ON A BRYOPHYTIC SPOROPHYTE-LIKE STRUCTURE FROM THE GANJRA NALLA BEDS IN THE SOUTH REWA GONDWANA BASIN, CENTRAL INDIA

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ABSTRACT—A small object measuring 800 microns long and 320 microns broad comparable to a young Moss sporophyte is reported from a macerated mass of shale from the Ganjra Nalla beds, South Rewa. It has been provisionally named *Capsulites gondwanensis* gen. et. sp. nov.

INTRODUCTION

A portion of shale (specimen R. S. $\frac{1}{4}$) collected from the Ganjra Nalla beds, on maceration with dilute schulze's fluid yielded an interesting microfossil besides spores, tracheids and cuticles. A prilimiinary account of this structure has already been published in Palaeobotany in India VI (Saksena 1947). It resembles a young capsule of moss having a short seta and foot.

DESCRIPTION

Capsulites gondwanensis gen. et. sp. nov.

Generic Diagnosis—The structure divisible into three distinct regions—foot, seta and capsule. The capsule having spindle shaped body divisible into basal, middle and apical portion.

Specific—Spherical foot, very short seta and comparatively long, thick capsule. Foot composed of small thick walled cells ; seta represented by the constriction between the foot and the capsule. Capsule spindle shaped. The cells in the basal portion of the capsule thick-walled, in the middle portion elongated lengthwise with sinuate walls, in the apical portion smaller and thick walled. Apical portion crown-shaped with a conical top in the centre surrounded by a circular groove. Annulus not very distinct.

Locality—The junction of the Ganjra Nalla with the Johilla river some $1\frac{1}{2}$ miles south-west of the Birsinghpur railway station, on the Katni-Bilaspur branch of South-Eastern Railway, South Rewa, Central India. (23.21 N : 81. 2 E).

Horizon—Lower Gondwanas, below the Barakar coal seam.

Holotype—Slide No. 97 (7) prepared out of the macerated material from shale piece R. S. 1/4, and kept at the Institute of Palaeobotany, Lucknow (India).

The general shape of this structure is strongly suggestive of comparison with a Moss sporophyte. This capsule-like structure seems to represent the young stage as it does not show clear differentiation into columella, spore sac and sporogenous tissue. Its microscopic size too supports this view. There are no spores found in the capsule. The foot is about 154 microns in diameter, and is composed of small thick-walled cells. Between the foot and the capsule there is a slight constriction which represents the seta, but no further details in this portion are visible. The capsule is a spindle shaped structure, measuring 800×320 microns with distinct apical and basal parts. No stoma has been seen in any part of this structure. The cellular structure within the outer wall of the capsule is not clear. It seems that most of it was dissolved out during maceration, because the inner cell walls are not cutinised. The

empty space in the middle portion of the capsule may be interpreted as empty spore sacs. These extend right up to the seta. The outer wall of the capsule is broken at several places (Pl. 21, fig. 1).

The apical portion of the capsule, forming the crown shaped structure is well preserved (Pl. 21, fig. 2). A girdle of large vertically elongated cells, four of which are seen in the photo, situated along the junction of the crown-shaped part with the body of the capsule most probably represents the annulus. The cells of the apex are polygonal in shape and have sinuate walls. At the top of the crown is a conical apex projecting upwards and having a circular groove around it. (Pl. 21, fig. 2.)

DISCUSSION

On the basis of the above available data it is very difficult to compare this structure with the sporophyte of any one of the living Bryophytes ; however, the only possible group of plants with which it can be compared seems to be this group. The idea of comparing this microfossil with a schizaeaceous sporangium, or with an ovule or a young seed of a Pteridosperm seems too far fetched and remote. The structure is quite different from any of these.

Our knowledge of fossil bryophytes is still very meagre. No Palaeozoic fossil resembling the sporophyte of Mosses has yet been discovered. This capsule is the first of its kind which allows comparison with a moss sporophyte, though here too it seems difficult to arrive at any definite conclusion.

The distinct division of the present microfossil into foot, seta and capsule, the structure of the apical portion of the latter, the possibility of the presence of annulus, and lastly the indication of a spore-sac extending along the entire length of the capsule places it nearer to Muscineae than to Hepaticae. In Hepaticae the capsule is not so well differentiated as in this case. In Anthocerotales there is no such differentiation of the apical portion of the capsule as seen here.

This structure cannot be compared *in toto* with any one group of Mosses. It combines the characters of Sphagnales, Andreaeales and Eubryales. The well defined round foot and very short seta are characters comparable to Sphagnales. The capsule with possibility of an annulus, and the crown shaped apex is comparable to Eubryales. It differs from Eubryales in that the apophysis is not developed at all. The possibility of spore sac extending to the basal portion of the capsule is a character in which it resembles Andreaeales.

So far the only known Palaeozoic bryophyte is that described by Walton (1925 and 1928), but he has given no name to his problematical fossil, which widely differs from this capsule. The name *Sporogonites* (Halle, 1916) is already occupied. *Muscites* instituted by Brongniart (Seward 1898) has been applied to gametophytic structures only. Hence a new generic and specific name has been proposed for the present microfossil. It resembles the capsule of a moss to a great extent, at least in general external features, and hence the generic name *Capsulites* has provisionally been suggested. Being a Gondwana fossil, having the detailed specific characters given in the diagnosis it deserves the specific name *gondwanensis*.

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EXPLANATION OF PLATE 21

FIG. 1—*Capsulites gondwanensis* gen. et. sp. nov., Slide 97 (7). × 120.

2—The apical portion of *Capsulites gondwanensis* enlarged. × 375.

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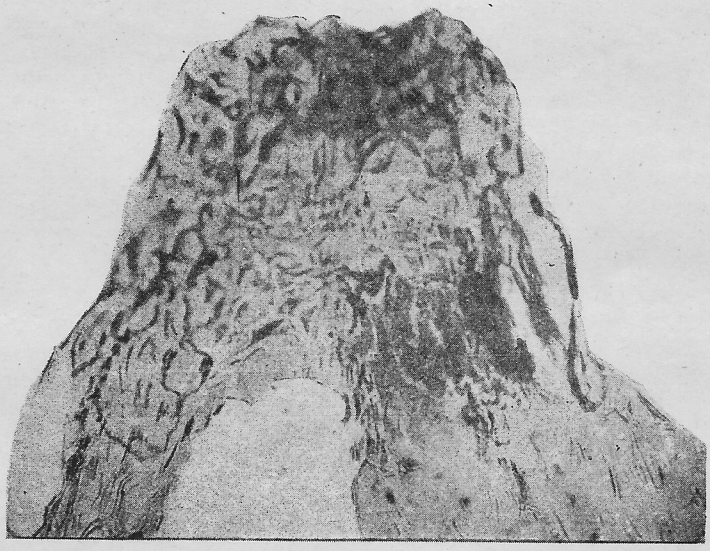

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