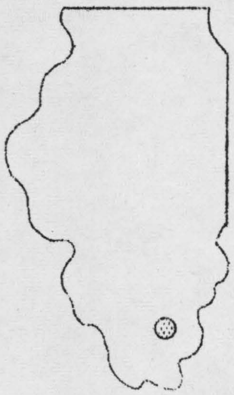
Geol. Survey

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

GEOLOGICAL SCIENCE FIELD TRIP
GUIDE LEAFLET
HARRISBURG AREA

SALINE AND GALLATIN COUNTIES

HARRISBURG AND EQUALITY QUADRANGLES



Leaders
I. Edgar Odom, Guy Dow

Urbana, Illinois
October 15, 1960

GUIDE LEAFLET 60-F

HOST: HARRISBURG HIGH SCHOOL

HARRISBURG GEOLOGICAL SCIENCE FIELD TRIP

ITINERARY

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

0.0 0.0 Caravan assembles in front of Harrisburg Township High School, headed east.

0.0 0.0 Turn left on Green Street.

0.2 0.2 Turn right on Sloan Street.

0.2 0.4 STOP. Continue ahead on Sloan Street.

0.1 0.5 STOP. Continue ahead on Sloan Street.

0.2 0.7 STOP. Junction Highways 34 and 45. Turn right on Highway 34.

0.5 1.2 Note the abandoned brick plant on the right.

0.6 1.8 SLOW. Entering village of Pankeyville, speed limit 40 mph.

0.8 2.6 Note strip mine in Herrin No. 6 Coal on left.

0.8 3.4 Note the Shawnee Hills on the horizon to the left.

0.5 3.9 SLOW. Turn left on county gravel road.

0.1 4.0 This county road runs across the broad flat Saline River Valley. This valley was once the site of a glacial lake.

0.4 4.4 Note the Shawnee Hills towering above the flat countryside.

2.3 6.7 The monotonous flatness of this former lake plain is very striking.

1.1 7.8 SLOW. Saline River bridge.

0.4 8.2 T-road north. Continue straight ahead.

0.6 8.8 STOP 1. Somerset Coal Mine, Saxton Coal Co., DeKoven and Davis Coal Beds.

In the high wall on the west side of the road two coal beds are exposed. The upper bed is the DeKoven and the lower the Davis. In Saline and Gallatin Counties these coals are remarkably persistent and average approximately 3 feet in thickness, but to the east and north they rapidly thin and are almost unrecognizable. These coals are strip mined in this area wherever they are sufficiently near the surface for economical exploitation.

Exposure of two coal beds in the same high wall is not common in Illinois; in fact, the number of mines that produce two seams in one operation can be counted on one hand.

The DeKoven and Davis coals are separated by only 15 to 30 feet of intervening rock, and this permits double seam mining here and along the south edge of the Eagle Valley Syncline.

There is little difference in the physical or chemical quality of these two coals. Both are typically bright banded coals that have a prominently developed cleat that results in a large percentage of small-sized pieces in the mined coal.

Where do the DeKoven and Davis coals occur in the rock column in relationship to the Herrin No. 6 and the Harrisburg No. 5 coals? In this area the DeKoven lies on the average approximately 250 feet deeper than the Harrisburg No. 5 coal and 350 feet deeper than the Herrin No. 6 coal. An obvious feature of the coals exposed here is the northerly slope or dip northward toward the Illinois Basin. This feature is a result of the folding and faulting that has occurred in this area which we will consider in greater detail later today. To emphasize this point, we might add that only five miles north of this location, the DeKoven and Davis coals occur approximately 560 feet below the surface.

The general section exposed is as follows:

	Feet	Inches
Soil and loess	5	
Siltstone	8	
Gray shale	14	
Coal (DeKoven)	2	10
Underclay	2	
Siltstone	5	
Gray shale	11	
Black shale	5	
Coal (Davis)	3+	
Underclay	---	

Now that we have talked about several commercially important coal beds, let us consider the origin of the coals, the rocks in which the coal occurs, and the environment and age of formation.

The coals of Illinois occur in the Pennsylvanian System of rocks. Pennsylvanian rocks consist of many different types, the outstanding type being coal. In Illinois, coals are commonly overlain by black sheety shale ("roof slate") followed by limestone with marine fossils. The limestone is usually overlain by gray shale which also contains marine fossils. Beneath the coal there is an underclay, sometimes underlain by limestone or shale, then sandstone. This type of rhythmic succession of different kinds of strata is repeated in much the same sequence some 50 times where the Pennsylvanian rocks are thickest. Each rhythmic succession of Pennsylvanian rocks is called a cyclothem. An attached sheet shows an ideally complete cyclothem, but seldom do we find all the units present.

The thickness of the Pennsylvanian System and individual cyclothems varies greatly from place to place. An example of this is the interval between the Colchester (No. 2) coal and the base of the Pennsylvanian which averages about 125 feet in western Illinois, while in the southeastern part of the state, this part of the Pennsylvanian column is represented by about 1200 feet of strata. Although deposition started relatively early in Pennsylvanian time in western Illinois, it either proceeded very slowly or was interrupted frequently by intervals when no sediments were deposited.

