

STATE OF ILLINOIS
DEPARTMENT OF REGISTRATION AND EDUCATION
STATE GEOLOGICAL SURVEY DIVISION
Morris M. Leighton, Chief

GRAFTON AREA
Jersey County

GUIDE LEAFLET 47 B

by
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Urbana, Illinois
April 26, 1947

ILLINOIS STATE
GEOLOGICAL SURVEY
LIBRARY

PART I - ITINERARY

- 0.0 Marquette Lodge Parking Area.
- 0.1 Turn left on State Route 100.
- 5.2 Enter GRAFTON.
- 6.4 Leave Route 100 and continue ahead on Main Street.
- 6.7 End of Main Street. Turn right on minor road. Road runs on gently dipping surface of Niagara dolomite layers.
- 6.8 Cross Railroad spur and turn left, passing old quarry in Niagara limestone.
- 7.1 Narrow bridge, over Simms Creek.
- 7.3 STOP No. 1. Grafton Quarry. Exposes about 50 feet of Silurian (Niagara) dolomite, overlain by 5 to 8 feet of Devonian limestone.
- The Niagara dolomite is white to buff, dull, porous, full of small openings caused by dissolving of fossil fragments. Good specimens of the trilobite Calymene celebra Raymond, and other fossils, can be obtained.
- The Silurian-Devonian contact is marked by a greenish shaly zone which weathers readily. The Devonian limestone is dense, brownish gray, and has numerous brachiopods, especially Leptostrophia.
- Old crevices in the bedrock are coated with "cave onyx" (Travertine) and festooned with stalactites.
- Above the highest bedrock in the west end of the quarry is a thick mantle of Pleistocene loess. Farther east several generations of mantle rock and interbedded sands and silts lie between the loess and the bedrock. The lowest zone of mantle rock is locally cemented to a conglomerate by travertine. Mantle is chiefly residual chert from Mississippian formations which originally overlay the quarry rock.
- Although Grafton is just within the border of the Illinoian drift sheet, no glacially transported material was observed.
- 7.3 Reverse route.
- 7.9 Turn left onto Main Street.
- 8.2 Junction with State Route 100; turn right on 100 and ascend Jerseyville Hollow.
- 9.3 STOP No. IIA. To observe beds from top of Silurian, Niagaran, to Mississippian, Chouteau. Base of Chouteau limestone forms roof of rock shelter on opposite side of ravine. Below this is:

Hannibal Shale (Miss.)
(gray-green, blocky shale)

about 20 feet

Grassy Creek Shale (Miss.) about 10 feet
(black, slaty shale, with a hard,
thin, rusty nodular layer near base and
several inches of sandstone at base (in
stream))

Devonian Limestone 5 feet

Mainly dense, gray brown limestone, with
a few inches of buff, earthy dolomitic
limestone at top and about a foot of dull
gray calcareous shale at base, with much
sand in basal inch. Fossils abundant in
the limestone, chiefly crinoid columns and
the brachiopods: Leptostrophia, Atrypa,
Pholidostrophia "Spirifer", Cyrtina,
Schuchertella.

Niagara Limestone (Silurian)

Making steep cascades (same rock as in
Grafton Quarry).

To base of bluff.

9.9 STOP NO. IIB. To observe beds from Chouteau Limestone (Miss.) to Burlington
Limestone (Miss.) At top is:

Burlington Limestone (Miss.)

Granular crinoidal limestone, very cherty;
thickness incomplete in this outcrop.

Fern Glen Formation

Greenish shaly limestone

about 25 feet

Granular, crinoidal, non-cherty limestone

about 25 feet

Chouteau Limestone

Thin-bedded, shaly; many small geodes weather
in relief. (Down to roof of rock shelter)

10.2 Road-corners at Independence School. Reverse route.

12.2 Turn right along river and continue on Route 100.

13.1 Intersection with Mason Hollow road on right.

Bluffs here are of Niagara Dolomite below and
Mississippian Limestone above. The bench between
is made by the weak Grassy Creek and Hannibal
shales.

13.4 Leave Grafton.

14.0 Marquette Monument.

"At this place in early August, 1673, Marquette,
Joliet, and 5 companions entered Illinois."

