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

EARTH SCIENCE FIELD TRIP

GUIDE LEAFLET

ELIZABETH AREA

JO DAVIESS COUNTY

ELIZABETH AND GALENA QUADRANGLES

Leader
George M. Wilson

Urbana, Illinois
September 21, 1957

GUIDE LEAFLET 57D

HOST: ELIZABETH HIGH SCHOOL

ITINERARY

0.0 0.0 Caravan assembles in front of Elizabeth High School, headed south. Turn left entering Route 20.

0.3 0.3 Caution, intersection. Bear right.

0.1 0.4 Bear right.

0.1 0.5 Intersection, go straight ahead. Route 20 follows high ridge capped by Silurian dolomite, which is in turn covered by a cherty residue mixed with clay and loess. The cherty residue is called geest.

1.1 1.6 Note the thin-bedded cherty Silurian dolomite in the roadcut.

0.2 1.8 Note the excellent view of the countryside to the right and left. This is Terrapin Ridge, which is one of many erosional remnants in this area. The upper surface of these ridges is of essentially the same elevation and we believe that this is a portion of the Old Dodgeville Peneplain. The elevation here is approximately 1000 feet. In pre-glacial times this surface of 1000-1100 feet represented an erosion surface. Since that time streams have been rejuvenated and during pre-glacial and glacial times the stream erosion has produced the mature topography that we now see.

0.7 2.5 Slow, turn right.

0.5 3.0 Note the thin-bedded flaggy dolomite on the left.

0.6 3.6 Turn left at forks in road.

0.3 3.9 STOP NO. 1. Flaggy Silurian dolomite in road cut on left.

At this point we see the contact between the Silurian system and the Ordovician system. The formations here are the Edgewood dolomite in contact with the Ordovician Maquoketa shale.

It is noteworthy that the land use practices being followed in the farm in the valley are particularly good. In contour farming the land is used in such a manner that the velocity of the water falling on the surface is slowed. The corn is planted on the contour and the rows do not go up and down the hills but around them.

1.4 5.3 Note the quarry in the upper portion of the Galena formation on the left.

0.5 5.8 STOP NO. 2. Silurian dolomite.

Here the stratigraphic situation is as follows:

Section	Ft.
Loess	
Residual clay and chert	
Dolomite, thin bedded, with interbedded chert (This is the uppermost formation of the Alexandrian, called the Kankakee formation.)	20
Dolomite, thick bedded, greenish cast (This is the Edgewood formation of the Alexandrian Series.)	25

This series of beds in this locality is not especially fossiliferous, but shows the occurrence of chert in dolomitic limestone in a rather spectacular fashion.

0.4 6.2 Intersection, road from left. Continue ahead.

0.4 6.6 STOP NO. 3. An excellent view of the valley of Little Rush Creek.

This is a view of a valley in typical maturity. The top of the ridge is in Silurian dolomite.

The slopes of the hills are developed in the Maquoketa formation and the lower portion of the valleys are in the Galena.

As you have undoubtedly heard or read, this area is called the "Driftless Area." This is not true, for at isolated spots one may find glacial till. The streams of the region have glacial terrace deposits and the entire region is covered by loess, which is also of glacial origin. Glacial drift in itself covers materials of glacial origin.

During glacial times glaciers approached this region from the northwest, at later times from the northeast and the north. In the southwestern portion of Wisconsin, the northeast portion of Iowa and northeastern Illinois lies an area that is believed never to have been glaciated.

Later in the day we will see the gorge of the Mississippi which was cut into the topography. It has been suggested that the present course of the Mississippi was forced into its present course during Nebraskan time, which is the earliest stage of the Pleistocene. During the succeeding glacial stages the gorge itself was cut to a considerable depth by the great flow of water and suspended material. The stream channel is filled to a depth of 200 feet at least with stream sediments during the later portion of the Wisconsin stage by the diminishing glaciers as they melted back onto the Canadian Shield.

We assume that during this time the valley was filled from wall to wall with torrents of water during the summer season. As winter approached the volume of water drastically diminished and as a result, a great expanse of unvegetated silt and sand was left in the valley. The exposed valley flat was the source of the fine sand and silt which was picked up by the winds and deposited on the upland. From the thickness of the loess on the east side of the valley, we know that during the Pleistocene the prevailing wind was from the west-southwest.

0.6 7.2 Note the flaggy nature of the dolomite in the road cut on the left.

0.1 7.3 Road on right, caution.