The many different rock types in the Pennsylvanian System indicate many rapid changes of environment which took place repeatedly. At that time rivers were bringing sediments from the north and east, possibly from as far away as the present Atlantic coast and the region south of Hudson Bay. The midwest was a low, flat, swampy area, lying just a little above sea level but subjected to frequent marine invasions as the land rose or sank or the sea level raised or lowered. That these conditions existed is evident from the nature of the sediments. Many of the shales, limestones, and ironstones above the coals contain marine fossils. The coals are believed to have formed in broad fresh-water marshes somewhat like the Dismal Swamp of Virginia. Most of the sandstones, conglomerates, underclays, underclay limestones, and some shales probably accumulated in fresh-water environments such as river valleys, lagoons, lakes, or lowland plains. There is no area in the world today that has conditions like those that existed during "Coal Measures" time.

The plants and trees that grew in "Coal Measures" time were very luxuriant. In the jungle-like growths, the plants most common were huge tree ferns that had fronds five or six feet long and grew to a height of more than 50 feet. Along with them were seed ferns now extinct, giant scouring rushes, and large scale trees which grew to heights of 100 feet or more.

The large scale trees we find preserved in the coals do not have growth rings. The luxuriant growth and lack of growth rings probably indicate that the climate that prevailed at this time was warm and without seasonal change. As the plants fell into the swampy waters, they were partially preserved, buried by later sediments and converted into coal.

0.1 8.9 SLOW. Caution. Railroad track.

0.5 9.4 SLOW. Turn left.

0.1 9.5 Note the rugged cliffs along the front of the Shawnee Hills dead ahead.

0.1 9.6 T-road south. Continue ahead.

0.4 10.0 Note how abruptly the Shawnee Hills jut up above the flat Saline River Valley.

0.3 10.3 Note the conspicuous band of sandstone rock near the top of the Shawnee Hills. This is Lower Pennsylvanian sandstone.

0.3 10.6 SLOW. Turn right on road to Stone Face.

0.3 10.9 Entering Stone Face recreation area. Keep to right.

0.2 11.1 STOP 2. Old Stone Face. (Walk of one quarter mile)

Situated high on the bluffs, overlooking Saline Valley, is a natural feature hailed by many as one of the outstanding scenic attractions in southern Illinois. This much publicized feature is OLD STONE FACE. Clarence Bonnell stated that many important events in the history of this region have been witnessed by the rock profile. It is true that it witnessed one of the great ice sheets of the Glacial Period advance almost to the base of the Shawnee Hills, as well as several Indian civilizations and the pioneering struggles of the white man.

Old Stone Face, as well as the sheer bluffs that mark the front of the Shawnee Hills in this area, is composed of conglomeratic sandstone of Lower Pennsylvanian age. This sandstone, in its normal position, lies several hundred feet below the DeKoven and Davis coals seen at the last stop. However, here, the sandstone lies 500 feet above the outcrop of the DeKoven and Davis coals.

Why does this relationship exist? Between Stop 1 and Old Stone Face occurs the Shawneetown fault zone, a fracture in the rocks along which movement of the earth on either side of the fault has occurred. The south side, or the side where Old Stone Face occurs, was raised approximately 1,200 feet above the north side where the DeKoven and Davis coals were seen. Erosion has removed from the south side all the shales, coals, and thin sandstones down to the resistant Lower Pennsylvanian sandstones. Because this sandstone is composed of quartz sand and is tightly cemented, it is resistant and not easily destroyed by erosion.

It can be said that the height of the Shawnee Hills today is due to resistant rocks, holding up the higher points, rather than to the fact that these hills were once raised several hundred feet above the area to the north.

Too often, superstition enters into explanations of the origin of such features as Old Stone Face. This feature is a result of normal weathering processes and of the cementation of the sandstone. The cementing material, mostly iron oxide, holds the sand grains of the sandstone in such a way that the attack of weathering elements have caraved the shape of a face into the stone. All will agree that Old Stone Face is intriguing in its picturesque setting at the top of the Shawnee Hills.

0.0 11.1 Turn around and return to main gravel road.

0.3 11.4 SLOW. Turn right on main gravel road.

0.3 11.7 Note strip mine on far left in the DeKoven and Davis coal beds.

0.6 12.3 The road is paralleling the front of the Shawnee Hills.

1.0 13.3 Y. Turn right.

0.4 13.7 SLOW. Turn left.

0.8 14.5 Turn right. CAUTION. Saline River bridge. One-way traffic.

1.0 15.5 SLOW. Turn right.

0.2 15.7 SLOW. Narrow bridge.

0.1 15.8 T-road north. Continue straight ahead.

0.1 15.9 Note the strip mine ahead which formerly worked the Harrisburg No. 5 Coal.

0.8 16.7 The Harrisburg No. 5 Coal outcrops about midway up the hill in this locality. This coal was stripped along the side of the hill until the overburden became too thick for economical stripping.

0.4 17.1 SLOW. Turn left.

0.3 17.4 Turn right.

0.3 17.7 SLOW. Turn left.

0.2 17.9 SLOW. Turn right.

0.3 18.2 T-road north. Turn left (north)

0.5 18.7 STOP 3. Outcrop of Harrisburg No. 5 Coal in Abandoned Strip Mine.

