

Preliminary Fossil Pollen Analysis of the Merrillvill, Indiana, White Pine Bog

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PRELIMINARY FOSSIL POLLEN ANALYSIS OF THE MERRILLVILLE, INDIANA, WHITE PINE BOG

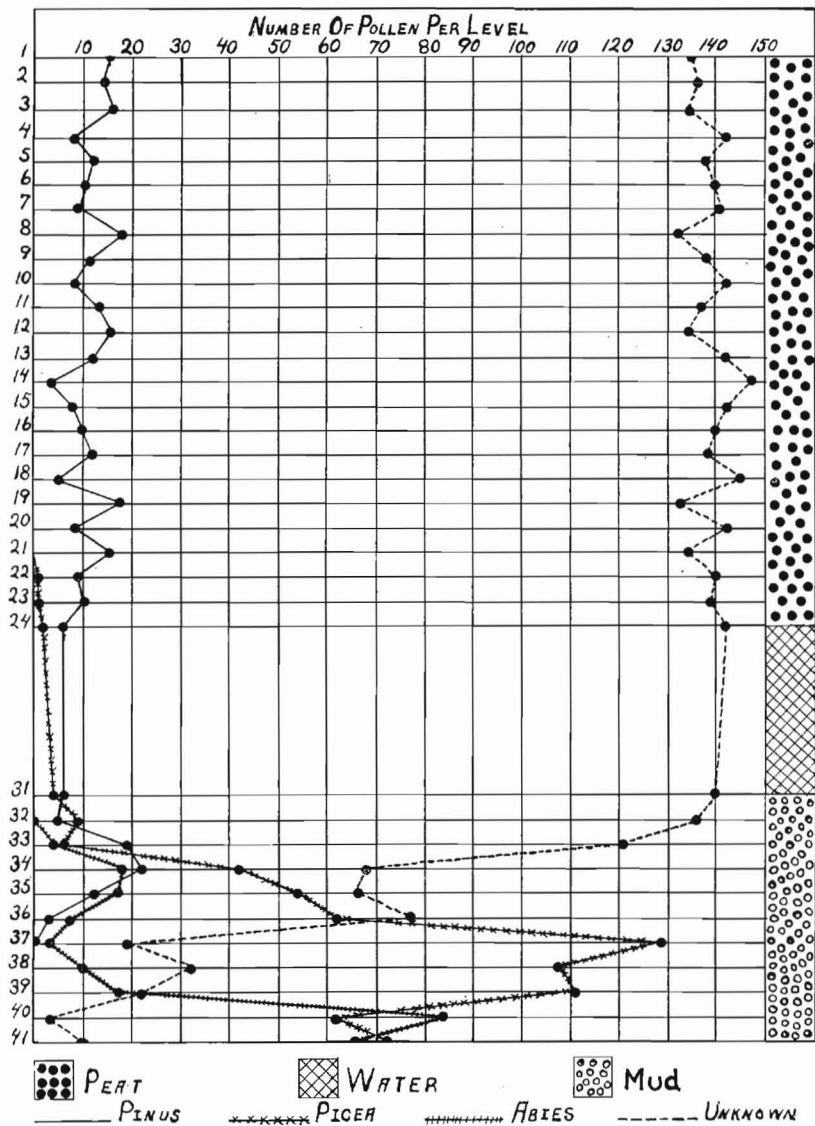
By ALVA J. LINDSEY

This analytical study in fossil pollen is not as complete as present methods and knowledge of pollen will permit. Pending a more extensive analysis, a few preliminary findings are here set forth, but, of course, subject to future modification.

Soundings were made in the Merrillville bog (2) at different points to ascertain the deepest place. Depths ranged between twenty-three and forty-one feet. At depths of twenty-three and twenty-four feet the bog mat rested on the hard blue mud bottom of the old lake bed. No peat was found to exceed twenty-four feet, but where the depth was greater the bog mat rested on seven feet of water and ten feet of mud. It was impossible to secure a peat sample between the twenty-fourth and thirty-second foot levels. Numerous trials were made but with negative results. The conclusion was reached that water underlies the bog mat and that the mat is still floating at the point where the samples were taken.

