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MICROPLANKTON AND MICROFLORAL
EXAMINATION OF PORTLAND BORE
CORE SAMPLES.

MICROPLANKTON AND MICROFLORAL EXAMINATION OF PORTLAND.
BORE CORE SAMPLES

An examination of plant and planktonic microfossils macerated from bore cores has been undertaken in conjunction with the Departmental deep drilling schedule in the Western District. Because of their wide dissemination throughout Southern Australian Cainozoic and Mesozoic sediments, these fossils have been used extensively for age determination and correlation. The work of Dr. I.C. Cookson and her collaborators in this regard is well known.

All samples for investigation were obtained from corings, as screen samples are likely to contain sufficient contamination from higher horizons to render results unreliable. This policy has the disadvantage that discontinuous coring may result in the absence of samples from critical horizons. This possibility is mitigated at Portland by the presence of two holes, although they are sufficiently far apart for the entry of complicating factors.

The treatment used was the Hydrofluoric acid - Schulze's Solution method, involving removal of silica, and subsequent oxidation by nitric acid and potassium chlorate. Following this (which is elaborated in actual practice) the microfossils, if any, were isolated and mounted on glass slides in saffronin stained glycerine jelly for examination under the microscope.

The large number of samples received from subsequent drilling at Port Fairy, Timboon, and Heywood, in addition to those from private bores at Port Campbell, Rosedale and elsewhere has prevented a full scale examination of the Portland material, and the list below is intended more as a guide to assemblages rather than a full quantitative and qualitative study.

MICROFLORA AND
BORE CORE 2A

BORE CORE 2A

Microfossils were found in the western part of the core throughout the section. These fossils have been identified and correlated in the following manner:

From bottom to top the microfossils from this core are the same as those found in the western part of the section, and the same as those found in the eastern part of the section.

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Portland No. 2 Bore.

3078' 5" - 3088' 2"

Microflora: *Triorites harrisii*; *Proteacidites* sp; *Beaupreaidites elegansiformis*; and unidentified pollens with echinate exine.

Microplankton: *Hystriochosphaeridea*, *Dinoflagellata*, and Algal spores.

3425' 10" - 3473' 3"

Tricolporites prolata

3703' - 3716' 3"

Nothofagus (*brassi* type); *Triorites harrisii*; *Monocolpate* pollens with echinate exine

4905' 10" - 4115' 10"

Bisaccate Gymnosperms

4442' 10" - 4459' 10"

Barren.

4672' 10" - 4682' 10"

Fungal hyphae and conidia; *Cyathidites* sp; *Triorites harrisii*; *Nothofagus* (*brassi* type); *Proteacidites* sp; *Gunnerites reticulatus*; *Myrtacidites mesonesus*; *Tricolpites reticulata*; cf. *Monosulcites Cookson*.
Hystriochosphaeridea, *Dinoflagellata*.

4711' - 4719'

Barren.

Triorites, *Nothofagus*, and *Proteacidites* species predominate.

Portland No. 3 Bore

3250' - 3259'9"

Barren

3907'6" - 3927'2"

Myrtacoidites sp.

4648' - 4664'

Disaccate Gymnosperm, fungal conidia

5278' - 86'

Unidentified pollen with ^{echinate} piliiferous exine

5467' - 76'

Barren

5632' - 38'

Cellular plant debris

5390' - 5395'
(Screen Sample)

Microflora

Trifarites harrisii,
Proteacidites species,
Fungal Conidia

Micro-
plankton

Dinoflagellates
Hystrichosphaerideae
(Hystrichosphaeridium sp.)
Hystrichosphaera sp.
cf. Coronifera sp.

5340' - 5'
(Screen Sample)

Barren

Portland No.2 Bore

The plant microfossils isolated have a time range from Lower-Middle Tertiary or longer, but the floral assemblage with brassi-type Nothofagus pollens is characteristic of Victorian Eocene - Miocene sediments. The deepest sample at 4719 feet was barren, but the plant debris present gave no indication of any major floral change. Identification of Hystriochosphaerideae and microplankton is proceeding, but they consist predominantly of forms previously undescribed from Australia, and the scope of this appendix is not sufficient to allow extensive taxonomic studies.

Portland No.3 Bore

The microflora isolated from this bore was extremely depauperate, and the microplankton zones at 3080' and 4680' in No.2 bore have not been found. In order to gain the utmost information from the basal section not intersected by No.2 bore both core and screen samples were examined. Core has so far been barren, but screen samples from 5390' have revealed a new microplankton horizon. Pollens isolated here indicate a Lower Tertiary age, but could perhaps be contamination from above. However, their comparatively large numbers and the absence of Cretaceous indea fossils among the microplankton is further corroborative evidence, although the latter assemblage is as yet incompletely known.

Correlation of the two bores is handicapped by the intermittent coring, sporadic sampling and paucity of microfloras. Neither of the microplankton zones found in No.2 bore were found in No.3 and much more extensive sampling is necessary before any worthwhile correlation can be made.

Correlation with the nearest deep bore (at Heywood) is not complete as drilling here has only recently concluded. The Nelson bore and the Port Fairy (Belfast No.4) bore have Mesozoic-Tertiary boundaries in the region of 4500 feet (Cookson 1955 and Mines Dept. Unpub.Report 1960/20), but both also have a marine Upper Cretaceous zone which is absent from Portland No.2, and which continued resampling have not revealed in the basal 200 feet of the No.3 bore, where lithological changes occur (see Glenie and Reed above).

The Dergholm bores to the north-west have shallow Tertiary deposits (200 - 300 feet deep in Dergholm No.1 and Kanawinka No.1 bores, Mines Dept. Unpub. Report 1960/17) resting on predominantly non-marine Lower Cretaceous sediments (Cookson 1958). These latter are not present in the Portland bores and the igneous rock at the bottom of No.3 bore makes their presence in the area highly conjectural. Hence the correlation value of the Portland bores is in the deep Tertiary sequence.

1958 - 1959
1959 - 1960
Portland No.3 Bore
3250' - 3250'
3301.5' - 3301.5'
4004' - 4004'
5278' - 5278'
5462' - 5462'
5835' - 5835'
5835' - 5835'
(Screen Sample)
5390' - 5390'
(Screen Sample)

Portland No. 3 Core

The plant microfossil assemblage in the lower-Miocene tertiary is characteristic of the lower-Miocene - Pliocene - Pleistocene - Holocene - Recent, but the microfossil assemblage in the upper part of the core is not typical of this appendix is not

Portland No. 3 Core

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The microfloras ⁱⁿ of the 2600' of sediments sampled show no major qualitative changes, and palaeo-ecological postulations regarding locality of contributing floras are intimately connected with others concerning type of sedimentation, permanence of land masses, etc., based on recent geophysical and geological studies.

The predominance of wind blown *Nothofagus* and *Triorites* pollens follows the pattern common to large sedimentary basins. The disproportionate representation of wind borne species has been often discussed, but the presence of *Proteacidites* and other insect carried pollens in equally large numbers indicates that the former are not unduly represented. Wind blown *Gymnosperm* pollens and *Pteridophyte* spores are comparatively rare.

This taken in conjunction with the presence of pollens from such common present day families as *Proteaceae*, *Myrtaceae* and *Haloragaceae*, indicates a contributing flora not too unlike that now existing at Portland, with forests of *Nothofagus* and *Gymnosperms* introducing a strange element from afar.

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