For many years the Harrisburg No. 5 Coal was the only bed mined on a commercial scale in Saline and Gallatin Counties. Today, since most of the easily recoverable No. 5 has been mined out, other beds have become increasingly important in this area. The No. 5 bed was mined extensively at and near Harrisburg and at other locations such as Springfield, by underground methods. The outcrop belt of the No. 5 Coal has been, however, stripped, and several active mines are still stripping along this belt. Underground mines in the No. 5 Coal now occur only in western Saline County.

In Saline and Gallatin Counties the No. 5 Coal is consistently 4 to 5 feet thick. The coal is of good quality and is generally without shale partings.

Between Stone Face and this point, we have again crossed the Shawneetown fault. We are now on the down dropped side of the fault. The base of the Pennsylvanian sandstone that outcrops at Old Stone Face is approximately 1,300 feet below the surface at this point.

The No. 5 bed outcrops along the side of this hill at an elevation of approximately 390 feet. It has been extensively stripped on the south and east sides where the overburden did not exceed 80 feet. The coal dips to the north so that on the north side it is too deep to strip. There are also several faults in this area that influence the depth of the Harrisburg coal.

At many places along the high wall in this area, large circular holes about 3 feet in diameter penetrate into the coal. These holes are evenly spaced about 12 inches apart, indicating that auger mining has been employed here. Auger mining is applied where overburden is too thick for economical stripping. The auger used for this operation is similar to that used in stokers to convey coal automatically into a furnace, except that it is much larger and carries cutting bits at the end. Auger mining permits recovery of the coal 50 to 70 feet from the high wall and is a step forward in the conservation of our mineral resources. It permits recovery of thousands of tons of coal that probably would not be mined otherwise.

0.4 19.1 SLOW. Turn right.

0.2 19.3 Note that we are following the outcrop of the Harrisburg No. 5 Coal around the edge of the hill.

1.0 20.3 SLOW. T-road west. Continue straight ahead.

0.3 20.6 SLOW. Narrow bridge.

0.6 21.2 SLOW. RR crossing.

0.2 21.4 SLOW. Turn left on road into Equality.

0.3 21.7 SLOW. Turn right on hard road toward Equality business district.

0.3 22.0 SLOW. Turn left toward Highway 113.

0.2 22.2 Turn right on road to Equality Grade School.

0.1 22.3 STOP 4. LUNCH Equality Grade School. Turn around.

0.1 22.4 Turn left.

0.1 22.5 Turn left.

0.1 22.6 STOP. Turn right. Entering Equality business district.

0.4 23.0 SLOW. Turn left

0.3 23.3 CAUTION. RR crossing.

0.1 23.4 Bridge over Saline River.

0.7 24.1 STOP 5. Discussion of Lake that Existed in the Saline River Valley During the Ice Age.

This stop is practically astride the line that marks the southernmost point of glacial ice penetration in North America. The glacier that reached this area is called the Illinoian for our state and was the third in a sequence of four glaciers that entered the Mid-West during the last 1,000,000 years.

Any deposits left by the Illinoian glacier in the Saline Valley would not be visible to us because of events that occurred after the Illinoian glacial stage. These later events are associated with the Wisconsinan glacier, the last ice sheet to enter the United States. Although the Wisconsinan glacier stopped in its southward advance near Shelbyville, its effects were strongly felt in this area. The melting ice released large volumes of water down the Ohio, Wabash, Little Wabash, and Embarrass Rivers. The melt-water deposited a heavy load of sand and gravel that alluviated or filled the Wabash and Ohio Valleys. Deposition of sand and gravel in the Ohio Valley raised the Valley floor above its former level. In essence, this fill acted as a dam across the mouth of the Saline Valley. Behind this dam of glacial sand and gravel, a lake formed which extended far up the branches of the Saline River.

In the glacial lake, clay, silt and sand were deposited in places where the valley was deepest to a depth of over 150 feet. Although veneered by recent alluvial material, this lake bed forms the present level lands of Saline Valley. The Saline Valley was not the only southern Illinois stream affected in this manner during the Ice Age. Lakes also existed in Eagle, Little Wabash, Big Muddy and Embarrass Valleys.

Those that are old enough to remember the extent of the flood of 1937 have an approximate idea of the size of the glacial lake that once existed for several hundred years in Saline Valley.

2.4 26.5 Road is now paralleling the front of the Shawnee Hills.

0.1 26.6 Note strip mine on the right.

0.6 27.2 Wildcat Hill is the name applied to this section of the Shawnee Hills.

0.2 27.4 SLOW. Narrow bridge.

0.2 27.6 SLOW. STOP 6. Horseshoe. View and discussion of the Shawneetown Fault and disturbed strata at Horseshoe.

There is no other place in Illinois where we could better see the effects folding and faulting have had upon rocks than in this small quarry near Horseshoe. Here rocks that were once horizontal are twisted and inclined up to 70 degrees. Exposed to view are the siliceous Osage limestones and shales of lower Mississippian age. The rocks in the lower portion of the quarry lie very near the contact of the Mississippian with the underlying Devonian System which in this area is represented by about 400 feet of black shale.

The Osage limestones and shales illustrate nicely the powerful forces that operated when the Shawneetown faulting occurred, forces so strong that they were able to down-drop the north side of the fault block nearly 3,700 feet in relationship to the south side. This displacement is indicated by deep wells on the north side of Saline Valley where the Osage strata occur 3,700 feet below the outcrops at the quarry.

