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Geology of Fox Valley, Illinois

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One of the fundamental factors in the industrial and social development of Fox Valley in Illinois is its geology. As shown on Plates A and B, all aspects of the geology--topography, glacial drift, and bedrock formations--are much diversified.

Topography. - The topography of the region through which Fox River flows is varied. The northern part is affected by morainal hills and lakes as far south as Woodstock, Crystal Lake, Algonquin, and Elgin. The prominent line on the map (Plate A) which bounds this area is also the outer boundary of the West Chicago moraine. Southwest of this line the surface features are, in general, more subdued, except along the Gilberts moraine and parts of the Elburn, Farm Ridge, and Marseilles moraines. The reader is referred to Plate A for the courses of these morainal belts. The intermorainal country is flattish except where incised by Fox River and its tributaries.

The valley of Fox River itself is also varied. In the upper part, where the river is hardly more than a succession of large lakes, the valley is scarcely distinguishable; in the middle part, where it cuts through a number of moraines, it becomes broad and deep, with terraces on either side; in the lower part, where it is incised in bedrock, it is a small canyon. Its tributary valleys are for the most part small, indicating the geological youth of this glaciated country.

Glacial deposits. - The surficial material (Plate A) in the region consists of glacial drift, or material that was carried by the great ice sheets or glaciers which repeatedly covered northern North America during the Great Ice Age

and that was dropped when the glaciers melted away. Most of the glacial drift consists of a mixture of stony clay, silt, and sand, commonly known as till, but some of the drift consists of sand and gravel that was washed out and more or less sorted by the melt-water from the glaciers.

The moraines in the Fox Valley region are ridged belts of drift that were built up at such times as the melting of the successive glaciers approximately balanced their advance, so that their margins were relatively stationary and the material brought up to the margins by the forward movement of the ice was there deposited. The north-south, northwest-southeast, or northeast-southwest trend of the moraines shows that the glaciers moved westerly, southwesterly, and northwesterly.

Kames, or mound-like hills, and eskers, or narrow-crested ridges, of gravelly material, were built up where streams flowed out at the margins of the glaciers or where they flowed along courses within, under, or on top of the ice. Kames are numerous in Fox Valley north of Aurora. At many places, as for instance in the Gilberts moraine about 3 to 4 miles northwest of St. Charles, they occur in large groups with deep kettle-holes between the kames.

One of the best developed eskers in Illinois runs along Blackberry Creek northwest of Aurora. It forms a narrow discontinuous ridge, generally more than 50 feet high and more than 5 miles long. At its northwest end, where the glacial river emerged from the glacier, the esker spreads out into several eskerine ridges and small kames, and finally into a fan-shaped outwash plain.

Large amounts of sand and gravel were washed out from the later glaciers in Fox Valley. The material comprises wide plains in some places and also constitutes deep deposits along Fox River and some of its tributaries (Plate A). These outwash plains and valley-trains together with the abundant kames and eskers provide the materials for the gravel industry which is so important in the region.

Age of glacial drift. - All of the glacial drift at the surface belongs to the last, or Wisconsin, stage of glaciation, which is believed to have existed

35,000 to 50,000 years ago. Thus the present soil is relatively youthful. Under it are older glacial drifts--Illinoian, Kansan, and possibly also Nebraskan. Between each pair of glaciations there was an interglacial interval in which the climate was much like the present, deep soils were formed, and in them grew plants like those existing before settlement by white man. However, most of the animals that lived in the interglacial stages and immediately after the last glaciation, now are extinct or are found only in Arctic regions. The most common were the mastodon, the woolly mammoth, the musk-ox, the cave bear, the dire wolf, the giant sloth, the giant beaver, the elk, and similar forms, as revealed by bones unearthed in old bogs in which the animals presumably became mired. Such prehistoric animal bones were found in excavations in an old bog in Phillips Park in Aurora in 1935.

Bedrock. - The glacial drift lies on solid bedrock, whose surface is very uneven. The deeper parts of the bedrock surface obviously comprise old * valleys (Plate , bedrock-surface map in water supply section, and Plate A, cross-section), which were of course developed before glacial times and long after the bedrock was deposited and consolidated.

* The bedrock consists of several formations (Plate B), most of which are limestone or dolomite but some are sandstone and a few are shale. Most of them contain numerous fossils, or petrified remains, of marine animals that lived while the sediments--marl, sand, or clay--that now compose the bedrock formations were being deposited on the ocean floor millions of years before the Glacial Period.

Each formation represents a stage of time when the region was submerged beneath the sea, and each break between the formations represents an interval when the region was exposed as land. These formations are the source of the limestone or dolomite and the sandstone that are quarried at numerous localities in the region, and some of them are also aquifers for large underground water supplies.

The deposits in the successive seas were originally laid down in horizontal or almost horizontal layers. At various subsequent times the region was affected by earth movements which bent the formations into upfolds, or anticlines, and downfolds, or synclines, developed cracks, or joints, in the formations, and moved the formations along some of the joints to create displacements, or faults. Consequently at some places the original flat-lying rock strata now dip more or less steeply or are displaced vertically. The most pronounced dip of strata in Fox Valley occurs a short distance southwest of Plano, where the * Sandwich fault crosses the region from northwest to southeast (Plate B). Along this fault the formations have been displaced vertically about 500 feet (cross- * sections on Plate B and Plate , water-supply section).

These earth movements and the preglacial erosion determined the present areal distribution of the bedrock formations under the glacial drift. Outcrops of the formations do not occur north of South Elgin, as the present valleys have not cut through the glacial drift north of that town. South of South Elgin, outcrops are common along Fox River and along some of its tributaries downstream as far as Sheridan. South of Sheridan the bedrock is exposed almost continuously along both sides of Fox River and along the lower parts of its tributaries.

All of the sedimentary rocks exposed in the region and encountered in wells belong to the Paleozoic era, the middle one of the five great eras into which geologic time has been divided, and are probably from 400 million to 600 million years old. They lie on older rocks, belonging to the Proterozoic era, some of which were originally also sedimentary but many of them are of igneous origin, that is, they were formed by the cooling of molten rock or magma forced from the deeper part of the earth into the rocks near the surface or through them onto the surface. All of these older sedimentary and igneous rocks have been more or less changed as a result of the great earth movements to which they have been subjected and so are known as metamorphic rocks. A few wells in northern Illinois, including one near Irene in Boone County and one east of Sycamore in

De Kalb County, have passed through the Paleozoic sedimentary formations and into the igneous or metamorphic rocks which underlie them, at depths respectively of 2925 and 3845 feet.

In summary, the geology of Fox Valley is important for various reasons. The topography and character of the glacial drift have determined the drainage pattern and affect the run-off of the region. The surficial materials are the parent materials for the soils. The glacial drift and the bedrock provide the source materials of important mineral industries. The glacial gravels and some of the bedrock formations constitute aquifers for large groundwater supplies. In many other less conspicuous ways the geology influences other aspects of the industrial and social development of the region.