there is definite record of the Illinoian and abundant evidence of the Wisconsin. Between these two glacial invasions, there intervened a mild climate period of a couple of hundred thousand years. Under these conditions, there at first accumulated over the uplands a blanket of wind blown dust that the winds picked up from the raw glacial deposits in the sediment-choked rivers and sifted gently across the prairies and highlands. In time, soils developed, and the humic acids and downward percolating rain waters (high in carbonic acid) leached and chemically changed the underlying glacial drift and debris.

MORAINES

The region visited by the field excursion is one famous in North America for the complexity of its glacial history and the remarkable preservation of its glacial deposits. The deposits of continental glaciers assume many forms and conditions. First, there are the moraines, composed largely of glacial till. Till is a mixed and unsorted mass of clay, silt, sand, pebbles, cobbles, boulders -- whatever material was incorporated in the glacial ice and was left behind when the glacier melted away. Till is generally present as a more or less continuous blanket covering the surface over which the glacier moved. In areas where the glacier advanced rapidly the till blanket may be relatively level and thin; this is the "ground moraine". Where melting and forward movement were nicely balanced, so that the ice margin was stable for a long period, "terminal moraines" developed that are characterized by greater elevation, by a rolling or "knoll and kettle" topography, and commonly show numbers of large glacial boulders, or "erratics". In addition to the till deposits are glacio-fluvial or glacio-lacustrine deposits, -- that is, glacial drift that has been effected by transportation and deposition in glacial lakes or streams. The most outstanding manifestations of this type are glacial outwash, eskers, and kames.

GLACIAL OUTWASH

When the ground in front of a melting glacier slopes gently away from the ice front, the waters streaming down slope from the melting ice, deposit sand and gravel in alluvial fans. These fans eventually coelesce to form an outwash apron or outwash plain. The most evident outwash plain to be observed along the conference route is that in front of thw West Chicago Moraine.

KAMES

When ground in front of a glacier slopes toward the glacier, the waters from the melting ice are ponded and glacial lakes are formed, surrounded by high ground on the one hand and by the high ice wall on the other. When streams flowing out of the melting ice enter such temporary lakes, deltas are formed which have one side built against the ice wall. When the ice wall melts away, this delta slumps to a rounded knoll of sand and gravel, called a "kame". A typical kame may be seen east of the Junction between Highway 47 and the Batavia Road

ESKERS

The streams which flow upon or under a melting glacier, deposit sand and gravel in their channels just as other streams do. When the ice which walled the banks of these glacial streams melts away, the stream bed is left as a more or less winding raised embankment stretching across the country like a meandering railroad grade Generally its interior will have been hollowed out by man, because eskers are important sources of clean, fresh sand and gravel. The Kaneville Esker northwest of Sugar Grove is the longest in Illinois.

MORAINES IN THE WEST CHICAGO REGION

In that tract of country lying between Illinois Highways 59 and 47 along the general latitude of Lily Lake - W. Chicago, the following moraine lines are encountered in going from east to west:

Cary Sub-epoch
  West Chicago Moraine

Tazewell Sub-epoch
  Minooka Moraine
  Marseilles Moraine
  Gilberts Moraine
  Marengo Ridge

HISTORY OF FOX RIVER

Before the coming of the Wisconsin Glacier, the Fox River did not exist. A study of the bedrock surface shows the existence of a well developed natural drainage pattern that has no relation to that existing in this area today.

The first occurrence of a sizeable stream along the general course of the present day Fox appears to have developed late in the Marseilles stage of glaciation, when the ice front had melted back until it lay east of where the river now flows. Water from the melting ice, in seeking to find its way southward down slope in front of the glacier developed this ancestral Fox Valley.

Then, during the next, or Minooka stage, the glacier pushed forward again and crossed the ancestral Fox from St. Charles north to Elgin. This caused the river there to swing westward and carve a new channel well shown in the vicinity of the State School for boys 3 miles west of St. Charles.

The conference route crosses this Fox River Cut-off just east of Bald Knob. Southward the cut-off followed several different courses at different times.

Finally, when the Minooka readvance was dissipated by melting, the river regained its old valley. Later, when the Late Wisconsin glacier stood along the line of the West Chicago Moraine, great quantities of sand and gravel were discharged westward into the valley, which built its floor of sediment up to the high level of the gravel terrace which flanks the river today. Since then, the river has been lowering its channel as it proceeds to cut away this load of West Chicago glacial outwash.

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Teachers Field Trip

Reorder No. 1112-⅓

PARK BRAND FOLDER

HEAVY WEIGHT