Faulting and folding are dynamic processes. From the nature of the Osage strata it might appear that the Shawneetown faulting occurred in one great episode. The chances are very good, however, that along this zone it occurred in several episodes scattered over millions of years. The time of this period of deformation in this section is rather uncertain, for there is a long period of geologic time in Illinois for which there is no rock record. We can only say that it cccurred sometime between the end of the Pennsylvanian (Coal Age) Period and the beginning of the Upper Cretaceous Period.

The Shawneetown fault is the largest in the state. It trends from near Shawneetown westward along the front of the Shawnee Hills to beyond Horseshoe where it swings southwest and passes into a large anticline near Horton Hill. The entire front of the Shawnee Hills, including Cave Hill, Wildcat Hill, and Gold Hill is actually a large anticline, the north limb of which has been faulted off along the Shawneetown fault zone.

Simultaneously, with the deformation along the Shawneetown zone, other parts of southern Illinois also were affected. Extensive faulting in Hardin and Pope Counties, injections of molten igneous materials, and fluorspar and other mineralization are all a part of this complex deformational episode.

27.6 Turn left

0.2 27.8 Travelling through Horseshoe Gap. This was one of the main roads used by early settlers on their way to the salt mines which once were abundant in this area and basis of a flourishing industry.

0.3 28.1 Note steeply dipping Pennsylvanian sandstone on right. The Eagle Valley syncline lies just a few hundred yards ahead.

0.1 28.2 SLOW. Turn left.

0.0 28.2 SLOW. Narrow bridge.

0.0 28.2 Turn right.

0.1 28.3 We are now entering Eagle Valley. This is a syncline type of structure. The rocks are folded downward.

0.2 28.5 SLOW. Narrow bridge.

0.4 28.9 Note the belt of high hills that completely encircles Eagle Valley.

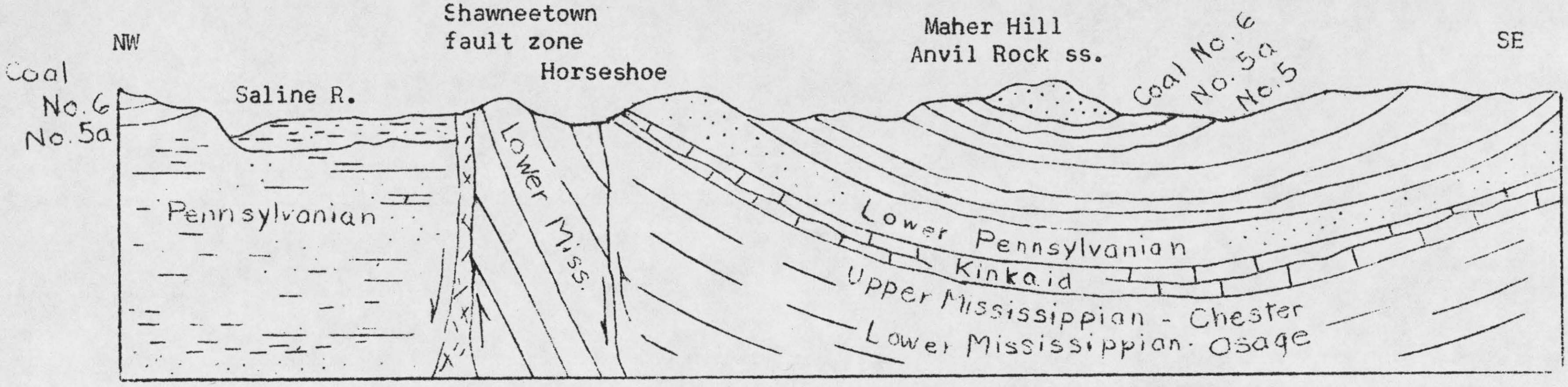
0.7 29.6 SLOW. Turn left.

0.4 30.0 STOP 7. Out crop of Anvil Rock Sandstone in Eagle Valley Syncline.

The Anvil Rock sandstone occurs in the Pennsylvanian rock column a few feet above the No. 6 Coal and is the youngest consolidated rock in this immediate area. Here it is located near the middle of the Eagle Valley Syncline, an area where the rock sequence is bent downward. In its normal position the Anvil Rock sandstone lies at least 1,000 feet above the Lower Pennsylvanian sandstone seen at Old Stone Face and Horseshoe Gap, but its topographic elevation in Eagle Valley is 300 to 400 feet lower.

In a syncline the youngest rocks occur at the center while in an anticline the oldest rocks occur at the center. The Eagle Valley syncline is shown in the diagram on page 9.

E A G L E V A L L E Y S Y N C L I N E



Cross Section NW - SE through Horseshoe and Maher Hill.

The rocks beneath Eagle Valley were subjected to tremendous forces which bent them downward into a trough-like structure that geologists call a syncline.

Along the north limb of the syncline the rocks broke and slipped past each other. The rocks are crushed and sheared along the breakage or fault zone. The vertical displacement along the Shawneetwon fault zone is at least 3700 feet.

This syncline is deepest and widest immediately west of the Ohio River and becomes constantly narrower and shallower westward. It dies out completely southwest of Herod. It is crossed near its middle by the Grindstaff and Saline River faults, and several smaller faults cut the eastern end.

