

Proceedings of the Iowa Academy of Science

Volume 44 | Annual Issue

Article 31

1937

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Recommended Citation

Wilson, L. R., and Brokaw, A. L. (1937) "Plant Microfossils of an Iowa Coal Deposit," *Proceedings of the Iowa Academy of Science*: Vol. 44: No. 1 , Article 31.
Available at: <https://scholarworks.uni.edu/pias/vol44/iss1/31>

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PLANT MICROFOSSILS OF AN IOWA COAL DEPOSIT

L. R. WILSON AND A. L. BROKAW

Much work has been done with the microfossils of Quaternary peat and silt deposits in Europe and North America, but comparatively little has been done with plant microfossils in older carbonaceous deposits, and, as far as the authors are aware, no statistical study has been made of these in coal deposits. The present study was undertaken in an effort to test in the Iowa coal the statistical methods used by paleoecologists upon Quaternary peat deposits.

The following procedure was found satisfactory in the preparation of the coal for study. Small pieces of coal were digested in Schultz's Solution for several days. These were then washed several times with water and transferred to a 25 per cent solution of ammonium hydroxide for about six hours. After several washings with water the material was allowed to settle and after decanting, the macerated coal was lightly stained with saffranin and examined under a binocular for larger tissues and spores. The finer material was transferred to glycerine jelly and mounted on microscopic slides and covered with a No. 1 cover glass. The slides were examined with the aid of a mechanical stage. Two hundred microfossils were counted at each horizon and the drawings were made with a camera lucida. Many species of spores and pollen-like fossils occur in the Iowa coal, but in the present study only six of the most diagnostic forms are considered. In the graphs (Fig. 2) where the six spore forms do not total 100%, two others were included in the counts. These are being reserved for further study.

The authors have not attempted to describe the species of microfossils though they are obviously new. Some belong to the form genus *Triletes*. Further study of these forms is now in progress and specific descriptions are being reserved for a comprehensive paper. The value of these descriptions may appear negative upon first consideration, but the microfossils have been found to have definite vertical distribution, which gives them some stratigraphical value, and if our paleobotanical knowledge is ever sufficiently developed to link the spores and pollen-like fossils to specific plants much will be possible in paleoecological studies.

