

OUR PRESENT KNOWLEDGE OF AMERICAN COAL BALL PLANTS

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The investigation during the past year centered about the coal balls collected in the old strip mine at Calhoun, Richland County, which has yielded much excellent material.

During previous years it was primarily the material from Harrisburg and Danville which was examined and of which preparations and microphotographs were made. As a rule, coal balls from only one locality are examined at a time in the paleobotanical laboratory of the University of Chicago where the coal ball studies for the Illinois State Geological Survey are carried out.

About 240 Calhoun coal balls were cut of which a number were sectioned and studied in detail. A research student, Mr. Roy Graham, used some of this material for the preparation of a dissertation on which he is to receive his doctor's degree at the 1933 June Convocation of the University of Chicago.

Of particular interest is the fact that the Calhoun coal is one of the youngest in the State, being of McLeansboro age. Worthen classified it as No. 13 or 14, the Harrisburg coal as No. 5, and the Danville coal as No. 7. The impending reclassification of Illinois coals according to cyclothems will undoubtedly give other numbers but their relative positions will not be materially changed.

The fossil plants found in Calhoun coal include a number of species of Calamites, Sphenophyllum, Lepidophloeos, Lepidodendron, various ferns, such as Anachoropteris, Botryopteris, Corynepteris, Scolecopteris, Ptycho-carpus, Cyathotrachus, Psaronius, a new fern genus, Sphaerotheca, a number of Cydothales such as Heterangium, Telangium, Conostoma, as well as a Gymnosperm, Cordaites.

The time-saving cellulose peel method has been used almost exclusively in preference to cutting individual coal ball sections and grinding them down to microscopic thinness. After the coal ball is cut in two or more portions and has been found to contain valuable information, its cut surface is smoothed. Afterward this surface is etched with diluted hydrochloric acid which removes a thin layer of the limestone matrix but leaves all organic enclosures intact. A solution of cellulose acetate in acetone or of parlodion in equal parts of absolute alcohol and ether is poured on and left to dry until a solid film forms. This film, which is easily removed, contains the organic particles in exactly the same position which they held while imbedded in limestone. In other words, we have a very thin section where calcium has been replaced by cellulose. This method has been improved by Mr. Graham, who used nitro-cellulose dissolved in butyl acetate (see "Stain Technology," April, 1933 for more complete report). In microphotographs prepared from such cellulose peels, the minute spores show extremely well, even at a magnification of 1,000 diameters.

The floras of all Illinois coal balls so far investigated can be correlated with the fossil plants of the Stephanian group of the Upper Carboniferous period in England and the continent.