Samples of peat were taken at each foot level between one and twenty-four feet, while samples of mud were taken at each foot level between thirty-two and forty-one feet. As a safeguard against contamination, the portion retained for laboratory use was removed from the center of the two-inch core. Each sample was immediately bottled and tightly stoppered. Before each descent of the auger, the cylinder was thoroughly washed, especially on the inside, to remove the residue of the previous core. An additional precaution against contamination was the gathering of samples in the month of December, when the surface of the bog mat was frozen and the air was not laden with migrating pollen. The taking of samples during a period of freezing also eliminates the disagreeable feature of wading water and muck.

All samples were taken to the laboratory for immediate examination. A small portion of each sample was boiled in a 10 per cent. KOH solution with a trace of safranin added for staining. The stained grains are more readily discernable under the microscope. After boiling, the peat was centrifuged, decanted, rinsed in distilled water, centrifuged and decanted again. The boiling in KOH solution and centrifuging is unquestionably severe treatment, for it ruins the structure of many grains,



but the tenacity with which colloidal peat clings to the pollen is broken only by some such treatment. Deflocculation was an utter failure when the peat was bathed in water only; and but little more satisfactory when boiled in distilled water and centrifuged. The pollen grains were more readily separated from the mud than from the peat, boiling in distilled water and centrifuging being adequate for deflocculation. Permanent slides were made by removing a bit of the top precipitate from the centrifuge tube with a pipette and mounting it in glycerine jelly. The cover glass was then ringed with balsam. Identification was on the basis of measurements made of extant pollen grains of identical genera as well as comparison with Sears' (3) drawings and descriptive key.

The early workers in fossil pollen (1, 3) claim that trustworthy results are obtainable by counting one hundred or one hundred and fifty grains per level. The latter number was used in this study. Differentiation was made between winged coniferous and unknown genera. The winged coniferous pollen was further differentiated as to the genera: *Abies*, *Picea* and *Pinus*.

The diagram shows the analysis graph and bog profile. The bog consists of three main strata: peat, water and mud. Further stratification has not been undertaken. The three main strata are shown by respective markings at the right of the diagram. The numbers at the left represent the different levels at intervals of one foot each. The numbers horizontally placed at the top indicate the relative number of grains found on each level.

Pollens of *Abies* and *Picea* have their maximum accumulation in the mud stratum. Both appear in the lowest level. *Abies* is confined to the mud stratum, disappearing at the thirty-second foot level. *Picea* extends into the peat, disappearing at the twenty-second foot level. It seems that pollens of *Abies* and *Picea* were deposited in large degree during the open-water stage of the lake before the bog mat was formed. It was striking to note the almost pure stand of *Abies* and *Picea* and the dearth of vegetable matter in the lower mud levels. *Picea* was the more abundant of the two genera. *Pinus* appears in the mud at the thirty-sixth foot level and continues unbroken to the surface. It makes its appearance with a noticeable increase in unknown genera. An analytical study of the vegetation (2) has shown that *Pinus Strobus* now inhabits the surface of the bog mat in pure stand. The order of post-glacial succession has been *Abies-Picea*, *Picea-Pinus* and *Pinus*-other genera.

SUMMARY AND CONCLUSIONS

1. The Merrillville bog consists of three general strata: peat, water and mud. The mat is still floating at the point where samples were taken.

2. Pollens of *Abies* and *Picea* reach their maximum accumulation in the mud stratum, indicating their deposition during the open-water stage of the lake.

3. The pollen present in the mud stratum is almost entirely that of *Abies* and *Picea*.

4. The appearance of *Pinus* pollen is accompanied by pollen from many other genera.

5. The order of the postglacial succession in this bog area has been *Abies-Picea*, *Picea-Pinus* and *Pinus*-other genera.

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