

THE GLACIAL HISTORY OF THE ELGIN REGION

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The City of Elgin is situated in one of the most interesting glaciated localities of the country. The surrounding landscape portrays in remarkable fashion the architectural work of the great ice sheet. A great deal of study has been given the glacial history of this portion of the State by various workers, including Professors Chamberlin, Leverett, Trowbridge, MacClintock, Goldthwait and others, but there are still details to be deciphered. Notwithstanding the fact that the full history is not known, it nevertheless may be of interest to recite the facts as we now have them in hand, subject of course to the results of future study.

PRE-GLACIAL HISTORY

Before the glacial period, this general area had a markedly different aspect from its present. Before the incursion of the first ice sheet, this was a territory of limestone hills and valleys, mantled with such soil and residual clays as result from the weathering of the Niagara dolomite. The present valleys, with their erratic tributary development, were not here, but instead a system of valley development of the leaf-like or dendritic form similar to that of the driftless area of northwestern Illinois, although there was less relief. The present topography has come about from a heavy mantling of this old erosional landscape with glacial drift deposited in a series of recessional moraines with intervening belts of ground moraine. The uplands at the present time have an altitude of 900 to 1000 feet above sea level. From the records which we have of well drilling, the bedrock has an altitude of approximately 650 to 700 feet. In other words, if the old bedrock topography were to be restored, a glacial drift which ranges in thickness from 100 to approximately 300 feet would have to be removed. Clearly, the deposition of the glacial drift in the Elgin area has revolutionized the old topography, giving the country a markedly different aspect from what it had previously.

GENERAL HISTORY OF THE ICE INVASIONS

For more than a score and a half of years it has been known that the glacial period was a complex period of ice invasions, rather than a single epoch; that it included five distinct glacial epochs separated by long periods of warm climate, each interglacial epoch being in most cases much longer than the time since the last glacial epoch.

Records of the earlier ice invasions, however, are not to be seen in the Elgin region. Most of the earlier glacial history has been worked out in other parts of Illinois and in adjoining states, rather than in this area. We feel quite certain, however, that this territory was transgressed by at least three different ice sheets, although the full record is not visible here. Old soils separating glacial tills have been penetrated by various wells in this locality at depths ranging from about 40 to 137 feet. These old soils are striking evidence of one or more of the interglacial epochs when the climate became so mild that the ice sheet was melted away and soil making processes were active.

While it can not be claimed that the Elgin area is a type locality of the older drift sheets, it does have the distinction of showing in a way perhaps unsurpassed by any other locality in this or any other state, the late glacial history.

MORAINAL BUILDING

At the time of the invasion of the Wisconsin ice sheet, the basins of the Great Lakes had outlines somewhat similar to their present ones. The concentric arrangement of the moraines about these basins shows that the basins caused the ice to become organized into fairly distinct lobes with radial motion. In the case of the Lake Michigan lobe, the general direction of ice movement was southward, with radial motion towards the east and west sides. In the Elgin locality, the direction of the ice movement was to the southwest. The greatest extent of this ice sheet was to Peoria and Shelbyville on the southwest. With oscillatory changes in climate from cold to warm, the ice front began its recession, but the oscillatory nature of these climatic changes brought about halts or

readvances of the ice front so that at different stages of retreat moraines were built along the margin of the ice during the time that it was temporarily stationary. These moraines, named from the outer to the inner, are now known as the Shelbyville, Cerro Gordo, Champaign, Bloomington, Marseilles, Minooka, Rockdale, Valparaiso, and the Lake Border System.

Elgin lies just beyond the outer limits of the Valparaiso moraine. Driving westward from Elgin along the Grant Highway, one crosses two of the outer morainic belts, one of them about three miles west of Elgin, the other about eight miles west. The hummocky character of these belts, their strong undulations, the promiscuous arrangements of hills and depressions are the product of unequal glacial deposition at the front of the ice during two of its halting stages.

The next stage of recession is recorded by the northwest-southeast trending moraine which crosses the Fox River Valley just south of Algonquin. Further recession of the ice took place, during which a great amount of outwash poured forth in the Crystal Lake and Dundee localities, but the moraines built when this high outwash was laid down were later overridden by the ice which made the Valparaiso moraine, thus adding to the complexity of the morainic topography of the Valparaiso system.

THE LAKES OF NORTHEASTERN ILLINOIS

It is a familiar fact that the great majority of glacial lakes of Illinois are situated in the northeastern part of the State, lying chiefly in Lake County, giving that county its name. This territory is genetically a part of the beautiful lake country of Wisconsin, and its origin involves a consideration of most unusual conditions.

Such picturesque bodies of water as Fox Lake, Grass Lake and Pistakee Lake date back in their history to the formation of the glacial moraines of the Valparaiso system, when apparently the ice movement was vigorous, the rate of melting of the ice was rapid, and large portions of the ice became detached and buried and entered into the composition of the moraine for a brief time. If this is true, the present topography is not the original topog-

raphy that existed when this particular moraine was built. The moraine then had a greater continuity and greater mass than it now has. When the ice blocks melted, these portions of the moraine lost their identity as elevated parts and became basins which are now the sites of these lakes.