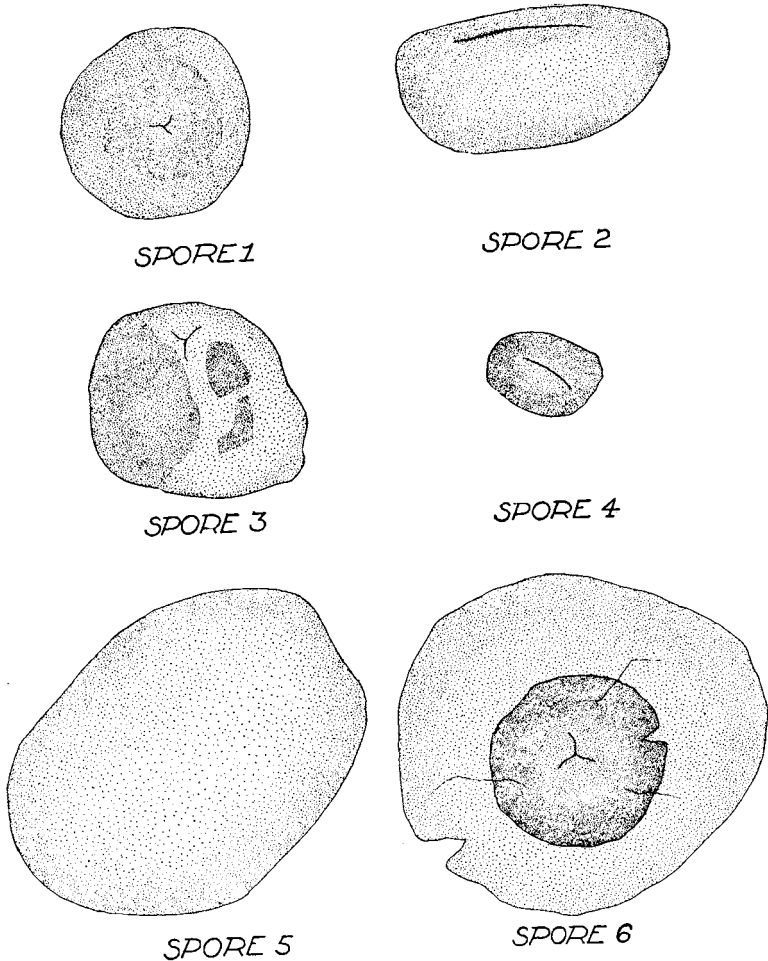


Fig. 1. Drawings of spores from coal at What Cheer, Iowa.

The deposit studied is located about one mile northwest of What Cheer, Keokuk County, Iowa. It is of Des Moines age. The mine is owned by the What Cheer Clay Products Company who have kindly permitted the investigations. At the place where the samples were secured the coal was approximately fifty inches thick. Specimens were collected at intervals of a few inches as shown in the graphs (Fig. 2).

The following brief descriptions of the most important microfossils, which are for the present time referred to numerically may be given.

Spore No. 1 is 45 *mu* in diameter and contains a central body

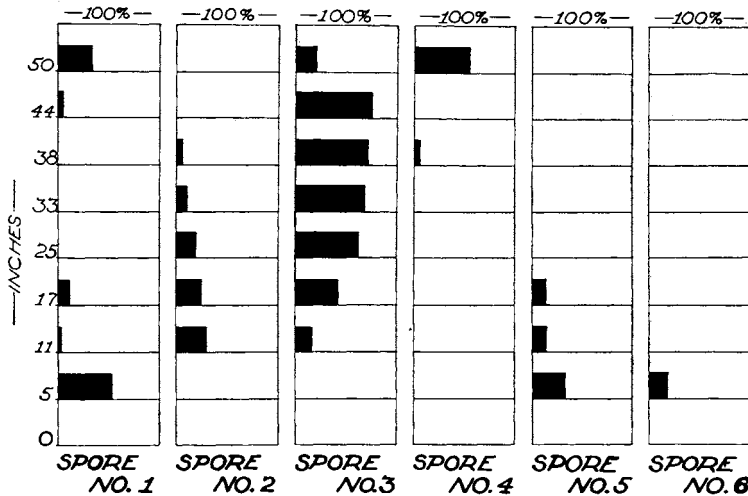


Fig. 2. Graphs showing the distribution of microfossils in the What Cheer coal deposit.

which is 27 *mu* in diameter. It possesses a triradiate opening. The preservation of the spores has not permitted a complete understanding of the position of the central body with respect to the outer structure. In some specimens the outer structure appears as a collar-like wing while in others it appears as a very thick exine. The surfaces are without any marked ornamentation.

Spore No. 2 is a bean-shaped fossil that averages 63 *mu* in length and 33 *mu* across the shorter dimension. It is without ornamentation. This fossil possesses a straight slit instead of a triradiate opening.

Spore No. 3 is a spherical body 55 *mu* in diameter. A triradiate opening is present in this spore. All specimens examined showed portions of a thick coat over a transparent one. These are presumably exine and intine respectively. No ornamentation was found upon the exine. The drawing of Spore No. 3 in Fig. 1 shows irregular remnants of the dark outer coat of the spore.

Spore No. 4 averages 27 *mu* in length and 14 *mu* in width. Its most characteristic feature is the dark color which superficially resembles the dark colored spores of many fungi. A slit down one side is usually present in this species.

Spore No. 5 is an unornamented subspherical fossil that averages 93 *mu* on the longer axis.

Spore No. 6 resembles Spore No. 1 in that a wing or thick exine surrounds the spore body containing the triradiate opening. The average diameter of the spore is 90 *mu* and the central struc-

ture averages 45 *mu* in diameter. Some specimens have been observed with folds extending from the outer structure across the inner, which would suggest that the outer structure was the exine rather than a wing.

COE COLLEGE,
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