DEPARTMENT OF
MINERALS AND ENERGY

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Record 1974/5

TERTIARY PLANT FOSSILS FROM MELVILLE ISLAND, N.T.

by

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Summary:

A collection of plant fossils from Melville Island is shown to be of Tertiary age. The Dicotyledonous genera Grevillea, Elaeocarpus, Ceratopetalum, Banksia, Aralia, and Roupala, and a fern, Pteris, are present. All these genera are components of the present-day Australian and Indomalayan floras, and are known to have existed since Eocene times.

Introduction

Plant fossils were collected by R.J. Hughes from the type section of the Van Diemen Sandstone at Cape Van Diemen, Melville Island; Lat 11°11'S, Long. 130°25'E. The BMR registered sample No. is 73050107. The rock is very fine-grained white, cream, or grey mudstone and the fossils occur as impressions, some with iron staining. Preservation is good and some fine detail is visible on some of the impressions. A number of Dicotyledonous genera and one fern fragment are identified, and the age of the assemblage is Eocene to Recent.

All the genera identified are components of present-day Australian and Indomalayan floras. Most of the specimens have also been matched to specimens in an Eocene collection from Vegetable Creek in New South Wales described by Ettinghausen (1888).

No attempt has been made by a botanist to classify the very considerable collection of Tertiary plants which have been discovered since Ettinghausen's study. The Australian Museum and the Mining Museum in Sydney have collections of well preserved leaf impressions which remain unidentified. A competent systematic botanist with a thorough knowledge of contemporary Australian and Indomalayan floras, working from an Herbarium where there is adequate material for comparison, could lay down a reliable foundation for future work. The identification of plants by leaf morphology, incompletely seen in fossils as it is, is hazardous and all determinations must be somewhat suspect. Yet where the shape and size of a leaf are clearly seen and where details of margin, venation, and texture are visible, it can be usefully compared with similar leaves occurring at other fossil horizons of known age, and to modern plants studied in the Herbarium. If cuticles are preserved and can be studied, a reliable comparison could be made.

The present collection from Melville Island has been studied by comparison with the Ettinghausen Types in the Vegetable Creek collection at the Australian Museum, and by a study of living examples of the genera to which the specimens have been assigned. The Grevillea sp. identified has not been found before, as far as can be determined, and may be a new species. The choice of Grevillea and not one of the closely related genera is based on examination of specimens in the National Herbarium in Sydney, where I was generously assisted and advised by Mr D. MacGillivray.

List of Plants Identified

1.	Grevillea sp. (probably sp. nov.)	Family Proteaceae.
2.	Elaeocarpus muelleri Ett.	Family Elaeocarpaceae.
3.	Elaeocarpus sp.	" "
4.	Roupala sapindifolia Ett.	Family Proteaceae.

5.	Ceratopetalum cf. C. Macdonaldi Ett.	Family Cunoniaceae.
6.	Banksia sp.	Family Proteaceae.
7.	Aralia sp.	Family Araliaceae.
8.	Seed.	
9.	Flower or fruit	Family Myrtaceae.
10.	Pteris	Filicales.

Description of Specimens

1. Grevillea sp.

Specimens F 23726, F 23727, F 23728, F 23729.
Figures 1-4.

The range of size and form of the pinnate leaves which are referred to Grevillea sp. is seen in Figures 1-4. The pinnules are decurrent and pinnule margins may be slightly recurved. The midribs of the pinnules are strong and the secondary venation is fine. In specimen F 23728 (Fig. 3) a single pinnule of a much larger pinnate leaf overlies the more complete frond, indicating that leaves of larger size occurred.

Grevillea is a member of the family Proteaceae and contains about 200 extant species, including silky oaks and spider flowers.

2. Elaeocarpus Muelleri Ett.

Specimen F 23730.
Figure 5.

Part of a large leaf is seen in Figure 5. It has an undulating margin and a strong midrib. Some fine lateral veins can be seen. This leaf appears to be the same as the Elaeocarpus Muelleri described by Ettinghausen at Vegetable Creek. A similar leaf from Cape Vogel, East Papua, was referred to the species by me (Record 1970/29).

The leaf structure is consistent with leaves of species of Elaeocarpus examined in the Herbarium.

Elaeocarpus is a genus of the family Elaeocarpaceae (to which the Blueberry Ash, common round Sydney, belongs) and there are more than 70 species in existence today.

3. Elaeocarpus sp.

Specimen F 23731.
Figure 6.

A leaf with undulating margin is illustrated in Figure 6. It is similar to several modern species of Elaeocarpus.

4. Roupala sapindifolia Ett.

Specimen F 23732.
Figure 7.

The pair of leaves arrowed on specimen F 23732 are referred to Roupala sapindifolia Ett. (= Rhopala sapindifolia Ett., 1888). The genus is a member of the Proteaceae closely related to Banksia. The other pair of leaves in Figure 7 are Elaeocarpus sp. and have delicately undulating margins.

Roupala is a genus distributed in Tropical America, Australia and New Caledonia.