0.1 7.4 Derinda Center. Road intersection, caution. Turn right.

0.7 8.1 Note the terraces on the right and left. During the alluviation of the Mississippi during the Pleistocene the stream was filled to a considerably higher level than at the present and as a result the tributaries of the Mississippi also built up their valleys. We see at least two groups of terraces developed in the tributaries. These are slack-water deposits.

0.5 8.6 Note terraces on right and left.

1.1 9.7 Note accumulation of residual chert on slope of hill on the right.

0.3 10.0 Note abandoned quarry in Silurian dolomite on right.

0.8 10.8 Slow, turn right.

1.0 11.8 Caution, road enters from left.

0.3 12.1 Caution, T-road. Continue ahead.

0.1 12.2 Shift into second gear and descend hill. The hill here is capped by Silurian dolomite. Note the residual material as we descend the hill.

0.4 12.6 Note how the slope of the hill diminishes as we enter the Maquoketa portion of the hill.

0.6 13.2 Note the terrace remnants on the valley slopes.

0.4 13.6 Slow, danger. Turn right, then left, then right. Crossing Wolf Creek. Look at the map and see the straightness of the valley here. Possibly the stream follows an east-west joint. The stream affords an opportunity to look at the nature of the alluvial deposits in the valley (residual chert and silt).

0.7 14.3 Slow, caution. Railroad crossing.

0.3 14.6 Turn right on curve.

0.1 14.7 Turn left. Caution, street intersection in town of Elizabeth.

0.1 14.8 Stop, turn left. Entering U.S. 20.

0.2 15.0 Note hummocky nature of pasture on the right. Along Apple River valley in the vicinity of Elizabeth lead diggings in the surficial material was carried on during the latter part of the 19th century. At the present time one may even now find small crystals of galena.

0.3 15.3 Slow, caution, turn left.

0.3 15.6 STOP NO. 4. Quarry in Galena dolomite of Ordovician age.

The sequence of rocks is as follows:

Section	Ft.
Dolomite, medium bedded to flaggy (Dubuque member)	15
Dolomite, thin-bedded, weak	10

Fossils may be found in moderate amounts in both members of the Galena formation.

Of especial interest in this quarry are the joints that are well shown in the walls and floor. The first mining in the Galena-Dubuque area was in the jointed dolomite. The mineral obtained from these east-west joints was principally galena. Prospecting for the top run deposits is done by searching for the joints in the streams and gullies.

It is in the open clay filled joints that prospecting takes place. The example in this quarry shows the nature of such clay filled joints.

0.3 15.9 Turn right on curve. Note the old abandoned lead mine in the valley on the south side of Wolf Creek. This mine was in a crevice or joint filling.

0.2 16.1 Note terrace on the south side of valley.

0.1 16.2 Caution, slow, fork in road. Continue ahead.
Caution, railroad crossing.

0.6 16.8 Bear left.

0.2 17.0 Note flatness of upland surface in the Apple River Valley.

0.2 17.2 Slow, caution. Overpass over railroad. Turn left and right.
Note the soil profile developed in the loess on the left.

0.9 18.1 Note terrace on left

Section	Ft.	In.
Silt, fine to medium grained, gray	6	
Limonitic band		2-3
Silt, gray, medium grained	2	

0.2 18.3 Note thickness of loess on hill on left.

0.5 18.8 Apple River on right.

0.3 19.1 Caution, road intersection. Turn right.

0.2 19.3 Turn left.

0.1 19.4 Note high Silurian capped hills on left.

0.2 19.6 Note terrace surface on right and entrenchment of small stream into the terrace.

0.7 20.3 Note the loess and silt accumulation on the left. The lower portion of this outcrop is laminated and cross-bedded. Several loess kindchen are in evidence here. Loess kindchen are calcareous concretions that develop in calcareous loess and silt.

0.2 20.5 Caution, slow, T-road. Turn right.

0.1 20.6 Descend terrace.

0.2 20.8 Turn left, entering Hanover.

0.1 20.9 Turn right.

0.1 21.0 Turn left.

0.1 21.1 Stop, caution. Cross U.S. Route 20 and enter parking area of the Hanover School.
STOP NO. 5. LUNCH.

0.1 21.2 Leave parking area, turn left.

0.1 21.3 Turn right.

0.1 21.4 Stop, caution. Enter U.S. Route 20, turn left.

0.3 21.7 Slow, turn right.

0.2 21.9 Slow, turn hard left.

