

STUDIES IN THE GLOSSOPTERIS FLORA OF INDIA — 34. ON  
A RECORD OF *PHYLLOTHECA AUSTRALIS* BRONGN.  
FROM JHARIA COALFIELD, BIHAR

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ABSTRACT

*Phyllothea australis* Brongniart, 1828 is reported for the first time from the Barakar stage of the Lower Gondwanas of India. On the basis of a detailed study it is suggested to merge *P. indica* Bunbury, 1861 with the earlier *P. australis*.

INTRODUCTION

THE genus *Phyllothea* was established by Brongniart (1828) for certain plants, from the Hawkesbury River, near Port Jackson, Australia, resembling in habit the recent equisetums. This genus is known by about 24 species of which 7 are reported from the Gondwanaland. From India so far only three species, viz. *Phyllothea indica* Bunbury 1861, *P. griesbachii* Zeiller 1902 and *P. sahnii* Saksena 1952, are known. Another species *P. robusta* Feistmantel 1880 has recently been transferred to a new genus *Stellothea* (SURANGE & GYAN PRAKASH, 1962).

*Phyllothea indica* was first reported by Bunbury (1861) from the Raniganj Stage of Nagpur. Zeiller (1882, see BOUREAU, 1964, p. 404) reported a variety of this species, i.e. *P. indica* var. *longifolia* from the Rhaetic of Tonkin. Seward (1898, p. 288) found that *P. indica* was similar to, *P. australis* Brongniart 1829. Arber (1905 p. 21), however, maintained the two species separate, especially as the Indian form was till then imperfectly known. Since the time Bunbury described his specimen nothing substantial was added to our knowledge of this species till Surange (1955) recorded and described some well preserved specimens of this species from the Raniganj coalfield, Bengal. Though he found a distinct similarity between his specimens of *P. indica* and those of *P. australis*, yet kept the two species separate, leaving the merger till the time cuticular structure of the two species is known.

Some time back some specimens of *Phyllothea* were collected by Dr. B. S. Venkata-

chala of the Sahni Institute from outlying shale dumps at Bahjardih (Barakar Stage) in the Jharia coalfield, Bihar. I am thankful to him for handing over these specimens to me for investigation. From a study of these specimens I feel convinced that it is not desirable to separate *P. indica* from *P. australis*.

DESCRIPTION

Genus *Phyllothea* Brongniart, 1828

*Phyllothea australis* Brongniart, 1828

Pl. 1, Figs. 1-4

Selected Synonymy

- 1861 — *Phyllothea indica* Bunbury, p. 335, pl. 10, figs. 6-9.  
1880 — *Phyllothea indica* Feistmantel, p. 67, pl. 12, figs. 3-9.  
1882 — *Phyllothea indica* Bunbury Var. *longifolia* Zeiller, p. 5, pl. 10, figs. 1, 2A.  
1890 — *Phyllothea australis*, Feistmantel, p. 79, pl. 14, figs. 2-5.  
1898 — *Phyllothea australis* Seward, p. 287.  
1898 — *Phyllothea indica* Seward, p. 287, fig. 68 c.  
1905 — *Phyllothea australis* Brongniart, Arber, p. 17, pl. 2, figs. 6-8.  
1905 — *Phyllothea indica* Bunbury, Arber, p. 20, text-fig. 6.  
1955 — *Phyllothea indica* Bunbury, Surange, p. 85, pl. 2, figs. 7-9.  
1966 — *Phyllothea indica* Bunbury, Surange, p. 40, figs. 22A-C.

The present description is based upon the study of several specimens preserved as impressions on grey and buff shales. All the specimens are devoid of any carbonized matter and hence no cuticular preparations could be made. The preservation of most of the specimens is otherwise satisfactory. All the specimens, though show well

preserved leaf-sheaths, are devoid of any trace of the stem structure. Hence no idea could be formed about the stem which bore these leaf-sheaths.

Plate 1, Fig. 1, shows a large number of leaf-sheaths, sometimes overlapping each other. From a study of the main specimen it would seem that the leaf-sheaths were attached to the stem at a distance of about 1.5-2 cm. A few similar leaf-sheaths are present scattered over the same piece of shale. The leaf-sheaths have in the central region a cup-like depression, 1.5-2 cm. in diameter. From the rim of this depression 8-12 free leaf segments radiate out. The free leaf segments are linear and gradually taper to an acuminate apex. The midrib is not distinguishable. The leaf segments measure 1-1.5 cm. in length and about 1 mm. in breadth at the base. From the diameter of the cup-like depression it seems that the stem which bore these leaf-sheaths was less than 2 mm. in diameter. These leaf-sheaths probably belonged to a young plant.

