

## FUNGAL BODIES IN TALCHER COALS \*

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**ABSTRACT.**—The microscopic study of Talcher coals in thin sections under transmitted light and polished surfaces in reflected light under oil immersion has been carried out. The fungal bodies form a conspicuous microscopic constituent and occur in three forms in durain which is closely compressed around them. The first form resembles sclerotia while the other two are opaque, rounded bodies with filamentous empty cavities or totally opaque. A comparison of these fungal bodies in thin and polished sections reveals that the tissues observed opaque in thin sections form the bright objects in polished sections, their reflectivity approaching very near to that of fusinite. These fungal bodies have been instrumental in causing wide-spread decay of the woody matter.

### INTRODUCTION

**F**UNGAL bodies seem to have been recorded first by Jeffrey and Chrysler in 1905 in the Tertiary lignites of Brandon. In 1925 Stach identified *Sclerotites brandonianus* in the Tertiary lignites of Columbia, Hungary and Germany. Seyler (1948) observed two species of sclerotia (*S. brandonianus* and *S. cavatoglobossus*) in the Tertiary lignites of Sumatra. The term 'sclerotoids' has been suggested by Hacquebard (1952) for the



fungal bodies which do not show any structure while 'sclerotium' for those exhibiting structure.

Investigations on the occurrence of fungal bodies in Indian coals have been carried out by Chandra (1954) who has identified sclerotia in the Palana lignite Bikaner and in the Poniat seam of Raniganj coalfield. Ganju (1955) has reported the occurrence of fungal bodies resembling sclerotia in the Lower Gondwana and Tertiary coals of different coalfields. The

present paper describes these microscopic constituents in the coals of Talcher Coalfield, Orissa (Pareek, 1955).

### MICROSCOPICAL STUDY

A detailed microscopical study of the coals from Top, Middle and Bottom seams in the Villiers, B. N. Rly., and M. S. M. Rly. collieries of the Talcher coalfield, has been carried out in thin sections under transmitted light and of polished surfaces in reflected light under oil immersion. Fungal bodies have been observed to form a conspicuous microscopic constituent of the durains in these coals. They are opaque and vary in shape, size and nature. They have been classified into three categories and are illustrated in Pl. 40, figs. 1-5.

The first form of fungal tissue appears as an oval body with a generally thickened outer ring and a cellular interior, the cells being thin-walled and closely packed. It is illustrated in the upper central portion of fig. 1, as seen in a thin section. In polished section this type of fungal tissue appears as seen in the central portion of fig. 3 and the right upper portion of fig. 5. A comparison of these fungal tissues in thin and polished sections reveals that the parts observed opaque in thin sections

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FIG. 1

X 150

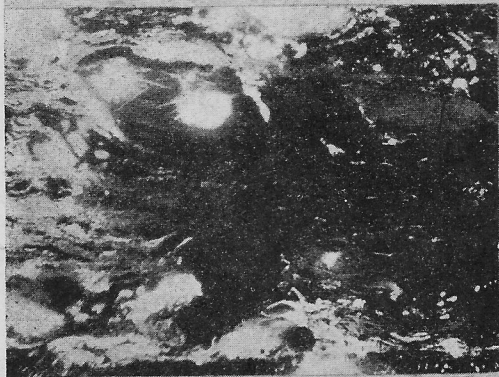


FIG. 2.

X 100

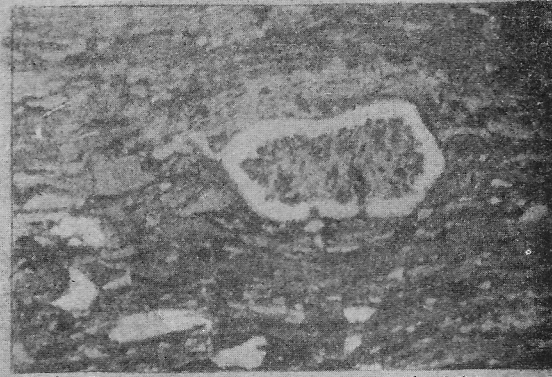


FIG. 3

X 220

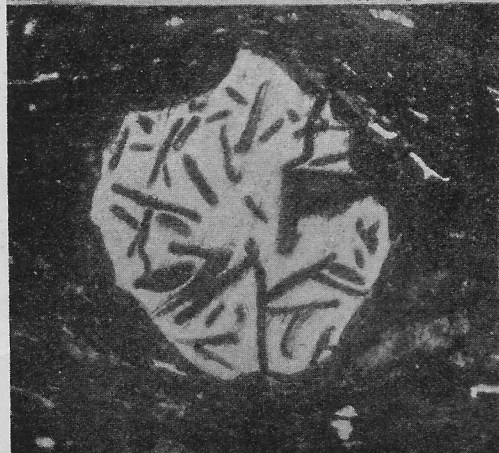


FIG. 4

X 220



FIG. 5

X 220

show the highest reflectivity in polished sections. The outer thickened ring, suggests a resemblance with sclerotia.

The formation of structures like sclerotia is attributed mostly to the fact that mycelium, during certain stages in the life history of most fungi, becomes organised into such loosely or compactly woven tissues. These are hard resting bodies that can survive unfavourable conditions by the trans-formation of single cells into thick-walled resting cells. They may remain dormant for long periods of time and may germinate upon the return of favourable conditions.

The second form of fungal body is opaque, irregular in shape and exhibits several small filamentous cavities which are usually empty and of nearly equal thickness but of varying length. They may probably represent cracks in the fungal tissue or even micellar cavities. Frequently they also show rounded empty cavities. Their nature and characters can be seen more clearly in polished sections than in thin sections. The left upper portion of fig. 2 illustrates such a fungal tissue as seen in a thin section while figs. 4 and 5 exhibit them in a polished section.

The third form which is of most common occurrence and forms a major constituent of durains occurs as small, almost rounded, totally opaque bodies with a carved outline. In thin sections they are opaque while in polished surfaces they form the bright objects in the general mass of durain indicating their high reflectivity which approaches very near to that of fusinite, a dominant constituent of the durains. The lower central portion of fig. 2 illustrates such fungal bodies as seen in a thin section.

## ORIGIN

The fungal bodies are considered to be the remains of wood destroying fungi which seem to have originated in the peat stage of coal. They have been instrumental in accelerating the chemical processes and in the maceration of coal, thus producing wide spread decay of the woody material. Their activities were probably checked when the peat deposit was covered with layers of sediments brought by the incoming streams and forming the over-burden.

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## EXPLANATION OF PLATE 40

( Figs. 1 and 2 are from thin sections in transmitted light ; Figs. 3, 4 and 5 are from polished surfaces in reflected light under oil immersion.)

- FIG. 1—A fungal body resembling sclerotia in the upper central portion. The groundmass is compressed durain comprising mainly of vitrinite strips that are arranged more or less parallel to one another and thin string-like yellow microspores. Fig. 3 exhibits these constituents in a polished section.  $\times 150$ .
- FIG. 2—Two types of fungal bodies are illustrated, an oval fungal body showing several thread-like or filamentous cavities and two rounded cavities in the left upper portion and rounded, totally opaque bodies in the lower central portion.  $\times 100$ .
- 3—A fungal body resembling sclerotia in durain.  $\times 220$ .
- 4—A fungal body having several filamentous cavities.  $\times 220$ .
- 5—A colony of fungal bodies, the one in the left upper corner resembling sclerotia, and the others with filamentous cavities in a decomposed woody tissue.  $\times 220$ .