0.5 22.4 Turn right.

0.6 23.0 Note silt on left side of road covered by dune sand.

0.1 23.1 Dune sand on right.

0.1 23.2 Note quarry on left in lower Silurian dolomite with thin-bedded chert.

Section	Ft.
Dolomite, thin-bedded	15
Dolomite, thin-bedded, with thin bands and nodules of chert	8
Sparsely fossiliferous.	

0.2 23.4 Dune sand on right and crest of ridge.

0.2 23.6 Note reddish residual material immediately under the surface and the talus blocks of dolomite and residual chert in roadcut on left.

0.2 23.8 Note the flattened terraces at elevation of approximately 780 feet.

0.3 24.1 Note a lower terrace level.

0.2 24.3 Note the loess on silt on the right.

0.2 24.5 Note the two terrace levels on the left.

0.1 24.6 Note the dune sand on loess on right.

0.1 24.7 Loess in roadcut.

0.5 25.2 Note the sand dune area on the left across the railroad tracks, and the Maquoketa shale on the right.

0.4 25.6 STOP NO. 6. Soil section.

Section	Ft.	In.
Gray silty, sandy soil zone		8
Fine buff colored silt		6-8
Silt, brown, clayey	1	6
Residual chert with brown clayey silt and dolomitic limestone	2	
Maquoketa shale, olive colored with brown iron-stone concretions	8	

0.1 25.7 Note terraces on right, some 25 feet above the level of the road and that they are truncated at the mouth of the stream.

0.6 26.3 On a glacial outwash terrace.

0.5 26.8 Note the nature of the tributary valley terrace material on the right, being composed of sand, residual chert and dolomite.

0.3 27.1 Sand dunes covered with grass and trees on the right.

0.5 27.6 Terrace material on right, showing profile.

Section	Ft.
Loess	4
Silt, laminated	1
Rubble of chert and sand	1

1.0 28.6 Blanding. Turn right. Note terraces ahead.

0.1 28.7 Sand dunes and loess-covered hills on left.

0.4 29.1 Note the coarseness of terrace deposits on right.

0.2 29.3 As we approach the Mississippi River the thickness of the loess increases.

0.8 30.1 Loess in road cut on right.

0.2 30.3 Road forks, bear left.

0.1 30.4 Base of Silurian.

0.8 31.2 Road intersection, continue right.

0.3 31.5 Mississippi River on far left. Note the depth of the cutting into the valley.

0.3 31.8 Note erosion in loess on right.

0.2 32.0 Caution, slow. Road intersection, continue ahead.

0.7 32.7 Slow, caution, cross roads. Continue ahead.

0.7 33.4 Note view of Mississippi. STOP NO. 7.

Note the terrace remnants on the south side of the tributary valley and the old peneplain surfaces. The upper flat surface is the Dodgeville and the lower is the Lancaster.

In preglacial times in a time before the super-position of the Mississippi River on the present topography, the upland surface of this region which now is found at approximately 1000-1100 feet above sea level, existed a broad undulating plain, which we now refer to as a peneplain. Then after rejuvenation, the streams again cut into the surface and carried away the lower portion of the Silurian (here in this region) and heavily dissected the Maquoketa and developed a new peneplain surface above the top of the Galena formation (in this region).

This long erosion cycle is referred to as the Pliocene in this area. We have no means of evaluating the things that happened in this section of the country between the Silurian and the Pliocene. To the south in the Port Byron area there was an overlap of Pennsylvanian rocks on the Silurian. In most of Illinois we infer that near the close of the Paleozoic era deposition of sediments ceased and for a lapse of many millions of years the center portion of the United States was subjected to erosion. Virtually all of the Mesozoic era was spent in erosion of this large area.

0.5 33.9 Excellent view of Mississippi River and terraces in the tributary streams.

1.1 35.0 Notice the cut terrace in the points adjacent to the Mississippi. The Tri-State Zinc Co. plant lies in the lower ground immediately to the left.

0.2 35.2 T-road on right.

0.1 35.3 Slow. Note the Silurian dolomite hills making up the skyline in the immediate foreground.

0.6 35.9 Shift into second gear. Note the flat upland surface and the terrace in the valley of the Mississippi. Pilot Knob lies on the left.

0.6 36.5 High cut terrace on the right and left.

0.3 36.8 Lower level terrace on the right.

0.2 37.0 Slow, caution, rough bridge. Note the depth of entrenchment of Smallpox Creek.

