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GLACIATION OF THE GRAYS LAKE,
ILLINOIS, QUADRANGLE

BY

WILLIAM E. POWERS AND GEORGE E. EKBLAW


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ABSTRACT

The Grays Lake quadrangle in northern Illinois lies within the Valparaiso (Wisconsin) moraine. The late glacial history of this region embraced (1) deposition of moraines of the Tazewell substage, (2) deposition in late Marseilles time of an outwash plain inside the Tazewell moraines, (3) a post-Tazewell erosion interval in which the Fox River valley and tributaries were cut to present depth, and (4) glacial advance in the Cary substage, with deposition of the Minooka, Valparaiso, Tinley, and Lake Border moraines.

The Grays Lake quadrangle contains the eastern edge of the late Marseilles gravel plain, deeply trenched and later mantled by Valparaiso drift. A lowland east of this plain, probably a fosse, is now partly filled with moraine and low outwash of Valparaiso age. The Valparaiso till sheet is thin and rests on older drift. Widely distributed throughout the Grays Lake area below the 830-foot level are deposits of thinly laminated lacustrine clay and silt. Some of the silt rests on Valparaiso moraine and originated in shallow postglacial lakes, but much of it is marked by morainal topography, and some is overlain by Valparaiso till. Thus is indicated a pre-Valparaiso lake formed during the deposition of the Minooka moraine, first of the Cary substage. The Minooka glacier crossed Fox River valley at Elgin, Illinois, forcing it into a new 820-foot channel farther west. From Elgin the Minooka moraine trends northeastward and, although buried by Valparaiso drift, lies near the east margin of the Grays Lake quadrangle all of which west of the Minooka moraine was flooded to the 820- to 830-foot level. Silt and clay deposits of the lake thus formed were later overridden by the glacier in Valparaiso time. To this lake the name "Glacial Lake Wauconda" is given.

GEOLOGICAL ORIENTATION

The Grays Lake quadrangle in northeastern Illinois (Fig. 1) lies within the broad Valparaiso moranic system, which here is divided into several individual ridges trending nearly north-south (Fig. 2). The Tinley and Lake Border moraines lie to the east, and the Minooka,

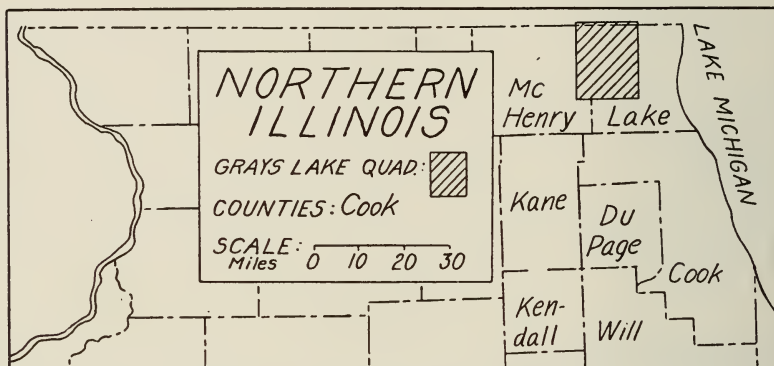


FIGURE 1.—Map of northern Illinois
Showing location of Grays Lake quadrangle.

Marseilles, Gilberts, and Marengo (Bloomington) moraines lie to the west. Of these the Marengo, Gilberts, and Marseilles belong to the Tazewell substage, and the others to the Cary substage of the Wisconsin glacial stage of the Pleistocene epoch.

GEOLOGIC HISTORY

The chief episodes in the late glacial history of northeastern Illinois, as previously described by Leighton (1925; 1931; 1933) and others (Thwaites, 1935, p. 82-83), are as follows:

Episode 1. Successive deposition of the Tazewell (formerly "Early Wisconsin") moraines—Marengo, Gilberts, and Marseilles—and of an extensive outwash plain, mainly behind (east of) the Marseilles moraine and north of the 42nd parallel (Fig. 3). The Gilberts and Marseilles moraines mark readvances after slight recessions.

