

Preservation of Plant Material in Coal Balls From Nashville, Illinois*

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ABSTRACT

Calcification of plant materials in No. 6 coal, Clarkson mine, at Nashville, Illinois, has assumed three rather characteristic modes of occurrence:

(1) Elongated wood "stringers" which must represent portions of sizable logs. The preservation is in general poor.

(2) Nodules, i. e. "coal balls" in the more technical and restricted sense. These contain heterogeneous plant materials frequently in an excellent state of preservation.

(3) Encrusted nodules, i. e. a nodular center surrounded by a coaly shell and a more or less completely calcified outer layer. This

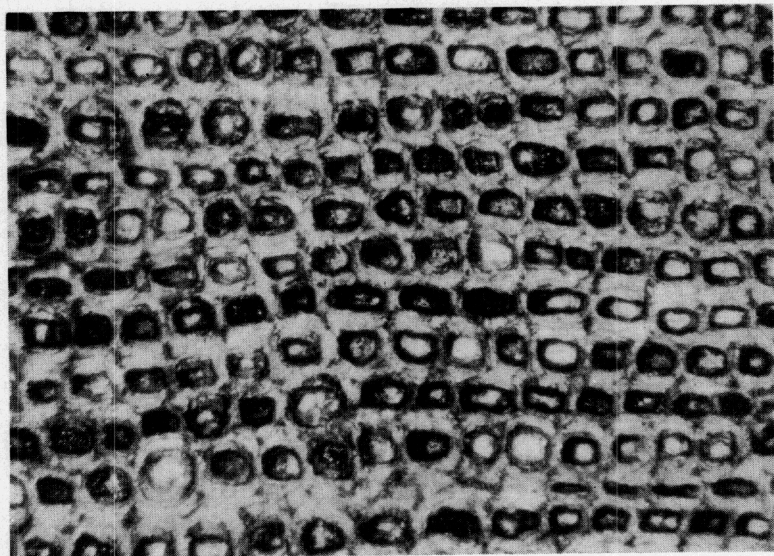


Fig. 1.—WOODY TISSUE FROM COAL BALL, CROSS-SECTION. Secondary cell walls prominent, lamellar portions nearly entirely replaced by calcite. Cells with dark lumens contain a filling of pyrite. Photographed by reflected light from an etched surface. Magnification 90 times.

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arrangement suggests that the calcite was deposited at two successive times separated by an interval of coal compaction.

The introduction of calcite seems indirectly associated with a sporadic "middle" limestone occurring directly over the coal wherever it is present.

The less well preserved woody tissues are interesting since it often appears that a considerable proportion of the original substance is missing. In nearly all cases the lamellar region of the cell wall seems to be the portion most extremely attacked. The secondary walls of these wood cells are present, represented by a somewhat laminated brownish (humified?) residue, each cell being definitely isolated from its neighbors as shown in the accompanying photograph.

It has been definitely established that lignin is concentrated in the middle lamella region in wood cells of present day plants, the secondary cell walls being predominately cellulosic. If this relation holds for these paleozoic woods, then the lignin has been depleted with proportional increase of cellulose. The process of calcification may have some direct bearing on this condition. It seems possible that the plant tissues which adjoined the areas of petrification and were converted into coal may likewise have been depleted of their lignin content.

Some support may be found in these observations for the contention of various authors that coals are derived from materials rich in cellulose and poor in lignin. It seems to the writer however, that such a condition as observed in these calcified woods, would hardly apply to the entire bed of coal.