

STUDIES IN THE GLOSSOPTERIS FLORA OF INDIA — 12.  
*STELLOTHECA ROBUSTA* NOV. COMB.: A NEW EQUISETA-  
CEOUS PLANT FROM THE LOWER GONDWANAS OF INDIA

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ABSTRACT

A new combination — *Stellotheca robusta* — is proposed for the plant described previously under the name *Phyllotheca robusta*. It differs from *Phyllothecas* in not possessing cup-like leaf sheaths, and the free, stout leaf segments united only at the base.

INTRODUCTION

FEISTMANTEL described in 1880 under the name *Phyllotheca robusta* two equisetalean specimens from the Lower Gondwana formations in the Rajmahal Hills, Bihar. Later, while describing this species Arber (1905) stated, "Union of the leaves into a sheath, near their attachment to the node, is not very obvious in the figures given by Feismantel. If this plant is correctly assigned to the genus *Phyllotheca*, the comparatively broad character of the free segments easily distinguishes it from the other *Phyllothecas* belonging to the *Glossopteris* flora." This species of *Phyllotheca* was first reported only from India; but later Walkom (1922) discovered it from the Lower Bowen Series of Australia. As regards its inclusion under *Phyllotheca* he stated, "It seems more probable that it should be referred to *Annularia*, but the specimens available are not well preserved and for that reason no change is made here." In fact Walkom's other species (1916), *Annularia stellata*? also appears to us to be very much similar to *Phyllotheca robusta*.

Feistmantel's two specimens were collected from Dubrajpur near Gopicander in the Rajmahal Hills. Our specimens were discovered from Tattitola, near Alubera which is roughly about ten miles north of Gopicander. It appears that this plant was fairly widely distributed in the Lower Gondwana exposures of the Rajmahal Hills, but so far it has not been reported from any other regions in India.

DESCRIPTION

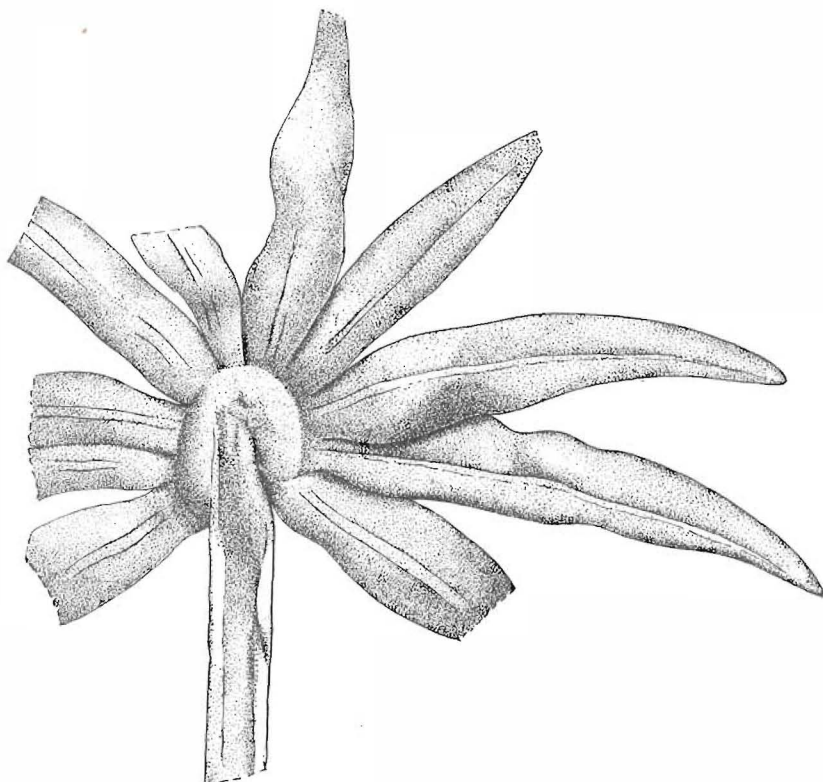
*Stellotheca robusta* nov. comb.