The study of the Eagle Valley syncline is important because the structure contains a large body of coal. The No. 6 and No. 5, DeKoven, and Davis coals are present in minable thicknesses and have been strip mined extensively along the line of outcrop. There are several active strip mines in the area.

0.5 30.5 T-road south, continue straight ahead.

0.5 31.0 SLOW. Narrow bridge.

0.1 31.1 Note outcrop of Pennsylvanian sandstone on left.

1.2 32.3 SLOW. Turn right.

0.2 32.5 SLOW. Rough bridge

0.2 32.7 SLOW. Narrow bridge.

0.3 33.0 SLOW. Turn left.

0.3 33.3 SLOW. Bridge over Eagle Creek.

0.1 33.4 Note Pennsylvanian sandstone on right and left.

0.6 34.0 T-road west. Continue straight ahead.

0.3 34.3 Bridge over Little Eagle Creek.

0.1 34.4 CAUTION. Narrow bridge.

0.2 34.6 Note Pennsylvanian sandstone on left.

0.2 34.8 SLOW. Turn right.

0.2 35.0 STOP. Turn left. This is the Village of Leamington.

0.7 35.7 SLOW. Rough bridge.

0.1 35.8 SLOW. Rough bridge.

0.6 36.4 Note strip mines on left. These mines stripped the Herrin No. 6, 5A, and Harrisburg No. 5 Coals.

0.4 36.8 Note the long gentle slopes of the hill to the right. These slopes are bedrock controlled. The hill slopes correspond approximately to the dip of the rock to the north into the Eagle Valley syncline.

0.3 37.1 Strip mine on left.

0.7 37.8 STOP. Turn right on Highway 1.

1.4 39.2 SLOW. Turn right on Pounds Hollow-Karbers Ridge Road.

0.4 39.6 Note the pine forest plantations on right and left. This is in the Shawnee National Forest.

1.6 41.2 Pounds Hollow Recreational Area on right. Continue straight ahead.

1.3 42.5 Pounds Hollow picnic area on right. Continue straight ahead.

0.8 43.3 CAUTION. Crossroad.

1.3 44.6 Note outcrop of Chester sandstone on right.

0.2 44.8 Note outcrop of Chester sandstone on right and left.

0.7 45.5 Karbers Ridge School on right.

0.1 45.6 High Knob Lookout Tower on far right.

1.4 47.0 SLOW. Entering village of Karbers Ridge.

0.3 47.3 STOP. Continue straight ahead.

0.9 48.2 Note Chester sandstone on right.

0.5 48.7 Chester sandstone on right.

0.1 48.8 Note the low belt of hills paralleling the highway on the far right. These hills are held up by the resistant lower Pennsylvanian sandstones.

0.7 49.5 Note Chester sandstone on right and left.

1.3 50.8 Note Chester sandstone on right.

1.2 52.0 SLOW. Approaching Highway 34.

0.1 52.1 STOP. Turn right on Highway 34.

0.4 52.5 STOP 8. Outcrop of Palestine Sandstone and Menard Limestone. (Park cars in field on left side of road. Don't stop on the highway.)

These outcrops occur on the north side of Rose Creek, on the east side of Highway 34. About 30 feet of Menard limestone and shale and 20 to 30 feet of Palestine sandstone are exposed. These formations are part of the Chester Series of Mississippian age. The Chester Series is composed of an alternation of limestone, shale, and sandstone, approaching 1,000 feet in thickness.

You will note that the Palestine and Menard formations dip about 10 degrees to the north. This sharp dip is due to a fault that runs approximately parallel with Rose Creek and another fault near Herod.

The outcrops are on the northwest flank of Hicks Dome. The central part of Hicks Dome lies about 3 miles to the southeast near the former settlement of Hicks. The rocks in the area of Hicks Dome are believed to have been pushed up by a mass of molten igneous rock that was injected into the earth's crust beneath this area at the time the Shawnee Hills were being formed. This theory seems probable, since scattered dikes of an igneous rock, called mica peridotite, are found in this area. The dikes were formed when the molten igneous magma ascended into cracks in the blanket of sedimentary rocks over the dome area. Similar dikes have been discovered at numerous places in southern Illinois, between Harrisburg and Princeton, Kentucky. Two such dikes are well exposed in a coal mine west of Harrisburg. It was intended that we should visit these dikes on this trip, but, because of the great distance involved, this was not possible.

The surficial rocks in the Hicks Dome area are Devonian limestones. Away from the central portion in all directions the younger strata of Mississippian age outcrop in a circular pattern, decreasing in age with increasing distance from the center. The dome area is cut by many faults especially near Rosiclare. The faults continue northeast into the Cave in Rock area. Along and adjacent to these faults occur the rich fluorspar deposits of this area. There are two abandoned fluorspar mines farther up Rose Creek, located on the fault that parallels the valley. Specimens of fluorspar can be found in the road, but there is nothing around the abandoned mines. Abandoned mines are dangerous. Please don't go into the area.

The Menard limestone and shale contain a wide variety of fossils. Brachiopods are most common, but plenty of crinoids and bryozoa fragments are also to be found. Good collecting. Stay as long as you like.

The Harrisburg trip completes the fall schedule of Geological Science Field trips. We will begin anew next spring at Sparta, April 15, 1961.

Thanks for coming, hope to see you at Sparta.

