

SOME GEOLOGICAL FEATURES OF WAYNE COUNTY, INDIANA.

T. M. BUSHNELL, PURDUE UNIVERSITY
AGRICULTURAL EXPERIMENT STATION.

One of the by-products of soil survey work is a certain amount of geological information. Such miscellaneous observations are omitted from soil reports, so are recorded here along with geological inferences drawn from soil data.

The glacial map of Indiana by Frank Leverett; a similar map by C. A. Malott and work done on the terraces of Wayne County by A. D. Hole and Earlham College students were all helpful to the men making the soil survey of that area.

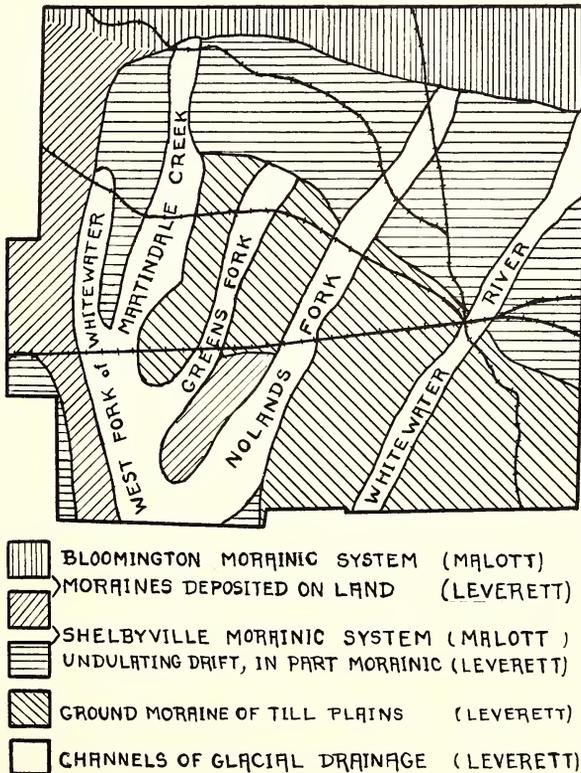


Fig. 1.—Geological map of Wayne County, Indiana.

Figure 1 is enlarged from maps on plate VI, Monograph LIII, U. S. G. S., by Frank Leverett and plate III by C. A. Malott, facing page 106, Handbook of Indiana Geology.

Figure 2 is a sketch illustrating some of the geological features which can be deduced from the Wayne County soil maps, which, when published will show soil conditions in great detail.

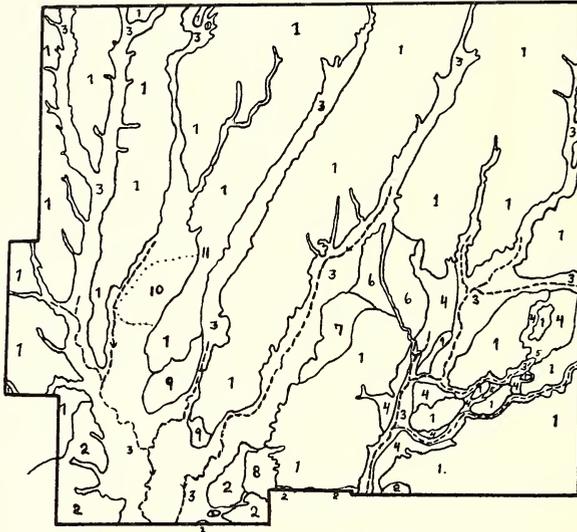


Fig. 2—Some Geological Features of Wayne County. (Figures are explained in text. Sketch based on Soil Map.)

The numbers on figure 2 are explained in the following notes.

1. Till, composed chiefly of silts and clays. The moraine shown in figure 1 along the northern border of Wayne County has been correlated with the Bloomington moraine system and is regarded as the outer border of the Early Wisconsin Drift. However, no soil difference was detected between this moraine, the undulating drift and the ground moraine belts over most of Wayne County.

2. Till—heavy material, quite similar to that in 1, when unweathered layers are compared. However, there is great difference in degree of weathering as shown by differences in comparable soil types. In No. 1 the depth to carbonates is about 20 to 40 inches below the surface. In similar topography, the carbonates in No. 2 are found 45 to 80 inches below the surface.

