

## A STRATIGRAPHICAL STUDY OF THE MANITO SWAMP

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East of the city of Manito, Mason County, Illinois, may be found a portion of an abandoned channel which during Late Wisconsin times was probably occupied by the Illinois and Mackinaw rivers. The channel is filled with peat averaging 6 feet in depth and contains important records of value in the reconstruction of the postglacial history of the Illinois valley. Unfortunately much of that record has already been destroyed through drainage and by the removal of some of the peat for commercial purposes. Although the removal of the peat has destroyed some of the buried records, it has, nevertheless, made it possible to collect macroscopic material which otherwise could not have been obtained by the common method of drilling.

The origin of the sand upon which the peat rests is attributed to the period when the Kankakee Torrent was at its height. The water originated from the exceedingly rapid melting of the ice of the Michigan, Saginaw, and Erie glacial lobes and entered Illinois River via the Kankakee. So rapid was the melting that, according to Ekblaw and Athy (2), the glacial river in northeastern Illinois varied in width from 5 to more than 12 miles. A wide channel also occurred south of the city of Pekin and extended south to Meredosia, Morgan County. In that channel the raging flood waters at first deposited coarse material, and later, as the water subsided, deposited sand. Subsequent to the decline in water level, peat accumulated in the undrained portion of the former channel.

The peat collected for laboratory study was obtained from the eastern margin of Section 26. At that point the Manito Chemical Company had removed all the organic soil to within a foot of the sandy bottom and thereby exposed excellent profiles of the peat beds. The material was black throughout, varied considerably in texture, and the top soil was loose and granular owing to drainage and subsequent aeration. The profiles showed the peat to be typical of that generally found in shallow undrained depressions. Such peat accumulates very slowly and for that reason samples were taken every inch from the bottom to top. Although pollen grains were found in most strata, their sparsity, due to the nature of the peat and the resultant effect of drainage, would not give a true picture of the vegetation succession.

The height of the water table is, according to Dachnowski (1), the principal factor governing the type of plants to be found on bogs. Laboratory studies revealed that at the outset, the water in the section of the swamp from which the samples were taken, was shallow. This was indicated by the occurrence of many seeds of *Menyanthes trifoliata* and sedge remains in the first four inches of the bottom peat. This stratum was also characterized by the abundance of leaves, lateral spurs, and cones of *Larix*.

Five inches above the bottom there occurred a thin band of inorganic soil consisting of a mixture of sand and clay. This may have been deposited either by wind or water. Upon this layer and associated with *Larix* leaves were many specimens of the mosses *Drepanocladus revolvens intermedius* and *Campylopus stellatus*.

Immediately above the mineral soil the water doubtless was shallow as indicated by the occurrence of *Menyanthes* seeds. Four inches above the silty layer *Sphagnum* occurred. Its presence together with the appearance of much *Picea* and *Larix* wood signified that the surface of the bog was built

up above ground water level. *Picea* and *Pinus* pollen were also abundant in the *Sphagnum* stratum.

Above the *Sphagnum* layer the macroscopic material indicated a change in water level which brought about the destruction of *Sphagnum* by submergence. From the 9-inch level to the 18, the material consisted chiefly of sedge remains and the leaves of *Larix*, the latter probably having grown on the more elevated portions of the bog. *Salix* pollen occurred at the 10-inch level; *Picea*, *Quercus*, and many *Pinus* pollen at the 11-inch level. *Pinus* pollen was also common in the upper part of the layer and at the 17-inch level *Quercus* pollen was the most abundant.