0.2 37.2 Note terraces on the left as we make hard turn to the right.

1.3 38.5 T-road on right.

0.5 39.0 Note Silurian capped hill on right and left.

0.1 39.1 Danger, slow. Turn left.

0.1 39.2 T-road on right.

0.3 39.5 Go left. Note the terraces of the Mississippi ahead and on the right.

1.7 41.2 Note the large waste pile of the lead and zinc mine on the right.

0.1 41.3 Caution. Road intersection.

0.2 41.5 Slow. Narrow bridge.

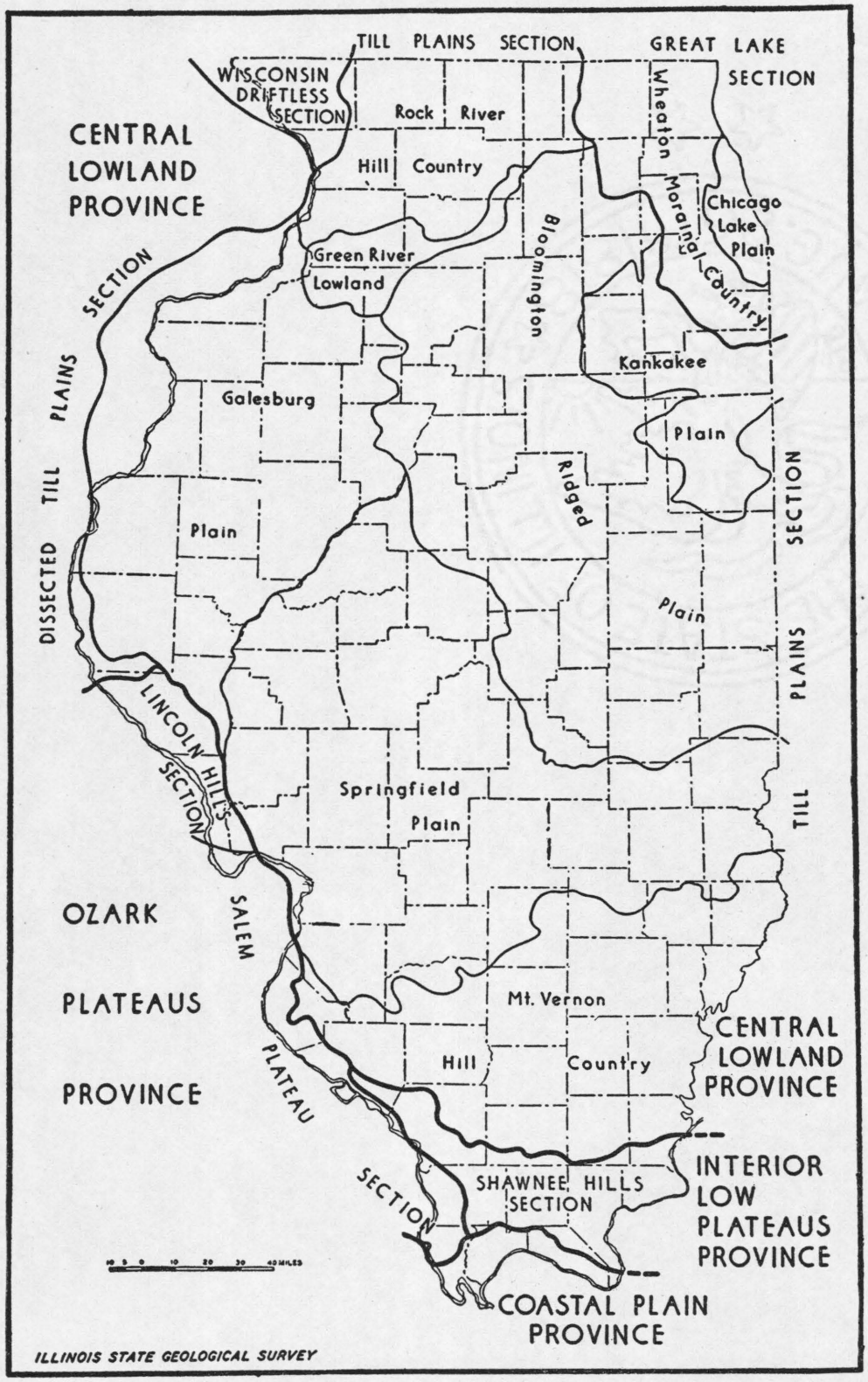
0.5 42.0 Turn left into the yard of the Tri-State Zinc Co.
STOP NO. 8.

