BEDROCK SURFACE AND THICKNESS OF GLACIAL DRIFT IN WILL COUNTY, ILLINOIS[1]

LELAND HORBERG AND A. C. MASON

Illinois Geological Survey, Urbana

Introduction.—In connection with studies concerned with economic and sanitary problems related to groundwater conditions in Will County, maps of the bedrock surface[2] and the average thickness of glacial drift (fig. 1) in the county have been compiled. Relatively detailed control, based on about 3,000 well records, is available for all of the county except the two eastern tiers of townships. Acknowledgments are due Professor D. J. Fisher and Dr. George H. Otto, who in previous years collected a large number of the well records now available.

Present surface.—The thickness of glacial drift represents the difference between elevations of the present ground surface and of the bedrock surface, which was developed largely by preglacial erosion. The major features of the present surface are the Minooka, Rockdale, and Valparaiso morainic ridges, with intervening ground-moraines, which cross the county in a general northwest-southeast direction. Broad valley-trains along the Kankakee, DesPlaines, and DuPage rivers transect and break the continuity of both end moraines and ground-moraines.

The present ground surface slopes in general away from the Valparaiso and other morainic ridges toward the DesPlaines and Kankakee rivers, which join just beyond the west county-line. The highest point in the county is in T. 36 N., R 11 E., and has an elevation of about 797 feet above sea-level; the lowest is along the west line of the county near the junction of the rivers and has an elevation of about 500 feet. This is a relief of approximately 297 feet in about 20 miles, or slightly greater than the relief of the bedrock surface.

Bedrock surface.—Bedrock elevations within the county range from 720 feet above sea-level on the bedrock upland near Monee (sec. 16, T. 34 N., R. 13 E.) to 455 feet where the DesPlaines bedrock valley leaves the county at the west edge of the map (sec. 18, T. 34 N., R. 9 E.). This is a total maximum relief of 265 feet within a distance of 25 miles. Local relief along the sides of major bedrock valleys is sharp. Slopes of 100 feet in a quarter of a mile are present in the vicinity of Joliet.

The bedrock uplands have low to moderate relief, but in general the bedrock valleys appear to be relatively narrow and steep and would be considered youthful. Some of the larger valleys, however, are wide enough to have reached the stage of early maturity.

There is a general parallelism of bedrock valleys and present valleys with respect to their trends and the major drainage systems represented. In detail, however, the relationship breaks down and there are actually but few cases where present streams have inherited valleys from the bedrock surface.

Most of the bedrock valleys of the county are the eastern headwater portions of River Ticona,[3] a large preglacial stream which flowed westward through Grundy, LaSalle, and Putnam counties to the "Big Bend" of Illinois River. Here it joined the north-south trending bedrock valley of the pre-Wisconsin Mississippi, which is occupied by the present Illinois River below that point. The bedrock divide between the southwestward drainage into River Ticona and the northeastward drainage into the basin of Lake Michigan crosses the eastern part of Will County. This divide was cut through near Lemont to form the Chicago Outlet and also it was breached east of Joliet along a buried bedrock valley.

The preglacial valleys of the county probably developed largely by headward erosion along the west margin of the

[1]Published with the permission of the Chief, Illinois Geological Survey.

[2]For map of the bedrock surface near Joliet see Illinois Geol. Survey Circular 95, 1943. An additional map covering a large part of Will County is to be published later by the Illinois Geol. Survey.

[3]Willman, H. B., Preglacial River Ticona, Ill. Acad. Sci. Trans. Vol. 33, pp. 172–175: Illinois Geol. Survey Circular 68, pp. 9–12, 1940.