- 14.8 Entrance to Graham Hollow and Pere Marquette Vacation Area
Roadside ledges between Grafton and this point all
are horizontal layers of Niagara dolomite.
- 15.2 Weathered outcrop of shale, probably Ordovician, Maquoketa. Overlain
by the Niagara Dolomite of the Grafton Quarry; blocks of dolomite slump
down over the soft shale.
- 15.7 Picnic Area. STOP NO. III.
St. Louis Limestone (Miss.) beds nearly vertical, on axis of the Lincoln
Fold.
- 16.1 STOP NO. IV. Ste. Genevieve (Miss.) oolitic limestone dipping south at
about 45° angle. We are now somewhat south of the axis of Lincoln Fold.
- 17.0 STOP NO. V. Caseyville (basal Pennsylvanian) shale and thin-bedded sand-
stone lying horizontally. We are now south of the influence of Lincoln
Fold.
- 18.5 LUNCH STOP. On river bank opposite park entrance.
Note: Park Lodge, available for rest and refreshments, lies one-tenth
mile east.
- 18.5 Leave lunch stop and turn left on Route 100.
- 18.6 Turn right into parking area for Trailside Museum and Nature Trails.
STOP NO. VI.
- Take trail north along base of bluff. We are again on
axis of Lincoln Fold and pass steeply dipping strata from
St. Louis (Miss.) Limestone down to Niagara (Silurian)
Dolomite. Twin Springs are doubtless formed where down-
ward moving water encounters the impervious Maquoketa
Shale (Ordovician). Visit the Trailside Museum to
observe fossils and minerals from the formations we
have been studying.
- 18.6 Reverse route.
- 18.7 Turn left into park and ascend hill.
- 19.3-19.6 Vertical banks of Pleistocene windblown loess.
- 19.7 STOP NO. VIII. Parking Area. Overlooking Illinois Valley.

Bon Voyage!

For a wonderfully scenic return trip, Route 100 up
the Illinois Valley as far as Detroit, is highly
recommended.

Geologic History of the Pere Marquette-Grafton Area

BEDROCK FORMATIONS

The strata which outcrop in the area covered by the itinerary are all rocks of sedimentary origin, chiefly limestones, dolomites, and shales, plus a few thin sandstone zones. Nearly all are very old and belong to the Paleozoic Era (or Era of Ancient Life). They also represent a long period of time, since in this small area, formations from five of the seven periods of the Paleozoic are present. The Paleozoic seas covered the Upper Mississippi Valley almost constantly, although there were several intervals when the seas withdrew and low coastal plains were exposed. In the area studied, these land intervals are responsible for the absence of beds of Upper Silurian Age, as well as those of most of the Devonian and the upper third of the Mississippian.

Strata of the following ages, from top to bottom, may be observed in the area:

Paleozoic Era	
Pennsylvanian Period	
Tradewater Shale and Sandstone	
Mississippian Period	
Ste. Genevieve Limestone	
St. Louis Limestone	
Warsaw Formation	
Burlington Cherty Limestone	
Fern Glen Limestone	
Chouteau Limestone)
Hannibal Shale)
Grassy Creek Black Shale)
	Kinderhook Group
Devonian Period	
Cedar Valley Limestone	
Silurian Period	
"Niagara" Dolomite	
Ordovician Period	
Maquoketa Shale	
Galena Dolomite	

LINCOLN FOLD

At some undetermined time between the deposition of the latest Paleozoic sediments and the Ice Age glaciation, a major movement of the earth's crust took place within the area. The result is known as the Lincoln Fold, a very sharp down-warp which brings Pennsylvanian rocks down to the level of Silurian rocks, as exposed on opposite sides of the fold. The fold is so sharp that in places the beds stand nearly vertical. The axis of the fold runs W.NW.-E.SE., and may be seen in the park north of the Trailside Museum and again along the highway west of Grafton. The south side of the monocline has moved downward relative to the north side.

EROSIONAL HISTORY

After the deposition of the Paleozoic rocks, the region was not again submerged below the sea, but remained a land area, exposed to the eroding agencies of the atmosphere, of streams, which carved hills and valleys, and of underground waters, which formed caverns and deposited stalactites and stalagmites. All these forces succeeded in wearing down the region to a base-level peneplain several times, only to recommence their work once again as sea level shifted and the region was rejuvenated.

PLEISTOCENE (ICE AGE) HISTORY

A part of the area, including the park proper, was never glaciated, while that in the vicinity of Grafton was ice-covered during the time of Illinoian Glaciation. Although the route crosses this ancient ice-border, no terminal moraine can be observed, and only an occasional erratic boulder of igneous rock marks the former presence of the ice. During the Wisconsin glacial stage, which followed the Illinoian, the glacier did not enter the region, but large quantities of sediment were washed down the Mississippi and Illinois rivers from the melting glaciers that lay far to the north. Throughout the Glacial Period, the Westerly winds blowing across the streams choked with those outwash sediments, picked up silt and clay, and deposited this dust to eastward as a "loess" mantle. This mantle is thicker in the park, where it doubtless represents several glacial periods, than it is at Grafton, where accumulation took place only during the Wisconsin and the later portion of the Illinoian stages.