Episode 2. Post-Tazewell, pre-Cary erosion during which Fox River and its tributaries developed valleys apparently as deep as at present (Fig. 3 A). South of Cary (near the 42°15' parallel) Fox River and its tributaries now occupy these same valleys, but farther north Fox River now wanders through the lowland of a former fosse, connecting several large lakes. Its former winding course in the high gravel plain west of this lowland is now shared by several small underfit streams which are deeply entrenched.

Episode 3. Readvance of the glacier at the Cary substage, building in succession the Minooka, Valparaiso, Tinley, and the several Lake Border moraines. In several places these moraines descend into the Fox River valley that was eroded during the post-Tazewell interval (Fig. 4). Local postglacial erosion has been much less than that during the post-Tazewell interval.

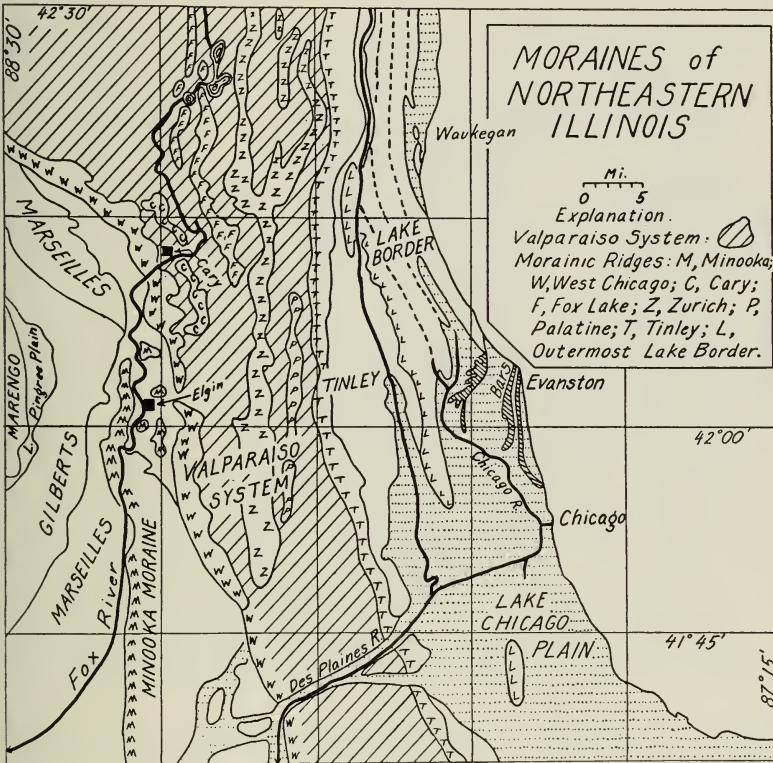


FIGURE 2.—Moraines in northeastern Illinois

LOCAL DEPOSITS

Subsequent studies of the glacial deposits in the Grays Lake quadrangle confirm the above history and contribute important additional information. At the northwest (Fig. 5) the Late Marseilles outwash plain constitutes an upland mantled at the west by thin Valparaiso till and farther east by outwash gravel from the narrow Fox Lake moraine of Valparaiso age, rich in kames and built along the eastern margin of the upland. East of the upland is a lowland area marking a former fosse. It is now partly occupied by several large lakes, Fox River, and associated marshes, the remainder being occupied by Valparaiso ground moraine and low terraces and lacustrine deposits of sand and clay. Fox Lake moraine and

its outwash aprons descend into this lowland farther south. Discontinuous ridges in the central and eastern parts of the quadrangle, formerly mapped as "members" of the Valparaiso moraine, are of uncertain significance, but, because outwash aprons, marginal drainage lines, and