The change from 1 to 2 takes place in less than one-half mile and seems to cross the country regardless of topography, moraines, etc.

The conclusion may be drawn that No. 2 has been weathered nearly twice as long as No. 1 and that this time interval may mark the break between the "Early" and "Late" stages of the Wisconsin glaciation; also that the moraine across northern Wayne County is not the outer border of the Late Wisconsin as the carbonates have been reached no

deeper in southeastern Wayne County than in Adams and Hancock counties.

It may be noted that soil study in certain other counties supports the idea here presented and future soil surveys will further trace this line of change. It is to be hoped, however, that geologists will critically examine the idea that depth to carbonates in calcareous till is a more reliable indication of geological age than distribution of moraines.

3. First bottoms and terraces along valleys of the Whitewater and its tributaries.

Practically all of the gravel in Wayne County is associated with these valleys—only a few pits being found in No. 1 (till).

Note that seven glacial channels enter Wayne from Randolph County, rather than only four mentioned by F. J. Breeze.¹ Apparently some of the seven arise on the moraine, rather than north of it in Randolph County.

Within Wayne County the glacial valleys increase abruptly in width at several points. While small local tributaries enter at these points, it may be that the enlargements were formed by streams flowing off the ice in glacial times.

Three distinct levels of terraces are frequently found in the valleys. The highest levels are often weathered four or five feet deep, the intermediate levels average three or four feet and the lowest about two or three feet. The underlying gravels are about the same in all three and the depth and degree of weathering is some measure of their ages. This porous material doubtless weathers more rapidly than heavy till, so depths of weathering cannot tell relative age of the terraces and till uplands.

4. This number indicates flattish areas occurring at high levels near the Whitewater River near Richmond. In some cases they are distinct abandoned valleys cut through till down to bed rock. The valley floors may be rock within a few feet of the surface, or gravel beds on rock, or thin till on gravel with rock not far below. More recently canyon-like valleys have been eroded through the bed rock.

5. Here are found abandoned waterfalls in the abandoned valleys. The more northern location may once have been a cascade over one quarter of a mile wide but the site is now occupied only by the head of Short Creek which drops over a falls a few feet wide and ten feet high. The more southern spot marked 5 apparently was the site of twin falls 30 or 40 feet high in one of the highest abandoned valleys of the region.

6. The Asylum Plain. This region will appear on the soil map with types normal to till plains, but the land seems to be like a valley between higher areas of till north and south of it. There is some evidence of assorted materials beneath this plain. The plain lies at about the same level as the high abandoned valleys. It is traversed by a channel in which drainage starts in the edge of Noland Fork Valley and passes into the East Whitewater below Richmond. This suggests that Noland Fork formerly may have followed that course. On the other hand, the directions of the valleys of the three main creeks which converge north

¹Abandoned Channels in Randolph and Delaware Counties, Indiana. Proc. Ind. Acad. Sci., 1922, p. 96, fig. 1.

of Richmond, coupled with the narrowness of the Whitewater Valley at Abington, and greater width of the valley-like "Asylum Plain" leading to the broad Noland Fork Valley suggests the possibility of an early outlet of the drainage above Richmond towards the west.

7. The Centerville section is marked by soil conditions suggestive of complicated glacial history, with perhaps some assortment of materials.

8. This area seems in some degree a continuation of conditions found on the Centerville slope. It is basin-like and contains some assorted and stratified deposits. It seems to lie between Early Wisconsin hills on the west and Late Wisconsin on the east.

9. Areas mapped as terrace, but showing some signs of till material. The larger area marks a great constriction in the bottoms of Greens Fork.

10. An area in the terrace of Martindale Creek marked by many depressions while immediately north and south of it the terrace surface is smooth.

11. West of this point Martindale terraces rise almost to the level of the till divide. The change from valley to upland is hardly discernible and is marked by soil change rather than topography. Apparently a rise of a few feet more of glacial floods would have put the Martindale waters over the divide into the lower lying Greens Fork valley.

The interpretations given in these notes of the various features observed, are not to be regarded as final solutions but rather sign posts pointing the way to a region full of interesting problems for geologists to solve.