

Plant remains from the Carboniferous Pascoe River beds of North Queensland

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A restricted Tournaisian flora containing *Stigmaria pascoensis* sp. nov.? *Botrychiopsis* sp. and *Cordaites* sp. is described. The *Stigmaria* is the first from the Gondwana region genuinely ascribable to the genus, but stem genera normally associated with it have not been found. The only clearly related flora also occurs in northern Queensland 1000 km to the south of the Pascoe River beds locality in the Tournaisian Venetia Formation. Other similar Early Carboniferous floras from Australia, India and Argentina are more widespread, more diverse, and slightly younger.

Key-words—Tournaisian flora, Carboniferous, Pascoe River beds, North Queensland, Australia.

INTRODUCTION

A SMALL Carboniferous flora from the Pascoe River beds of northern Queensland is discussed. Previous investigators have considered the flora as typically Laurasian Early Carboniferous, but herein it is reinterpreted as an endemic Gondwanaland regional flora. The identification of often poorly preserved lycopod logs is a problem associated with these floras. Most investigators have used Laurasian genera, and even species when generic characters such as ornamentation of the leaf scar are not preserved, or not present. Rigby (1987) proposed the use of an all-purpose name for lycopod stems when taxonomic characters such as vascular scars, parichnos and a ligule are absent. The lycopod remains from the Pascoe River beds are unusual in that the root stock, *Stigmaria pascoensis* does not have any of the other parts of lycopod plants associated with it: neither lycopod stems, leaves nor fructifications have been found.

PREVIOUS INVESTIGATIONS

Plant remains were reported originally from the Pascoe River beds by Morton (1924) who quoted Walkom as identifying: "Lepidodendroid stems; *Cordaites* and seeds which probably belong to same", which gave a Carboniferous age. Playford (unpubl., 1965, quoted by Whitaker & Willmott, 1969) identified "*Lepidodendron* and

Rhacopteris, which indicate a Lower Carboniferous age."

White (1973) identified *Stigmaria ficoides* and *Cardiopteris* sp. collected at a locality "in Hamilton Creek, 6 km above its confluence with the Pascoe River and 35 km west of Portland Roads. Grid reference E6492, N33912 on the Cape Weymouth sheet." The Cape Weymouth sheet is 1:250,000 sheet SD54-4.

The specimens used by White form the basis of this revision. All are housed in the Commonwealth Palaeontological Collection (CPC) by the Bureau of Mineral Resources, Canberra, Australia. The specimen GSQ F13240 from an unknown location is housed in the palaeontological collections of the Geological Survey of Queensland, Department of Resource Industries, Brisbane, Australia.

SYSTEMATIC DESCRIPTIONS

LEPIDODENDRALES

Incertae sedis

Genus-*Stigmaria* Brongniart 1822

Stigmaria pascoensis sp. nov.

Pl. 1, figs 2, 4, 6

1973 *Stigmaria ficoides* Bgt., in White, p. 143, fig. B.

Diagnosis—Lycopod root-stock or rhizome com-

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pression fossil bearing cylindrical rootlets attached to the root-stock at circular scars; scars 5—8 mm diameter, spaced generally more than one scar diameter apart but may be closer, casts of scars have a depressed rim, a raised annular cushion and a central vascular pit less than 1 mm diameter; rootlets, if present, attached to scars, rootlets cylindrical, or compressed ribbon-like having a single central vascular strand, not narrowing in the longest example known, length 135 mm; suggestion of fine striations on root-stock running more or less parallel to the axis.

Type specimens—Holotype: CPC 30454 (Pl. 1, fig. 4); paratype: CPC 30463 (Pl. 1, fig. 6). Other figured specimen: GSQ F13240 (Pl. 1, fig. 2).

Discussion—The holotype and paratype had been identified as *Stigmaria ficoides* (Sternberg) Brongniart 1822, by White (1973). This species is based on specimens having anatomical details which are lacking in all known compression specimens from northern Queensland.

I do not have access to much of the very extensive literature concerning this species (see Crookall, 1966, p. 549-554) so have had to depend on a number of XX Century publications for details (Hirmer, 1927; Stewart, 1947; Crookall, 1966; Chaloner & Boureau, 1967; Frankenberg & Eggert, 1969).