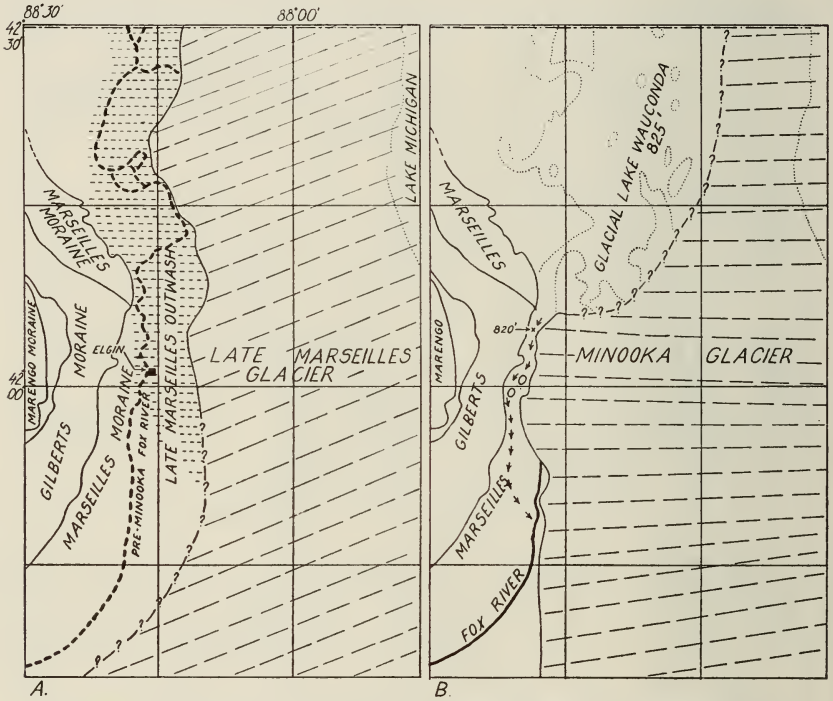


FIGURE 3.—Conditions in northeastern Illinois during Late Marseilles and Minooka times

A. Late Marseilles time with deposition of high outwash plain. B. Minooka time, with Glacial Lake Wauconda in Grays Lake quadrangle. Area covered same as Figure 2, with omission of Lake Chicago plain.

other features characteristically associated with end moraines are lacking, they are now interpreted as pre-Valparaiso moraines, perhaps disconnected by erosion before advance of the Lake Michigan glacier to the Valparaiso moraine.

The Valparaiso till sheet in the Grays Lake area is generally thin, indicating that it is ground moraine rather than massive terminal moraine. At numerous places the till, a sticky gray boulder clay, nowhere thicker than 25 to 30 feet, rests on older gravel and sand. Where till alone occurs, it may seem to be thicker, but, as it probably rests on older Marseilles or Minooka till with which it is nearly identical in appearance,

this greater thickness may be only apparent. The gravelly, hilly Fox Lake moraine and outwash plain at the west indicate deposition in connection with large amounts of meltwater and therefore predicate rapid melting of the glacier.

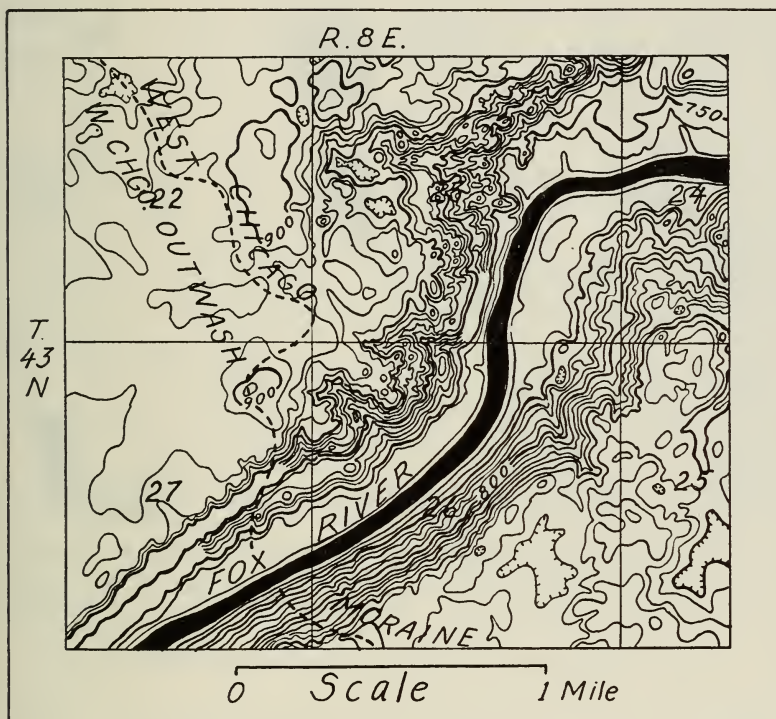


FIGURE 4.—Topographic map of area near Algonquin, Illinois

West Chicago moraine is shown descending into Fox River valley nearly to stream level.