GEOLOGIC COLUMN - HARRISBURG AREA

Prepared by the Illinois State Geological Survey, Urbana

ERAS		PERIODS	EPOCHS	REMARKS
Cenozoic "Recent Life"	Age of Mammals	Quaternary	Pleistocene	Recent post-glacial stage Wisconsinan loess Illinoian loess and till Slackwater lake deposits, loess and slope wash. (Stop 5)
		Tertiary	Pliocene Miocene Oligocene Eocene Paleocene	Not present in field trip area.
Mesozoic "Middle Life"	Age of Reptiles	Cretaceous		Not present in field trip area.
		Jurassic		Not present in Illinois.
		Triassic		Not present in Illinois.
		Permian		Not present in Illinois.
Paleozoic "Ancient Life"	Age of Amphibians and Early Plants	Pennsylvanian	McLeansboro Carbondale	Shale, coal, underclay, sandstone, limestone Stop No. 3
			Tradewater Caseyville	Stop 1. Shale, sandstone, DeKoven and Davis Coals Can be seen at Stop No. 2.
		Mississippian	Chester (Upper Mississippian)	Alternating sandstone, limestone, and shale formations.
			Meramec Osage	Limestone Limestone and shale; Stop 6.
	Age of Fishes	Devonian	New Albany	Shale and limestone
		Silurian		Limestone Not exposed in field trip area.
	Age of Invertebrates	Ordovician		Limestone, Sandstone, Dolomite Not exposed in field trip area.
		Cambrian		No information available. Not exposed in field trip area.

Proterozoic
Archeozoic
} Referred to as "Pre-Cambrian" no data available.

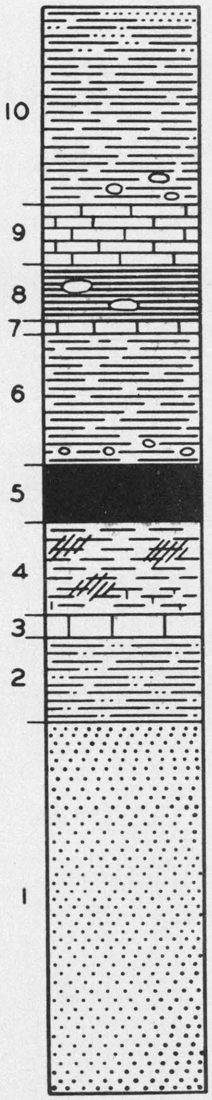
PHYSIOGRAPHIC DIVISIONS OF ILLINOIS

(Reprinted from Illinois State Geological Survey Report of Investigations 129, "Physiographic Divisions of Illinois," by M. M. Leighton, George E. Ekblaw, and Leland Horberg)

(82536—15M—11-63)

Time Table of Pleistocene Glaciation
(after 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	
Wisconsinan	5,000 yrs. Valderan 11,000 yrs.	Outwash	Outwash along Mississippi Valley
	Twocreekan 12,500 yrs.	Peat and alluvium	Ice withdrawal, erosion
	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 28,000 yrs.	Soil, silt and peat	Ice withdrawal, weathering, and erosion
	Altonian 50,000 to 70,000 years	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)	Buffalo Hart Jacksonville Liman	Drift Drift Drift, loess	Glaciers from northeast at maximum reached Mississippi River and nearly to southern tip of Illinois
Yarmouthian (2nd interglacial)		Soil, mature profile of weathering, alluvium, peat	
Kansan (2nd Glacial)		Drift Loess	Glaciers from Northeast and northwest covered much of state
Aftonian (1st interglacial)		Soil, mature profile of weathering, alluvium, peat	
Nebraskan (1st Glacial)		Drift	Glaciers from northwest invaded western Illinois