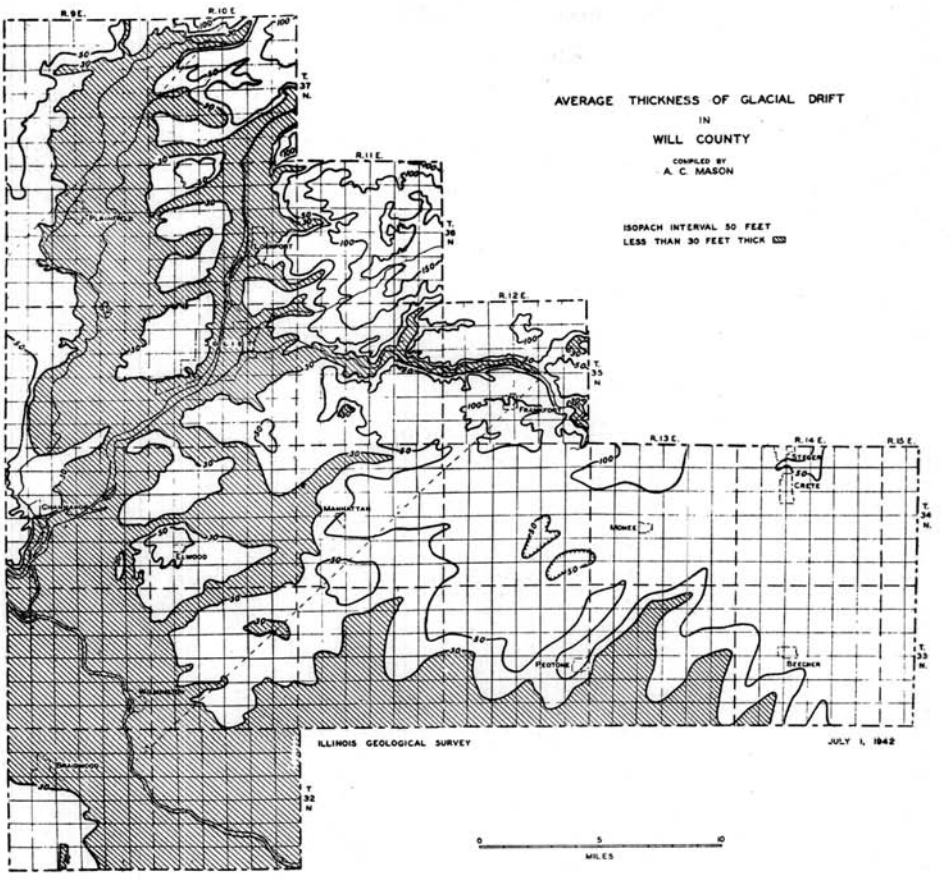

Fig. 1.

Niagaran escarpment which crosses the southwest part of the county. West of the escarpment, bedrock elevations are uniformly lower and reflect a broad lowland eroded on the Maquoketa shale and argillaceous sandstones and shales of the Pennsylvanian system.

Thickness of glacial drift.—Inasmuch as the thickness of the glacial drift (fig. 1) is determined by the difference between elevations of the ground surface and the bedrock surface, the drift is thickest along the undissected portions of the moraines and along buried bedrock valleys. The moraines are of major importance in outlining the three belts of thick drift separated by belts of thin drift, and it is only in the southeast part of T. 36 N., R. 11 E. that bedrock-valley fill is clearly reflected in the thickness map (fig. 1).

The Valparaiso moraine can be traced from the northeast corner of the county (T. 37 N., R. 10 E.) southeastward toward Frankfort and Monee as a belt of thick drift along which the thicknesses range from 50 to over 150 feet. To the west, the Rockdale moraine and associated Manhattan ridge is reflected by a central belt of thick drift extending north-south through R. 10 E. Discontinuous areas along this belt have drift thicknesses of 30 to 50 feet, with occasional small areas of over 50 feet. The Minooka moraine forms the belt of thick drift along the west margin of the county north of Channahon and has drift thicknesses generally between 50 and 100 feet. In the intermorainic areas the drift is

generally less than 30 feet thick. Bedrock crops out almost continuously along DesPlaines and Kankakee rivers, occasionally along DuPage River and other streams, and elsewhere in isolated localities.

The greatest thickness of drift in the county occurs in the east half of T. 36 N., R. 11 E. on the Valparaiso moraine and in the valley of Spring Creek nearby where drift has filled a relatively deep bedrock valley. In approximately 60 per cent of the 844 square miles of area of Will County the drift is more than 30 feet thick, in approximately 35 per cent the drift is more than 50 feet thick, and in only 5 per cent of the county is the thickness more than 100 feet.