The Australian specimens are entirely compressions so they must be placed in some other species, even though their surface ornamentation agrees fairly closely with that of *S. ficoides*. This idea is reinforced, as known *S. ficoides* are attached to, or associated with, stems or trunks of *Sigillaria*, section *Eusigillaria*, *Lepidodendron*, *Lepidophloios* and probably *Bothrodendron* (Crookall, 1966) none of which occur in Australia. Some Australian lycopod specimens have been attributed to one or other of these genera, but I have been unable to find the appropriate scar ornamentation on any of the specimens I have seen. There seems to be no justification to place these rhizome or root-stock specimens in *S. ficoides*, or even express taxonomic doubt as *Stigmaria* sp. cf. *S. ficoides*, or *S. ?ficoides* all implying a relationship with Laurasian lycopod trunk genera.

A specimen from an unknown locality in the Carboniferous of the Broken River Embayment, north

Queensland, demonstrates conclusively that these specimens are root-stocks (GSQ F13240, Pl. 1, fig. 2).

It is impossible to say in which direction the axis of the specimen lies as there is no margin for orientation. The scars are arranged regularly in rows, the two closest parallel rows are 15 mm apart at right angles to the inferred phyllotaxic whorls. Roots are visible along the broken edges of the slab as flattened cylinders. All visible roots cross the full 70 mm thickness of the bed, some showing tapering, but most do not. Only two roots are visible on the plane of the lower surface, although all roots visible along the sides of the slab appear to be broken along this plane. The roots are strongly suggestive of the worm-tube trace fossil *Scolithos*, however a few lie intersected by the broken side of the slab showing a clear connection with the scars.

The upper surface of the specimen is a mould of the original plant hence scar ornamentation is shown in negative relief. Diameter of pits representing root cushions, ignoring some distorted pits, = 7 - 8 mm; diameter of central tubercle, also a pit, representing the vascular bundle = 1.7 - 2.2 mm.

Darrah (1969, pl. 27, fig. 3) has figured a very similar specimen from the Mazon Creek locality, Illinois, at the base of the Carbondale Formation of middle Pennsylvanian (Westphalian) age. He identified it as *S. ficoides*, which is unfortunate as it is not permineralized. I do not suggest there is any relationship with the Queensland specimen.

I consider it less confusing to erect a new species for the Australian compression specimens having an architecture similar to the external surface of *S. ficoides*.

GYMNOSPERMAE

Incertae sedis

Genus - *Botrychiopsis* Kurtz 1895

?*Botrychiopsis* sp.

Pl. 1, figs 1, 3

1973 *Cardiopteris* sp., in White, p. 144, figs A, C, D.

Discussion—Small fragments of detached pinnae occur on most slabs. These fragments have a similar morphology to equivalent sized fragments of *Botrychiopsis ovata* (McCoy); Rigby 1984, and of *B. plantiana* (Carruthers) Archangelsky & Arrondo 1971, and possibly

Plate 1

(Fig. 1, x2; fig. 2, x1/2, other figs, x1)

- 1, 3. *Botrychiopsis* sp. CPC 30453, CPC 30661.
- 2, 4, 6 *Stigmaria pasocensis* sp. nov. GSQ F13240, roots perpendicular to the plane showing root scars. CPC 30454,

- holotype, CPC 30463, scarred axis along the right side, with a prominent root passing along the top and left edge of figure.
5. *Cordaites* sp. CPC 30445, poorly preserved leaf fragment.

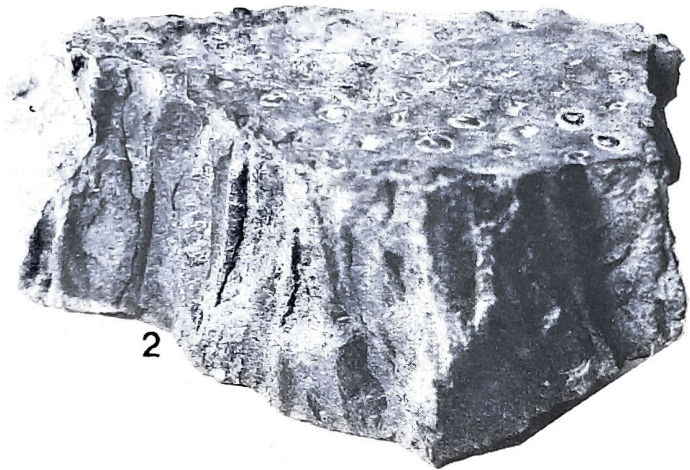
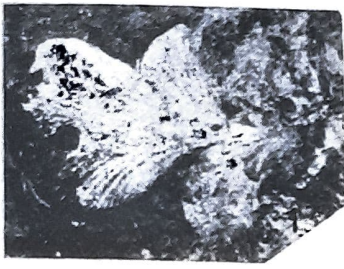


Plate 1

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