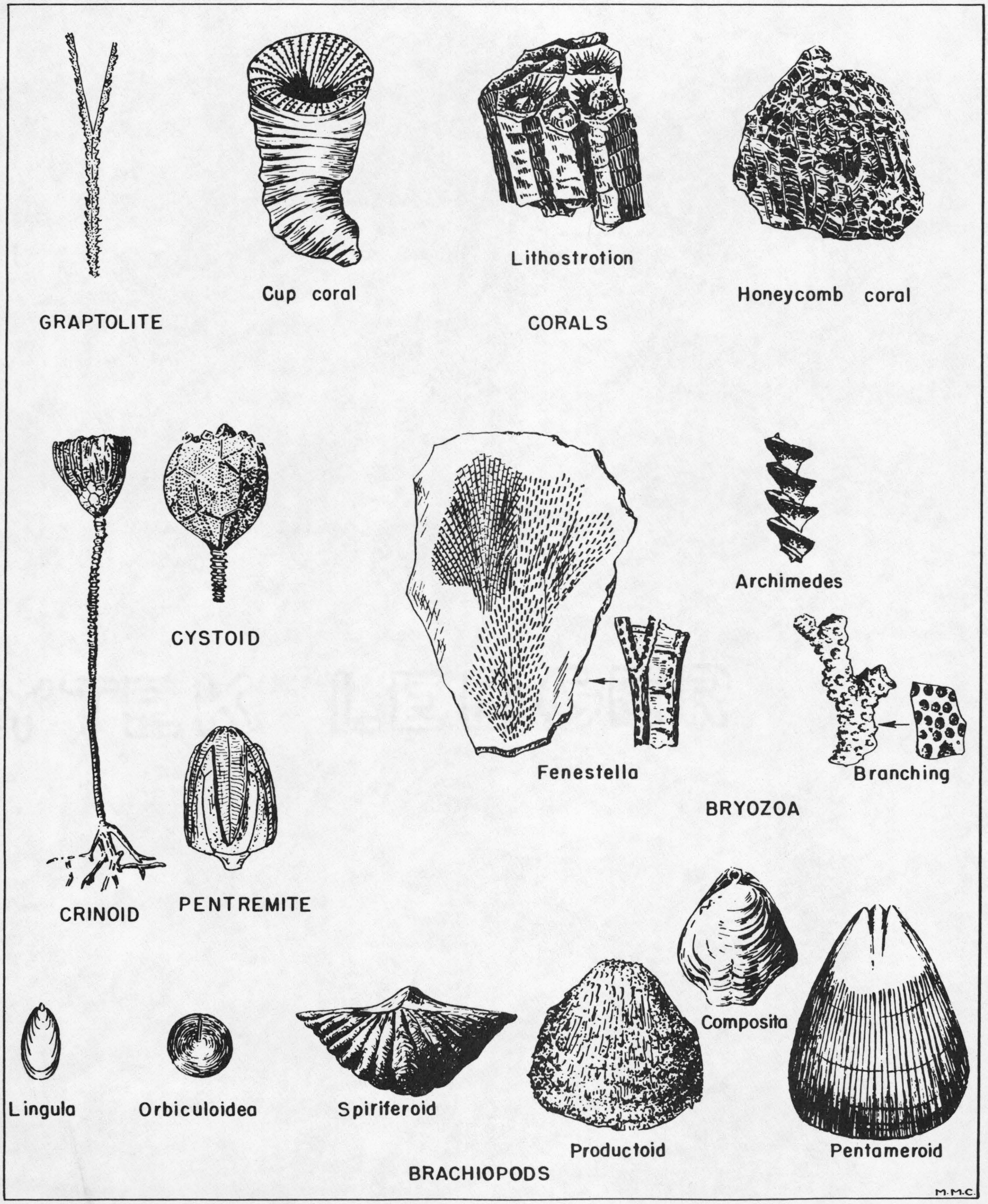


AN IDEALLY COMPLETE CYCLOTHEM

(Reprinted from Fig. 42, Bulletin No. 66, Geology and Mineral Resources of the Marseilles, Ottawa, and Streator Quadrangles, by H. B. Willman and J. Norman Payne)

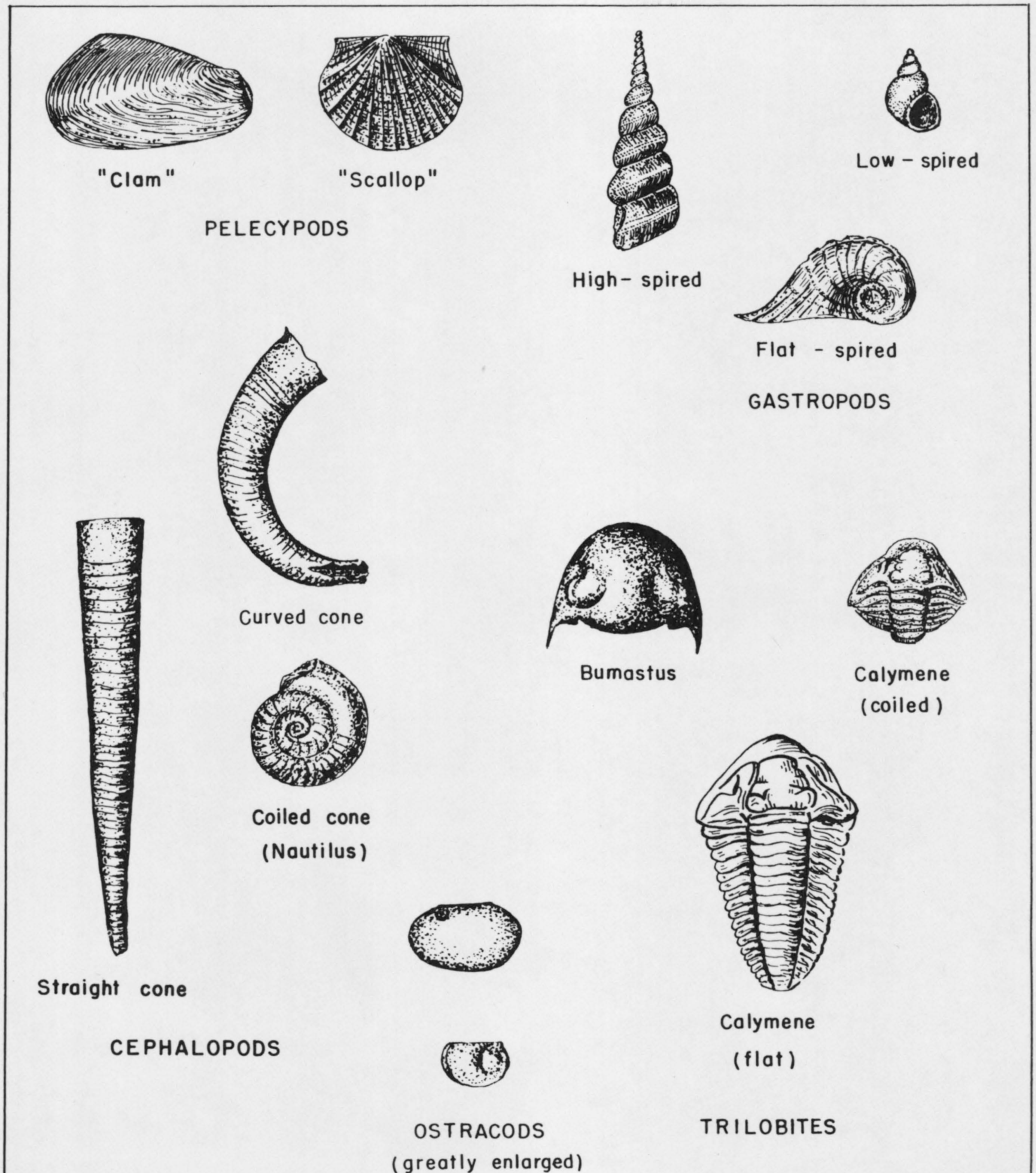
(47669—15M—11-61)

