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CARDIOCARPUS IN IOWA.

BY ARTHUR J. JONES.

While engaged in geological work in Guthrie county a number of peculiar seed-like structures were collected from a seam of bituminous coal. They occurred in the newly opened mine of Mr. Scott, three miles northwest of Fanslers.

These seeds are not more than half an inch long and are quite thin. They are acuminate and vary from oval to broadly heart-shaped. At the base is a scar evidently indicating the juncture of the stem. No connection, however, was seen between the seed and the stalk of any plant in the coal. They are covered with a thin coating of pyrite and they all occurred in an eighteen-inch vein of coal.

Similar seeds are described by Lesquereux and Newberry as belonging to the genus *Cardiocarpus* and found in the coal measures of Pennsylvania, Ohio and neighboring states. The structures observed are evidently merely nuclei, although scarcely a trace of an encircling rim can be seen on any of them. The specimens collected are similar to the nuclei of *Cardiocarpus bicuspidatus* and *C. zonulatus*.

It is now generally conceded that the seeds called by the generic name *Cardiocarpus* are merely the mature fruit of certain species of *Cordaites*. The *Cordaites* form a distinct order of gymnospermous plants very closely allied to the Cycads on the one hand and to the conifers on the other. They, however, bear a strong resemblance to the Lycopods and for some time were classed under this head. The living plant which most nearly resembles *Cordaites* is *Cycas revoluta*. Newberry says that the fruit *Cardiocarpus* was probably somewhat drupaceous when living, the nucleus being entirely concealed, but compressed by the great weight of the overlying strata it has become flattened; the fleshy pericarp is now the thin membranous rim, and the nucleus appears at the center, not so much crushed on account of its more solid structure, but somewhat flattened.

This fruit and other remains of *Cordaites* have been found in Ohio, Pennsylvania, Tennessee, Indiana, and various other states, but they have not been reported from Iowa.