The concentration of lakes in this part of Illinois raises the question as to why this should be. It is also to be noted that the moraines of this part of the State have a much greater content of stratified gravel than the moraines of the rest of the State, and that the topography is rougher, more hummocky, and possesses more of the kame and kettle features than the rest of the moraines of the State. All of these features indicate that the drainage from the ice sheet in this territory was much greater than in the rest of Illinois. This was evidently due to two things: (1) The conjunction of the Lake Michigan lobe with the Delavan and Green Bay lobes was such that the radial movement of these ice lobes was opposed to each other, resulting in the ice becoming greatly riven and crevassed, thereby facilitating melting and drainage; (2) The surface elevation at the conjunction of these lobes was lower than that of the summit of either lobe, hence there was concentration of drainage from the surface of any two adjacent lobes. With great quantities of water, therefore, pouring forth from the ice sheet in this territory, the finer materials of the glacial debris were carried away, leaving the coarser materials deposited in the form of sand and gravel hills commonly known as kames, and in the form of outwash plains and valley trains.

What has been said thus far in regard to the lakes in the morainic belts does not apply, however, to such lakes as Crystal Lake. This beautiful body of water does not lie in a terminal moraine; it is surrounded by an outwash plain. It appears to have originated from a detached block of ice, a mile and a half in length and a quarter of a mile in width, having become detached in the recession of the ice and surrounded and buried by the outwash gravels, later leaving a basin for the inundation of the lake water. This general territory in fact is

a territory in which pitted outwash plains show a most remarkable development. East of McHenry on the east side of Fox River there is an outwash plain dotted with numerous pits, yet made up entirely of gravel which has a uniform summit level.

THE FOX RIVER VALLEY

The Fox River Valley appears to have had its inception in the period following the deposition of the high outwash plain at Crystal Lake, Carpentersville and Dundee. This is well shown northeast of Algonquin where 160 feet above the present river the outwash deposits lie at the summit of both valley bluffs, the valley itself being sharply entrenched. It is very clear from these relationships that the Fox River Valley was cut subsequent to the deposition of the Crystal outwash plain. It also appears from the contour of the valley walls that the cutting of this valley was rapid and was accomplished by a large volume of water. We do not know the source of this water, because the later moraines to the east obscure the topographic conditions which prevailed at that time, but it is conjectured that the Fox River was an outlet of the Great Lakes, similar to the old Chicago outlet but before the deposition of the Valparaiso moraine.

Following this period of valley cutting, there was a re-advance of the Wisconsin ice, and it is to this advance that the Valparaiso system of moraines is due. The ice appears to have advanced as far as West Chicago and within two miles of Elgin, and two miles of Algonquin, a notable moraine known as the West Chicago moraine marking its limit. Two miles northeast of Algonquin this moraine descends into the Fox River Valley within about 50 feet of the valley floor, which fixes the age of this moraine as later than the carving of the valley. From the front of this ice and subsequently from the ice which built the Cary moraine, water poured down the Fox River loaded with sand and gravel greater than the transporting power of the stream, resulting in a partial filling of the valley to a height of 80 to 90 feet, near Cary, producing a valley train which may be traced with decreasing height down the Fox River to Ottawa at its

union with the Illinois. The valley train, however, does not exist today in its entirety, but only as remnants of terraces.

In addition to the Fox River valley train, other outwash deposits were made in the form of outwash plains. A remarkable example of this occurs east and southeast of Elgin. Here these enormous gravel resources are being drawn upon for our railroad and highway building, in addition to other phases of the concrete industry, and the topography is being markedly changed by the activities of man so well displayed in the pits of the Chicago Gravel Company.

This gravel outwash occurs at a distinctly lower level than that at Dundee, Carpentersville, and Crystal Lake, and is later in origin than the cutting of the Fox River Valley, whereas the Crystal Lake gravel deposits just mentioned are older. This conclusion is based not only upon the difference in level at which the two deposits occur, but upon the fact that the higher gravels are found to pass and to continue eastward beneath the Valparaiso moraine for a distance of approximately six miles in McHenry County, whereas the lower gravel plain has its source in the Valparaiso moraine.

THE CLOSING STAGES OF THE GLACIAL PERIOD

After the ice had readvanced to within two miles of Elgin, and built the outer Valparaiso moraine, the climate became such as to cause the recession of the ice by stages, with the resultant building of recessional moraines to the east until not only had the entire Valparaiso system been developed, but also the Lake Border system, and the ice had receded to within the basin of the Great Lakes. From this time forth, the average severity of the climate decreased, the lake levels shifted from time to time as the lower outlets were uncovered by the receding ice or shifted by the warping of the land surface, until finally the North American continent was freed of this active and colossal geologic agency which had so thoroughly revolutionized the topography of the land surface upon which it encroached.

Judging from the freshness of contour of the glacial moraines from the meager amount of gulying which has taken place, except under special conditions, and from the small amount of slope wash which has gone on, it appears that the increasing warmth responsible for the melting of the ice made possible also a rather prompt re-invasion of the plant kingdom followed no doubt also rather promptly by a return migration of the animal life.

We do not know the precise length of time that has transpired since the glacial period, but recent studies seem to show that it has been something like 20,000 to 30,000 years since the building of the outer moraine of the late Wisconsin, which would correspond with the building of the West Chicago moraine which lies just east of Elgin.