

TERTIARY FOSSIL FERN FROM VICTORIA, AUSTRALIA.

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ABSTRACT.

The type specimen of the early Tertiary fern *Cyclosorus Dargoensis* (McCoy) new comb. is re-figured, and new information provided. A palynological examination of the matrix has been made.

INTRODUCTION.

When Tertiary type fossils in the National Museum of Victoria were being checked, it was noted that a fossil fern named *Lastraea Dargoensis* by McCoy (1878) from the deep leads of the Bogong High Plains was in need of adequate illustration. Plate 1 re-figures the specimen, and the new combination *Cyclosorus Dargoensis* is proposed.

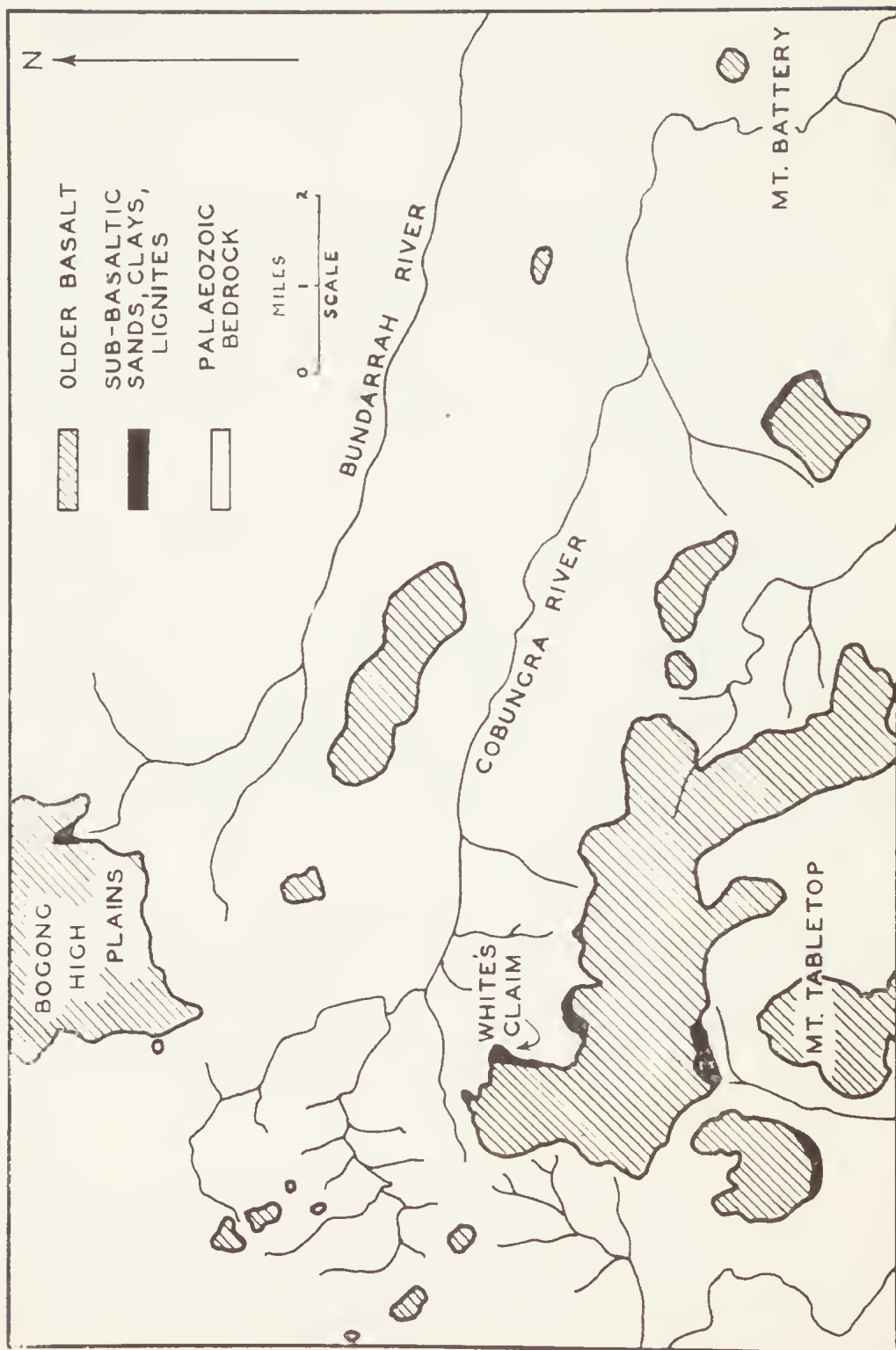
PROVENANCE.

Professor (later Sir) Frederick McCoy in 1878 published determinations of fossil plants obtained from fluviatile and lacustrine deposits under the Older Basalt of the Bogong High Plains. These fossils came from White's goldmining claim on Cobungra Creek at the headwaters of the Bundarra River (Couchman 1878), over 5,000 feet above present sea-level. Hunter (1909) and Kenny (1937*a, b*) have given information on the geology. Brough Smyth (1876) illustrated some of the fossils, while Royce (1887) and Tadgell (1926) have given general information on the area. The geographical position of the site is shown in Figure 1.