A notable feature of the Grays Lake area is the presence of widely distributed deposits of very fine, unctuous, pebble-free clay, together with finely laminated silt, clay, and fine sand. These deposits are clearly lacustrine in origin and belong to two classes: (1) post-Valparaiso deposits mantling low, flat areas of Valparaiso ground moraine; and (2) deposits marked by a morainal surface topography with erratic boulders and occasional patches of till resting on the clay and silt. All deposits of (2) lie below the 830-foot level, although many are adjacent to areas that rise above 830 feet (Fig. 6). Thus they indicate a pre-Valparaiso lake at this level.

GLACIAL LAKE WAUCONDA

Both the cause and the date of this lake are apparent from a study of the Minooka glacial moraine. After the post-Tazewell erosion interval during which the Fox River valley system was cut to a depth far below



FIGURE 5.—Significant glacial features in the Grays Lake quadrangle

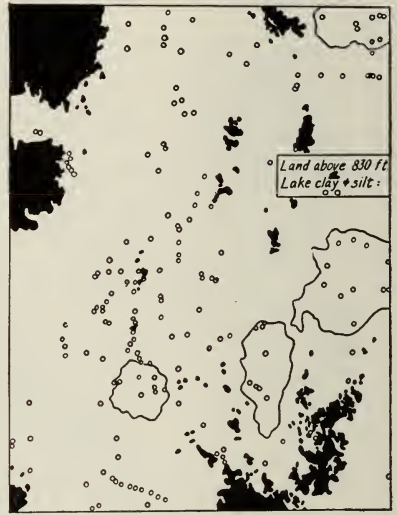


FIGURE 6.—Distribution in Grays Lake quadrangle of water-laid silt subsequently glaciated during Valparaiso substage

Areas above 830 feet contain no silt.

the 830-foot level, the Lake Michigan glacier readvanced into north-eastern Illinois and built the Minooka moraine. In the vicinity of Elgin the glacier crossed the Fox River valley, forcing the river into a channel whose bottom now lies at 820 feet (Fig. 3 B). North of Elgin the Minooka moraine apparently trends northeast, buried beneath Valparaiso drift. A careful study of present topography indicates that this buried Minooka moraine lies near the eastern margin of the Grays Lake quadrangle. Therefore, all the region west of the Minooka moraine and below an altitude of 820 to 830 feet must have been flooded with meltwater to form a broad lake discharging through the 820-foot channel near Elgin. Wave action against islands and shores was responsible for widely scattered though thin deposits of lacustrine silt and clay. The name "Glacial Lake Wauconda" from a town in the Grays Lake quadrangle is here proposed for this lake. On these clays and silts the Lake Michigan

glacier subsequently deposited till and boulders and developed the morainal topography of the Valparaiso moraine (Fig. 2).

SUMMARY

Studies in the Grays Lake quadrangle confirm the importance of the post-Tazewell, pre-Cary erosion interval and show that at its close the upper Fox River valley was occupied by an extensive shallow lake created when the Lake Michigan glacier dammed the valley near Elgin while building the Minooka moraine. Silt and clay deposits in this lake, as well as part of the Minooka moraine itself, were later glaciated and covered by the drift of the Valparaiso moraine. The full significance of this marked change in the position of the glacial margin between the advances to the Minooka and Valparaiso moraines is as yet unknown. The conclusion of Bretz (1939, p. 52-53) that the Valparaiso moraine is a relatively thin till sheet instead of a massive moraine as formerly supposed is fully supported.

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