5. Ceratopetalum cf. C. Macdonaldi Ett.

Specimen F 23733.
Figure 8.

A petiolate leaf with a finely crenulate margin is illustrated in Figure 8. It resembles the specimen named Ceratopetalum Macdonaldi by Ettinghausen.

Ceratopetalum is a member of the Cunoniaceae, a southern sub-tropical family.

6. Banksia sp.

Specimen F 23734.
Figure 9.

Part of a leaf illustrated in Figure 9 is referred somewhat doubtfully to Banksia sp. It is similar to leaves identified as Banksia by Ettinghausen.

Banksia is a member of the Proteaceae and more than 50 species are described in the Australian flora.

7. Aralia sp.

Specimen F 23735.
Figure 10.

Part of a leaf which appears to be referable to Aralia is illustrated in Figure 10. The family Araliaceae (to which the Queensland Umbrella Tree belongs) is distributed in the Indomalayan region, tropical America, and Australia.

8. Small flower or fruit

Specimen F 23736.
Figure 11.

A small flower cup or fruit similar to those which occur in Myrtaceae is seen in Figure 11. A five-parted calyx is attached to a receptacle which contains the ovary.

9. Small pointed Seed

Specimen F 23737.
Figure 12.

A small, unidentified seed is illustrated in Figure 12.

10. Fern fragment: Pteris humei Ett.

Specimen F 23738.
Figure 13.

A small fragment of the fern Pteris humei is identified. It matches material in the Vegetable Creek collection.

11. All specimens not illustrated in the collection are numbered F23739 and labelled individually when they contain determinate plant remains.

Conclusions:

The plant assemblage from Van Diemen Sandstone on Melville Island is Eocene or younger in age.

References:

ETTINGHAUSEN, C von, 1888 - Contributions to the Tertiary flora of Australia. Mem. geol. Surv. N.S.W., Palaeont., 2.

WHITE, M.E., 1970 - Plant fossils from the Cape Vogel Basin, E. Papua. Bur. Miner. Resour. Aust. Rec. 1970/29.

PLATE I.

Grevillea sp. All Figures magnified X 2.

Figure 1: F 23726.

Figure 2: F 23727.

Figure 3: F 23728.

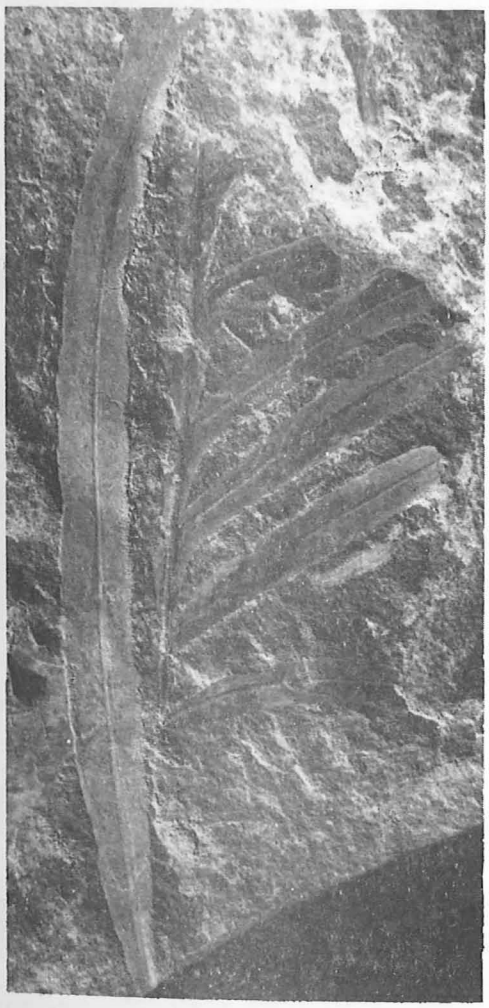
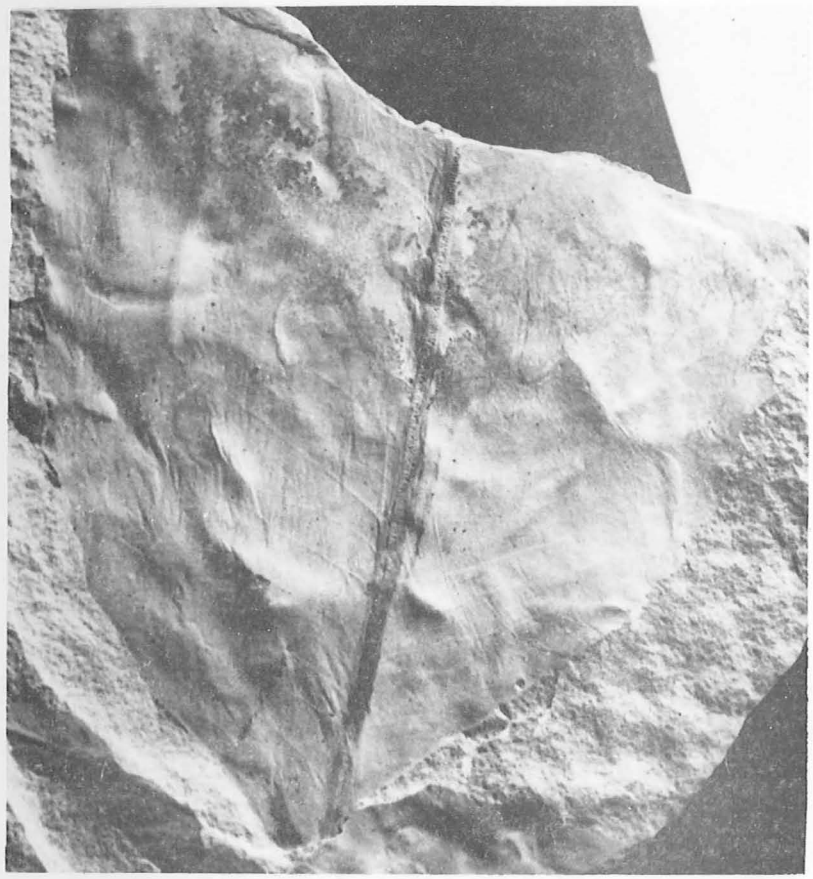