*Phyllotheca robusta* O. Feistmantel, 1880, p. 68, Pl. 14a, Figs. 1, 2; Arber, 1905, p. 25, Text-fig. 8; Walkom, 1922, p. 6, Pl. 9, Fig. 51.

The specimens represent fairly small branches bearing a few whorls of leaves (PL. 1, FIGS. 1, 2, 3). The stem is surprisingly slender in contrast to the robust leaf whorls. The stem measures 1 to 2 mm. in diameter and shows sometimes a few markings resembling ridges and grooves (PL. 1, FIG. 4). No branching has been observed in our specimens. The distance between the two nodes varied from 8 to 12 mm.

The leaf whorls are borne at the nodes at a distance of 8 to 12 mm. from each other. The leaves are elongate with acute tips and are only united at the base (PL. 1, FIGS. 5, 6). Their numbers vary from 8 to 12 in our specimens, but Feistmantel (1880) had counted from 10 to 14 and Walkom (1922) up to 15. The leaves are 1 to 2.5 cm. in length and 1 to 3 mm. in breadth. The free segments appear to overlap one another near the base (like a circinate venation of sepals) and spread out horizontally like a star. Each leaf has a strong and prominent midrib which persists right up to the apex. Some of the leaves show markings transverse to the midrib (PL. 1, FIGS. 5, 6), but these appear to be of lithological character and, therefore, cannot possibly be regarded as venation.

The most striking difference this plant shows from *Phyllotheca* is in the absence of cup-like leaf-sheaths, slender stem and in the absence of typical ribs as present on the stems of *Phyllotheca*. In fact, a casual glance at the specimens gives an idea that the leaves are very similar to *Annularia*. However, the



TEXT-FIG. 1 — A leaf sheath of *Stellotheca robusta* with ten circinate leaves arranged on the disc.  $\times 4$ .

lack of evidence as regards its branching habit, which may be different from *Annullaria*, coupled with the fact that no true calamitean stem has been reported so far from the Glossopteris flora, precludes the possibility of this plant belonging to *Annullaria*.

A new combination, *Stellotheca robusta* is, therefore, proposed to include such plants.

#### GENERIC DIAGNOSIS

*Stellotheca* gen. nov.

Leaf-bearing branches slender, articulated and ribbed; leaf segments *only* united at the base; free leaf segment of medium length, from 8 to 15 in number, fairly broad at the base and narrowing down towards the acute apex. Midrib strong and persisting up to the apex.

#### SPECIFIC DIAGNOSIS

*Stellotheca robusta* nov. comb.

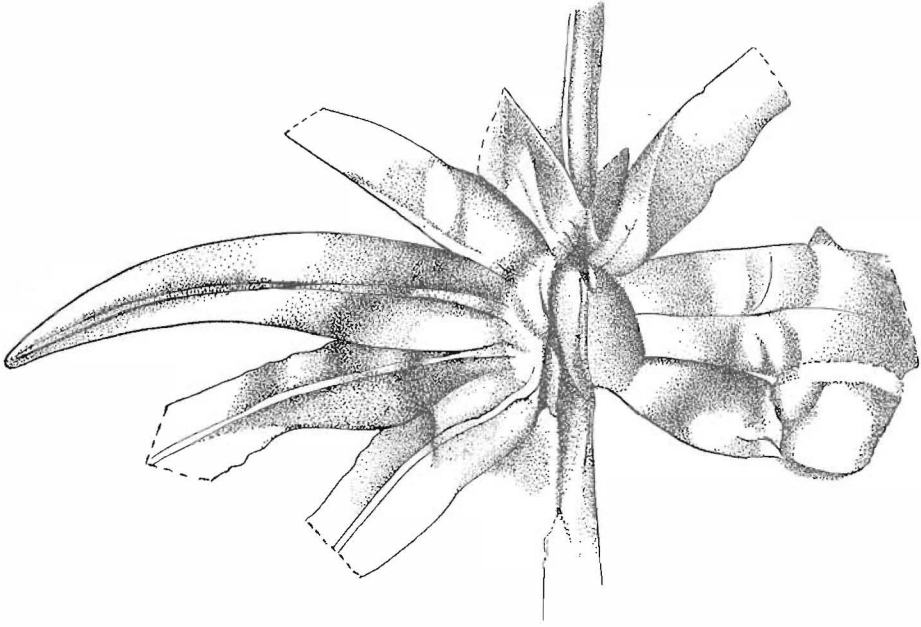
Leaf-bearing branches slender with robust looking verticillate leaf whorls. Leaves only united at the base, the free segments linear, 8 to 14 in number and spread out horizontally like a star, 1 to 2.5 cm. long and 2 to 3 mm. broad. Midrib strong and persists up to the apex.