From these plant beds McCoy determined "a *Lastraea, L. Dargoensis* (McCoy), allied to a Miocene species from Arctic regions." He thus gave a new specific name, but did not validate it with description or figure. The specimen is in the National Museum of Victoria (P16156), and consists of a brown (oxidized) micaceous siltstone with the fossil plants preserved as carbonaceous films (Plate 1). Hall and Pritchard (1894) refer to this occurrence.

TAXONOMY.

In 1929 Chapman included in his "Open Air Studies in Australia" a photograph (Fig. 60) of the type specimen of *Lastraea Dargoensis*, but it was so diminutive as to be inadequate as a figure. Thus Dr. Duigan (1951) listed it in her "Australian Tertiary Flora" as a "species *Incertae sedis*".



A photograph of the type specimen was sent to Miss Mary D. Tindale of the Botanic Gardens, Sydney, for examination. Mr. R. H. Anderson, the Chief Botanist, has kindly allowed us to use Miss Tindale's findings, which are as follows. "I do not think there is any doubt that it is a species of *Cyclosorus*, a genus of about 300 modern species belonging to the Family Aspidiaceae (if you follow Copeland in his 'Genera Filicum' (1947) 141 or Family Polypodiaceae sub-family Dryopteridoideae according to Christensen in the 'Manual of Pteridology'). *Cyclosorus* and *Lastraea* (or *Thelypteris* as it should now be known) both belong to *Dryopteris sens. lat.* The genus *Cyclosorus* is characterized by pairs of veins united to each excurrent vein between the lobes of the primary pinnae. This type of venation is clearly shown in the photograph. In *Thelypteris* (syn. *Lastraea*) the veins do not join the sinus. Your fossil fern is very similar to *Cyclosorus pennigerus* (Forst.) Copel. which is found in Victoria to-day."

A specimen of *Cyclosorus pennigerus* was kindly forwarded to us from the Botanic Gardens, Sydney, and this is figured in Plate 2, while the enlargement in Plate 1, fig. 2, of McCoy's specimen shows the similarities between the extinct *Cyclosorus Dargoensis* and the extant *Cyclosorus pennigerus*.

DESCRIPTION OF *CYCLOSORUS DARGOENSIS* (McCoy) Gill and McWhae.

Synonym: *Lastraea Dargoensis* McCoy 1878. *Rept. Prog. Geol. Surv. Vict.* pp. 174-176.

Type Specimen: Nat. Mus. Vict. p. 16156. Plate 1, Figs. 1-2. The specimen consists of part of a leaf with pinnae of the order of 4 cm. long carrying about 30 lobes measuring about 5 mm. by 3 mm. Ten lobes occupy approximately 3 cm. on one side of the pinna. Pairs of veins are united to each excurrent vein between the lobes of the pinnae.

PALYNOLOGICAL EXAMINATION.

One of us (K. M. McW.) made preparations from a piece of matrix of the type specimen. As the material was oxidized, the pollen and spore content was low. Numerous monolet spores were obtained and found to agree in size and shape with those of *Cyclosorus* as described by Harris (1955). The spores are free, and anisopolar, bilateral, monolet, laesura long, elliptical in polar view, exine thin (1μ), perine absent, and have equatorial diameters ranging from 30-47 μ . As the perispore has been lost from these fossils, either through preservation or preparation, a definite connexion with *Cyclosorus* cannot be established. However, the great abundance of monolet spores in the preparations suggest that the spores are probably derived from the fern whose remains are so common in this rock. The living genus, *Cyclosorus*, with which the fossil fern has been compared, possesses monolet spores covered by variously ornamented perispores. It is realised that there are spores of other fern genera which without the thin perispore could look like the fossil

spores just described. The palynological evidence is in keeping with the macroscopic identification but cannot demonstrate absolute relationship.

The following sporomorphs were also found with the spores:

Coniferae	<i>Dacrydiumites Florinii</i> Cookson & Pike.
	<i>D. Mawsonii</i> (Cookson) Cookson.
	<i>Microcachrydites antarcticus</i> Cookson.
Fagaceae	<i>Nothofagus</i> species <i>c, e</i> Cookson.
Incertae Sedis	<i>Triorites harrisii</i> Couper.

All the above species are found in beds of similar type and stratigraphical position at Vegetable Creek and in the Snowy Mountains (Gill and Sharp 1957), N.S.W.

GEOLOGICAL AGE.

The Bogong and Dargo High Plains of Victoria extend into New South Wales where in the Snowy Mountains area there are similar deposits of carbonaceous, lacustrine sediments preserved under Older Basalt. These are Lower Tertiary in age, and may be Upper Eocene (Gill and Sharp 1957). It is therefore probable that the deposits at Cobungra Creek containing *Cyclosorus Dargoensis* are of the same geological age.

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EXPLANATION OF PLATES.

PLATE 1.

- FIG. 1. Holotype of *Cyclosorus Dargoensis* (McCoy) Gill and McWhae, X2. ?Eocene.
 FIG. 2. *Do.*, in part, X4. Note venation between third and fourth of lower series of primary pinnae.

PLATE 2.

- FIG. 1. *Cyclosorus pennigerus* (Forst.) Copel., living. Specimen from Botanic Gardens, Sydney, greatly enlarged to show characteristic venation.
 FIG. 2. *Do.* lower surface, slightly enlarged.
 FIG. 3. *Do.* upper surface, slightly enlarged.



PLATE 1.



PLATE 2.