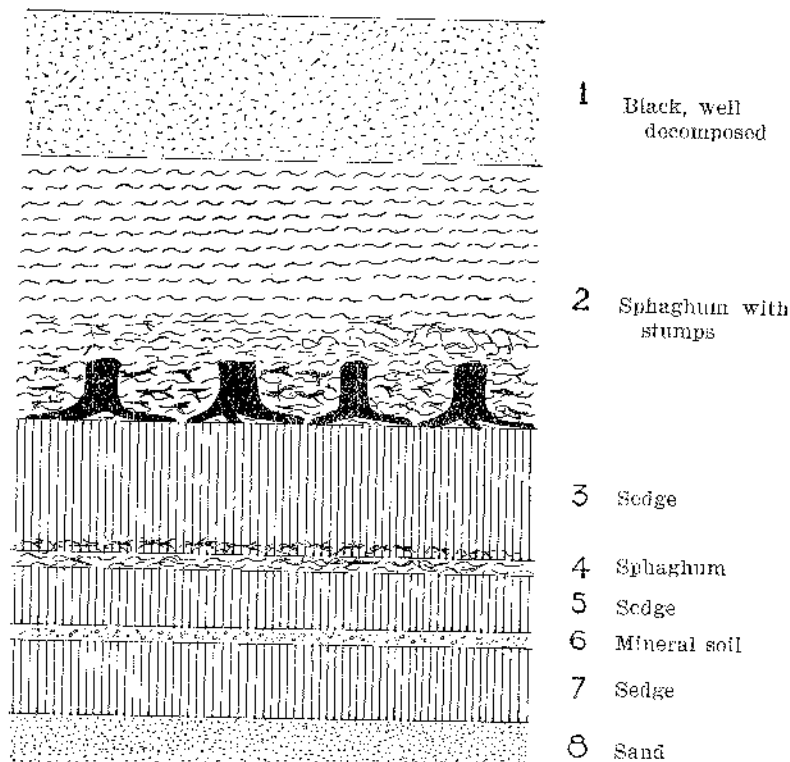


FIG. 1. Diagram showing structure of peat bed. (Cut supplied by author.)

As the surface of the depression gradually became higher owing to the deposition of peat, the water table at the 18-inch level became low enough to permit the growth of *Sphagnum*. *Sphagnum* persisted from the 18 to the 26-inch level as one of the important peat forming agents. At the 20-inch level *Menyanthes* seeds were common, and 21 inches above the bottom numerous well preserved roots and stumps of *Larix* and *Picea* were present indicating again that the surface of the bog was above ground water level. Woody peat accumulates very slowly and its thickness indicated that the swamp forest of spruce and tamarack remained for a long period. The presence of *Betula* pollen, leaves of *Betula pumila*, and annuli of *Polypodiaceae* in the upper portion also suggested maturity. Pine pollen was found throughout indicating that the tree probably grew either on the bog

or on the surrounding sandy soil. Conditions with reference to the surrounding sand cover may have been similar to those of northeastern Illinois (3) where the oak is gradually superseding the pioneer pine.

From the 36-inch level to the top, the soil, owing to drainage, was black, well decomposed and contained practically no material of value in the reconstruction of vegetational history.

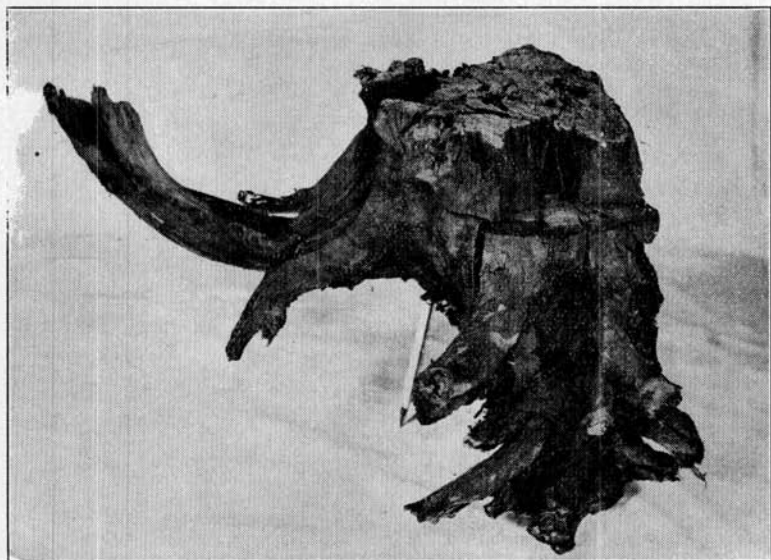


FIG. 2.—Tamarack stump found 21 inches above the bottom.  
(Cut supplied by author.)

#### SUMMARY

The stratigraphy of the Manito swamp indicated that as soon as the channel was abandoned by the Mackinaw and Illinois rivers, the edaphic conditions favored the growth of boreal shoal water plants together with *Picea* and *Larix* on the more elevated parts of the channel floor. Several fluctuations of water level occurred during the history of the swamp as shown by the alternating layers of sedge, sphagnum, and woody peat. During at least two distinct periods of the swamp's history the surface was dry enough to support the growth of *Larix* and *Picea*. The last swamp forest persisted for a long time and doubtless passed through the same successional stages as found on some of the mature bogs in northeastern Illinois. What the final stages were is difficult to say owing to the destruction of the plant remains by drainage and subsequent aeration. All evidence thus indicated that the abandoned channel served as one of the pathways for the northward movement of plants which had previously been forced in the opposite direction by the advancing ice.

1. DACHNOWSKI, A. P., Factors and problems in the selection of peat lands for different uses. U. S. Dept. Ag. Bull. 1419, 1926.
2. EKBLAW, G. E., and ATHY, L. F., Glacial Kankakee Torrent in northeastern Illinois. Bull. Geol. Soc. America, 36:417-428, 1925.
3. GATES, F. C., The vegetation of the beach area in northeastern Illinois and southeastern Wisconsin. Bull. Ill. Nat. History Survey, 9:255-372, 1912.