*Locality* — Near Tattitola, on the right bank of the Bansloi river (upstream), Rajmahal Hills, Bihar, India.

*Type* — Specimen No. 27909/432 Museum of the Birbal Sahni Institute of Palaeobotany.

#### COMPARISON AND DISCUSSION

*Stellotheca* is easily distinguished from *Phyllotheca* by the robust-looking leaf whorls,



TEXT-FIG. 2 -- Counterpart of specimen in Text-fig. 1.  $\times 4$ .

slender stem, absence of cup like leaf-sheaths and the free segments only united at the base and which are spread out horizontally like a star. As regards its habit, it is difficult to guess from the few small specimens which we have found so far. Slenderness of the stem which supports rather thick leaf whorls suggests that the plant could not have grown erect on its own. Perhaps these slender branches were borne on a stouter axis, and that the arrangement was something like that of *Annularia*. We have, however, no specimens at present to corroborate this interpretation.

It is interesting to note that Walkom (1916) tentatively assigned a somewhat similar plant from Australia to *Annularia stellata*. He believed (1938) that the specimens described as *Phyllothea robusta* may also represent a similar type. It appears that Walkom in identifying his specimen with *Annularia* was influenced by the idea that it provides a link with the northern floras (WALKOM, 1938). However, no other nor-

thern elements have been found in that flora and hence its inclusion under *Annularia* is not free from doubt.

Similar is the case with *Annularia*? *australis* Feist., which later Etheridge compared with those of *Annularia stellata* Schl. Arber (1905) had, of course, expressed a doubt that assigning of this plant to the genus *Annularia* is not free from doubt and further stated that the free, lanceolate segments approximate more closely to leaf-whorls of *Phyllothea robusta*.

In any case it shows what confusion these plants with *Annularia* like leaf whorls in the Glossopteris flora, which could not be definitely assigned to either *Phyllothea* or *Annularia*, created in our minds. It appears that in the Glossopteris flora there was present another equisetaceous genus, other than *Phyllothea* and *Schizoneura* and which perhaps had closer affinities to *Annularia* than to *Phyllothea*. A new genus has, therefore, been created to receive these plants.

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### EXPLANATION OF PLATE 1

#### *Stellotheca robusta*

1. A specimen of *Stellotheca robusta* showing three leaf sheaths and the discs.  $\times 2$ .
2. Counterpart of specimen in Fig. 1.  $\times 2$ .
3. Specimen of *S. robusta*.  $\times$  Nat. size.
4. A part of the stem of *Stellotheca robusta* showing nodes and internodes with prominent ridges and grooves on the internodes.  $\times 2$ .
5. An incomplete specimen of *Stellotheca robusta* showing the disc and the ribbed stem.  $\times 2$ .
6. A part of the leaf sheath showing transverse venation of the leaves.  $\times 5$ .
7. Leaves of *Stellotheca robusta* showing the prominent mid-vein and transverse venation.  $\times 5$ .



1



4



2



3



5



7



6