

PLANT FOSSILS FROM MANKATO TERRACE ALONG HUTCHINS CREEK, UNION COUNTY, ILLINOIS

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INTRODUCTION

Plant remains were discovered in 1954 in a terrace section along Hutchins Creek in Union County, Illinois, about four miles upstream from the junction with the Mississippi Valley (NW $\frac{1}{4}$, SW $\frac{1}{4}$, SW $\frac{1}{4}$, sec. 25, T.11S., R3W.). The abundance of well preserved vegetation led to later sectioning and collection of material for paleobotanical study.

Hutchins Creek lies about 10 miles south of the farthest penetration of the Illinoian ice. No direct glacial outwash materials reached its valley. However, the valley was repeatedly affected indirectly by alternating intervals of valley deepening and aggradation of the Mississippi Valley. During interglacial stages or stages of low sea level, the valley was greatly deepened. When sea level rose, or especially when great quantities of glacially derived material were brought down the master valleys, sediment choked the valleys and the valley floors rapidly aggraded.

Shaw (1915) recognized that such aggradation of the Mississippi, Ohio, and Wabash rivers caused ponding on the tributaries not themselves directly affected by outwash loads. Backwaters formed lakes of considerable extent in which stratified sediments accumulated. Recent studies by Leighton and Willman (1950) and by Harris (unpubl.)

indicated a probable Tazewell and Mankato date for the principal terraces in southwestern Illinois. The Hutchins Creek terrace is considered to be of Mankato age because it does not have a cover of loess, and its surface lies about 15 feet above the flood plain.

Hutchins Creek has a flood plain about one-third of a mile wide in the vicinity of the terrace. Several segments remain, but the sediments are exposed only in the segment here discussed where Hutchins Creek impinges against it. The valley is bounded by steep valley walls incised by many short, steep tributaries. Bedrock is Devonian chert and silicified limestone mantled on the upland by loess.

The terrace sediments consist of materials similar to those now being transported by the modern stream. They are locally derived white chert pebbles and loess-derived silt. The terrace section consists of three zones: 3) poorly sorted alternating gravel and silt layers, 9 to 27 ft. deep; 2) well stratified silt and very fine sand layers, 2 to 9 ft.; and 1) basal gravel bed, 0 to 2 ft. below the surface.

MATERIALS AND METHODS

Sediment samples at approximately one-half foot intervals were taken for analyses, from one-half foot

above the gravel bed up to six and one-half feet. All of the sediment samples were from zone 2. Leaf fragments were treated according to the method of T. M. Harris (1932). Leaf cuticles of 40 species and varieties of southern Illinois mesophytic forest representatives were prepared in the same way. Samples for pollen and other spore analyses were prepared according to the methods of Erdtman (1954). Numerous slides of known pollen were prepared for aid in identification. References were made to keys and illustrations of Sears (1930), Wodehouse (1935), and Erdtman (1952, 1954).

RESULTS

Examination of samples revealed the greatest abundance of fossils in the lower portion of zone 2. Where the section was measured there were two layers of leaves, branches, and other macro-fossils near the base in the gray silts. The following items were found: logs of the red-oak group; acorns and acorn cups similar to if not identical with those of *Quercus velutina*, black oak; portions of female cone scales of pine; leaf fragments of *Quercus*, *Fagus*, beech, *Tilia*, or basswood, a grass, and a fern. All of these were most abundant at about the 0.75 to 1.50-foot level above the coarse white gravel. Some fern leaf fragments were found as high as 1.75 feet above the gravel.

Beginning at the 0.5-foot level above the coarse white gravel a few *Quercus* and *Salix*, willow, and grass spores were identified. Just above, at about the 0.75-foot level, the most

abundant numbers and kinds of spores were observed. *Pinus*, pine, appeared at this level only; *Quercus* appeared to decrease, whereas *Salix* increased slightly in number. Also noted were: *Carya*, hickory; *Liquidambar*, sweet gum; *Chenopodium*, pigweed; and a few *Compositae* grains. Fern spores were most abundant at this level, and at the approximately one-foot level. At the higher levels only a few grains of *Quercus* and *Salix* were found, and these disappeared at the six-foot level. Fungus spores were very abundant throughout all samples except those from the six-foot level which had no spores. Too few grains were found to make possible a pollen spectrum analysis.

DISCUSSION AND SUMMARY

Although too few pollen grains were present to allow a percentage-wise comparison of certain value, there is perhaps significance in presence or absence of the types found at the various levels. Too few grains were found to give any clear indication of a forest sequence (Sears, 1948), except to note the appearance of some pine at the 0.75-foot level and its absence at all other levels. Oak and willow were found at all levels wherever any grains occurred. All forest-type pollen grains present are indicative for this region of a climate similar to that of the present. There appear to be two possible interpretations of the nature of the accumulation of organic debris: 1) essentially *in situ*; and 2) largely washed in by the stream which deposited the sediments. L. R. Wilson (pers. comm.) has suggested that the vegetation may represent a for-

est duff accumulation of a meso-phytic forest floor because of the decomposed nature of the material, the comparative abundance of fungus spores, and the scarcity of pollen. On the other hand, the vegetation occurs in repeated and discontinuous layers, rather than in a single layer. Gravel layers occur above and below zone 2, and continual deposition is indicated. The seven-foot silt layer appears to represent a backwater deposit when the main channel was at a distance, and the plant remains were washed in during high waters. Later the channel shifted back to this site and successive bars and slack water silts rapidly accumulated. According to the second hypothesis, the plant remains are derived from the small Hutchins Creek basin, but not from the immediate area.

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LITERATURE CITED

- ERDTMAN, G. 1952. Pollen morphology and plant taxonomy, Angiosperms. Stockholm, Almquist and Wiksell, 539 pp.
 1954. An introduction to pollen analysis. *Chron. Bot.*, 12: 239 pp.
- HARRIS, T. M. 1933. The fossil flora of Scoresby Sound, East Greenland. *Meddel. om Gronland*, 85(3): 1-112.
- LEIGHTON, M. M., and H. B. WILLMAN. 1950. Loess formations of the Mississippi Valley. *Jour. Geol.*, 58: 599-623.
- SEARS, P. B. 1930. Common fossil pollen of the Erie Basin. *Bot. Gaz.*, 89(1): 95-106.
 1948. Forest sequence and climatic change in Northeastern North America since Early Wisconsin time. *Ecol.*, 29(3): 326-333.
- SHAW, E. W. 1915. Newly discovered beds of extinct lakes in southern and western Illinois and adjacent stages. *Ill. St. Geol. Surv. Bull.* 20: 139-157.
- WODEHOUSE, R. P. 1935. Pollen grains. New York, McGraw Hill Book Co., 574 pp.