Plate 1, Fig. 2, shows 4 well preserved, and a part of a fifth leaf-sheath. The top most leaf-sheath shows a distinct cup-like depression in the centre, about 8.5 mm. in diameter. The rim of the cup flattens horizontally and from it radiate out 24 linear, acuminate free leaf segments. Other leaf-sheaths also show similar organization, except that the number of free leaf segments in them is not the same. The size of the free leaf segments is also not constant. The size of the free leaf segments varies from 0.8 to 1.3 cm. There is no trace of the stem region. A magnified view of this specimen is represented in plate 1, fig. 3.

Plate 1, Fig. 4, shows two beautifully preserved leaf-sheaths showing by far the largest free leaf segments. The cup-like

depression is about 2 mm. in diameter from the rim of which come out 8-10 leaf segments; linear, straight and gradually tapering to a point at the apex. The size of the free leaf segments is upto 2.5 cm. Here too, the stem part is not preserved. These two leaf-sheaths show a striking resemblance with those figured by Surange (1955, PL. 2, FIG. 7) from the Raniganj Stage of the Raniganj coalfield.

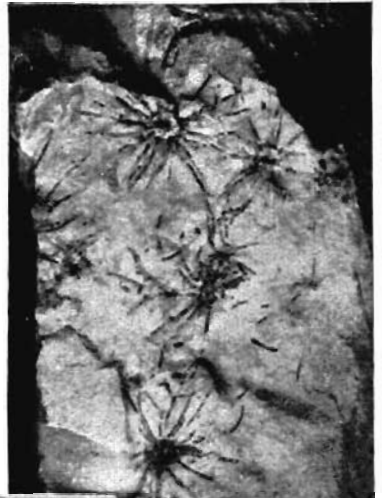
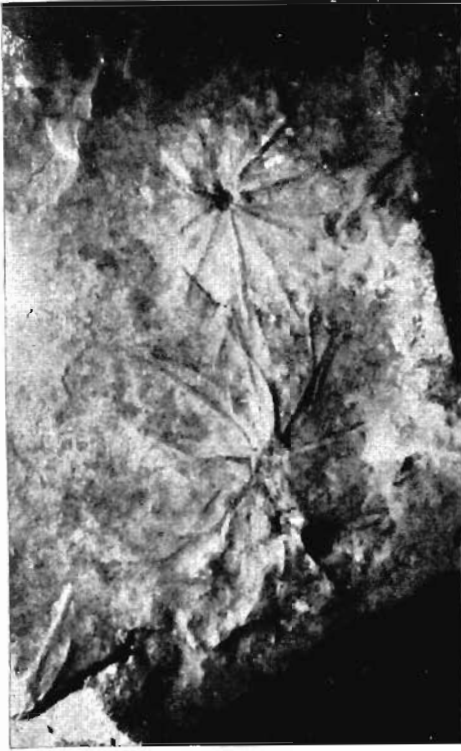
#### DISCUSSION

The main characters of *Phyllothea australis* Brongniart 1828 as outlined by Arber (1905, p. 17) are almost similar to those ascribed to *Phyllothea indica* by Bunbury (1861). Bunbury himself was not sure if the two species were specifically different. Seward (1898, p. 288) re-examined Bunbury's specimens and found them to differ in no way from *P. australis*. The leaf-sheaths figured in this work on plate 1 and also by Surange (1955, PL. 2, FIG. 7) show a striking similarity with the star-shaped detached leaf-sheaths of *P. australis* figured by Arber (1905, PL. 2, FIGS. 7-8).

From the work of Bunbury (1861), Feistmantel (1870), Surange (1955) and from the present study we know now that *P. indica* has essentially the same diagnostic features as that of *P. australis*. In both cases the stem is ribbed, the nodes are swollen and the leaf-sheaths are closely appressed to the stem to a great extent. The maximum number of free leaf segments in both the species is 24 and they are almost similar in size and shape. As such there is no necessity of maintaining a separate specific status for the Indian forms and hence it is proposed that these may now be referred to as *Phyllothea australis* Brongniart 1828.

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## EXPLANATION OF PLATE

## PLATE 1

*Phyllotheca australis* Brongniart, 1828

1. A large number of leaf-sheaths on a piece of grey shale. Specimen No. 33756. × Nat. size.
2. Four detached leaf-sheaths and a part of a fifth leaf-sheath. Note the distinct cup-like depression in the Central region of the topmost leaf-sheath. Specimen No. 33757. × Nat. size. (Photographed under liquid paraffin).
3. A magnified view of the specimen in Fig. 2. × 2.
4. Two star-shaped detached leaf-sheaths with long, linear and acuminate free leaf segments. Specimen No. 33758. × Nat. size.