COMMON TYPES of ILLINOIS FOSSILS



(55757—25M—5-62)

COMMON TYPES of ILLINOIS FOSSILS



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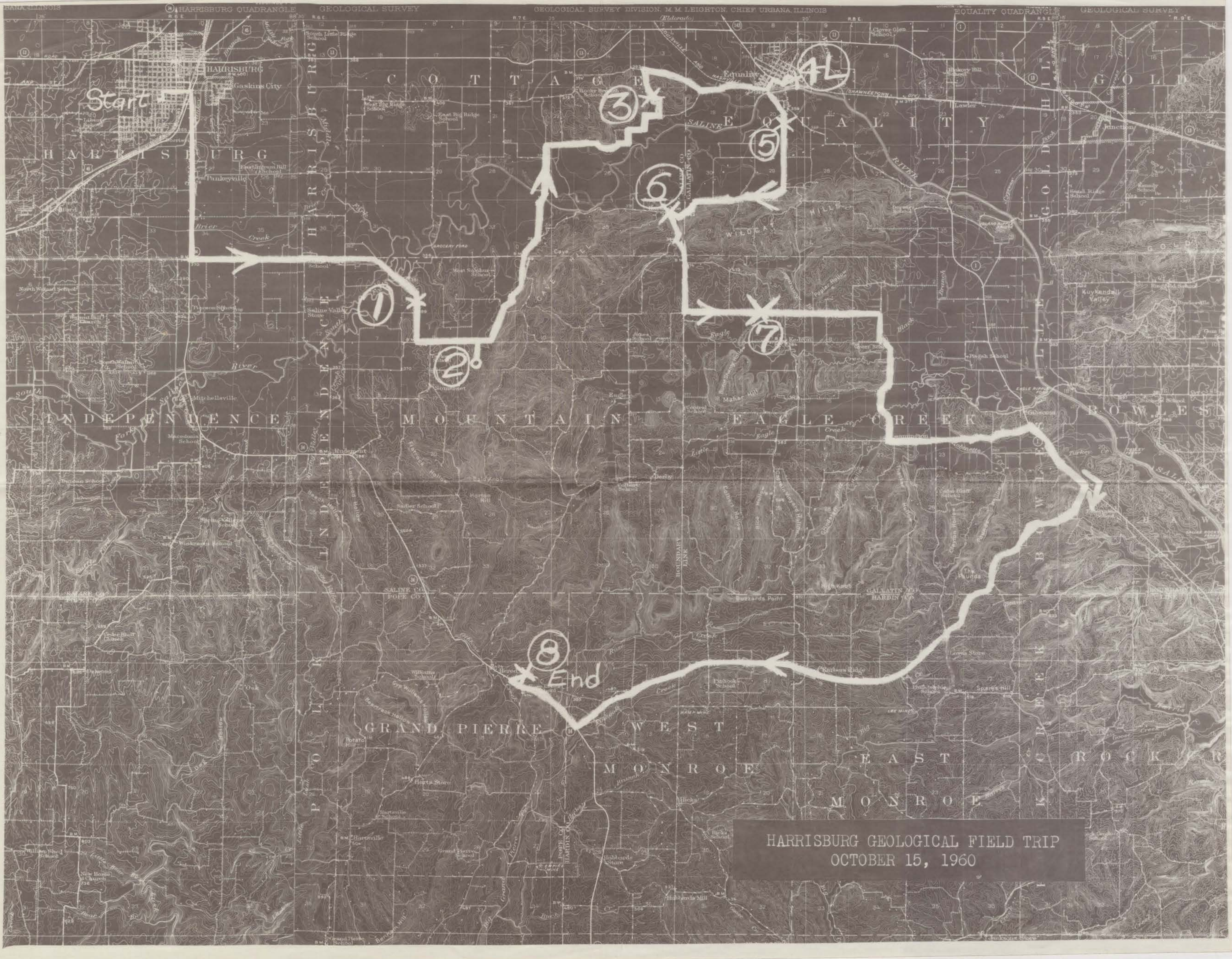

HARRISBURG GEOLOGICAL FIELD TRIP
OCTOBER 15, 1960