To return to the highway leave the mine yard, turn right and follow the main travelled road to Galena and Route 20.

Adios! Hasta Manana!

GENERALIZED GEOLOGIC COLUMN FOR GALENA AREA

ERAS		PERIODS	EPOCHS	REMARKS
Cenozoic "Recent Life"	Age of Mammals	Quaternary	Pleistocene	Loess deposits on upland; & Mankato Terrace Alluvium. Dune sand along Mississippi.
		Tertiary	Pliocene Miocene Oligocene Eocene Paleocene	Not present in Jo Daviess County
Mesozoic "Middle Life"	Age of Reptiles	Cretaceous		Present only in extreme southern Illinois.
		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 Jo Daviess County
		Mississippian		Not present in Jo Daviess County
	Age of Fishes	Devonian		Not present in Jo Daviess County
	Age of Invertebrates	Silurian	Cayugan	Not present in this area
			Niagaran	Present only on highest mounds south of trip area
			Alexandrian	Kankakee cherty dolomite Edgewood thin-bedded earthy dolomite
		Ordovician	Cincinnatian	Maquoketa shale and shaly limestone
			Mohawkian	Galena dolomite - in outcrop Decorah formation) Platteville ls.) in wells Glenwood formation)
			Chazyan	St. Peter ss. - in wells
			Prairie du Chien	Shakopee dolomite) New Richmond ss.) in wells Oneota dolomite)
		Cambrian		In deep wells only
Proterozoic Archeozoic		Referred to as "Pre-Cambrian" time.		No data available



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)

COMMON TYPES of ILLINOIS FOSSILS

GRAPTOLITE

Cup coral

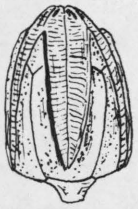
Lithostrotion

CORALS

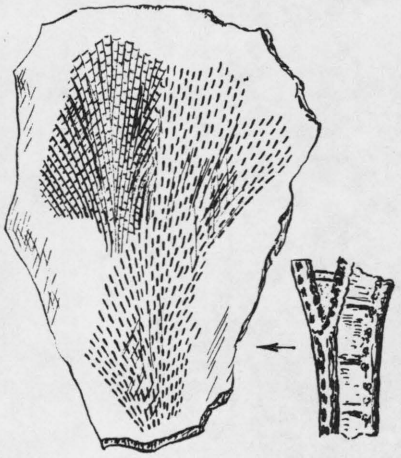
Honeycomb coral

CRINOID

CYSTOID

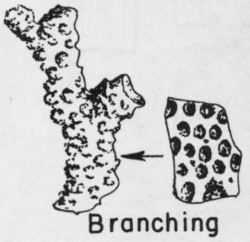


PENTREMITE



Fenestella

Archimedes



Branching

BRYOZOA

Lingula

Orbiculoidea

Spiriferoid

Productoid

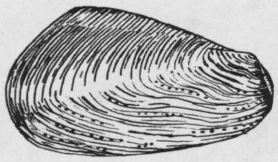
Composita

Pentameroid

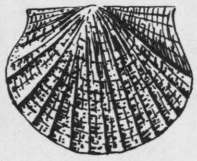
BRACHIOPODS

M.M.C.

COMMON TYPES of ILLINOIS FOSSILS



"Clam"

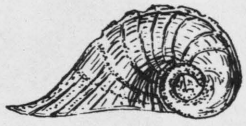


"Scallop"

PELECYPODS

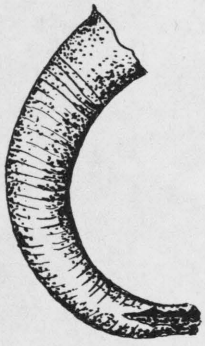
High- spired

Low - spired



Flat - spired

GASTROPODS



Curved cone

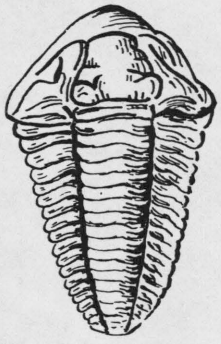
Straight cone

Coiled cone
(Nautilus)

CEPHALOPODS

Bumastus

Calymene
(coiled)



Calymene
(flat)

TRILOBITES

OSTRACODS
(greatly enlarged)

M.M.C.

ELIZABETH FIELD TRIP

September 21, 1957