Figure 4: F 23729.

PLATE II.

All Figures magnified X 2.

Figure 5: Elaeocarpus muelleri
F 23730.



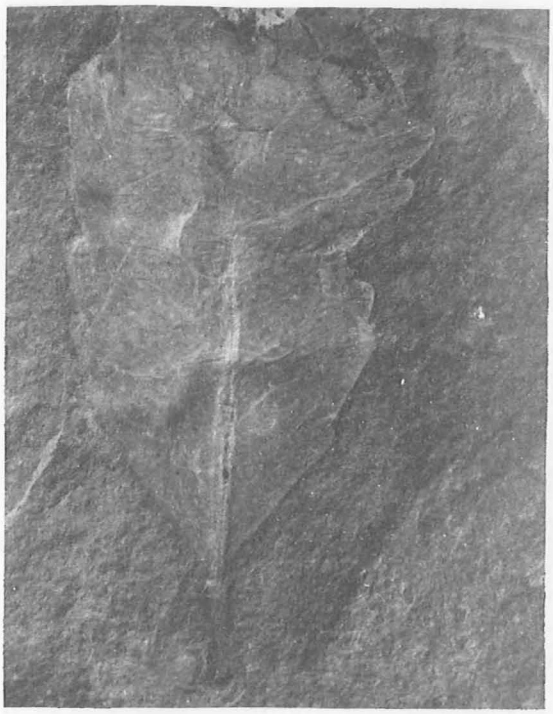


Figure 6: Elaeocarpus sp.
F 23731.

Figure 7: Roupala sapindifolia and
Elaeocarpus sp. F 23732.

PLATE III.

All Figures magnified X 2.

Figure 8: Ceratopetalum sp.
F 23733.

Figure 9: Banksia sp.
F 23734.

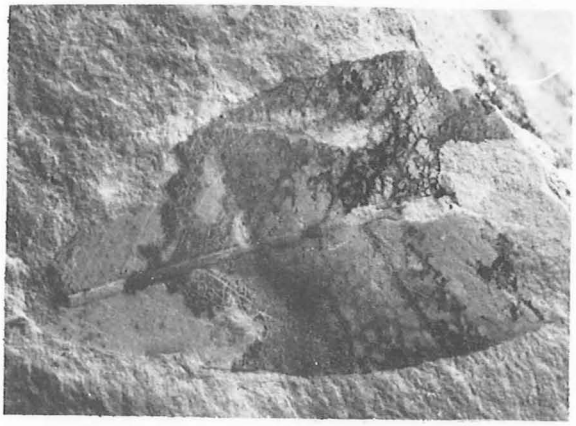


Figure 10: Aralia sp.
F 23735.

Figure 11: Flower cup.
F 23736.

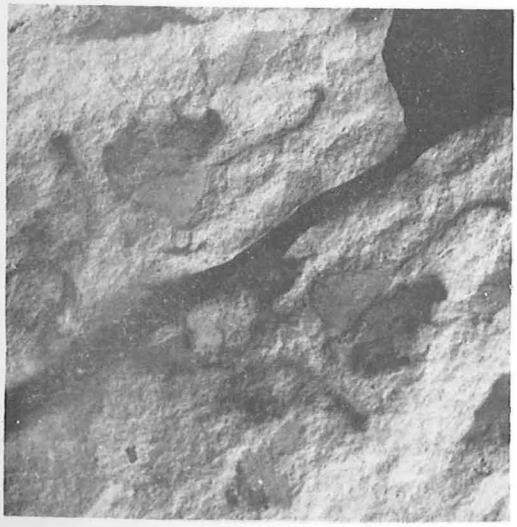


Figure 12: Small seed.
F 23737.

Figure 13: Pteris sp.
F 23738.