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PALYNOLOGICAL REPORT ON GORAE NO. 2

AND NO. 4 WELLS

OTWAY BASIN

BY

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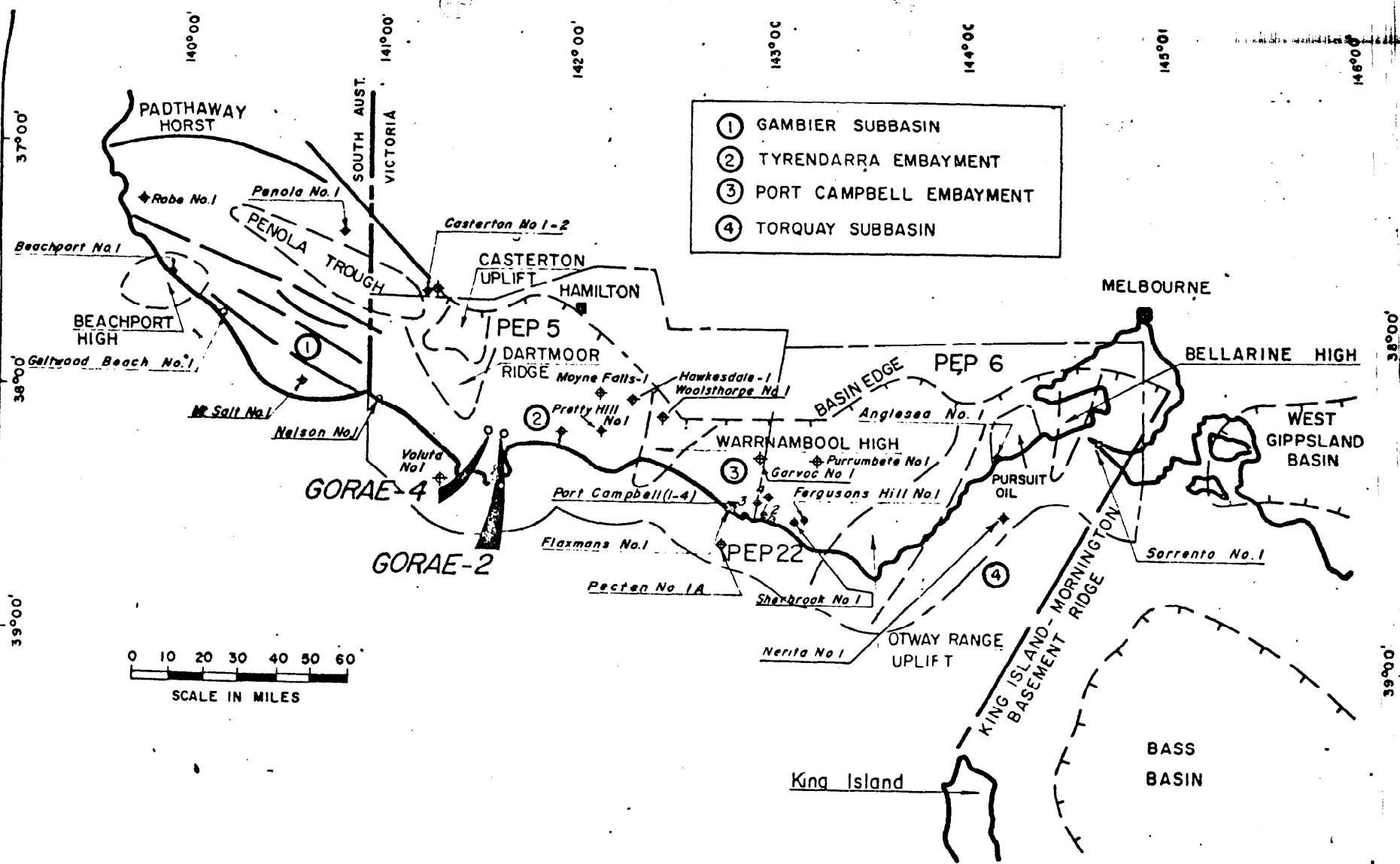


Fig 1

KEY MAP OF THE OTWAY BASIN

PALYNOLOGICAL REPORT ON GORAE No.2 AND No.4 WELLS

I INTRODUCTION

The present account includes the documentation and discussion of microfloral assemblages obtained from Gorae No.2 and No.4 wells in the Otway Basin. All samples examined are from cores and are representative of the intervals between 1815 and 5432 feet in Gorae No.2 well and between 2895 and 6077 feet in Gorae No.4 well. Tentative lithostratigraphic determinations (refer Sample list; ERP:MA:35.21; 6th August, 1970) indicates that the sediments studied are from the Sherbrook and Wangerrip Groups with possible representation of the Mepunga Formation of the Nirranda Group at 1815-34 feet in Gorae No.2 well.

The samples were treated by a method outlined by Dettmann (1968) in which hydrofluoric acid, zinc bromide, and ultrasonic vibration are employed. Residues obtained from this procedure were examined for preservation of the contained plant matter (see Tables 1) and then subjected to further treatment with Schulze solution (for 3-5 minutes) and weak alkaly (ca. $\frac{1}{2}\%$ ammonium hydroxide) for systematic analyses of the microfloras. All samples provided well preserved plant matter, usually in abundance, including spores and pollen grains together with wood and cuticular fragments and occasional examples of dinoflagellate cysts. Systematic assessments of the microfossils indicates that the enclosing sediments are of Lower Tertiary age, and that all but the uppermost horizon (1815-34 feet) in Gorae No.2 are possibly referable to Harris' (1970) Cupanieidites orthoteichus Zonule. Following Harris' arguments, the sediments assigned to the C. orthoteichus Zonule may thus be regarded as Upper Paleocene age. However, as admitted by Harris (1970), the Zonule may extend into the Eocene, and certainly the microfloras from 2178-2531 feet in Gorae No.2 contain several spore and pollen species of Eocene affinity. The horizon at 1815-34 feet may also be of Eocene age.

II MICROFLORAL ASSEMBLAGES

The microfloras extracted from the samples are documented below in terms of their qualitative and quantitative content. The quantitative estimates are denoted as follows: Ab (abundant) - numerical representation of a particular species totals at least 5% of total microflora; C (common) - numerical representation of a species forms 1-5% of total microflora, and R (rare) - numerical representation of a species is less than 1% of total microflora.

III Gorae No.2 well

core 6, 1815-34 feet *Mepunga* *cf* *Brown's ck.*

The microflora is well preserved and includes abundant spores and pollen grains and infrequent microplankton. Species identified include:

| | | |
|---------|--|------|
| Spores: | <u>Biretisporites</u> sp. | R |
| | <u>Cyathidites australis</u> Couper | R |
| | <u>C. minor</u> Couper | R |
| | <u>C. splendens</u> Harris | R |
| | * <u>Gleicheniidites circinidites</u> (Cookson) | C |
| | <u>Kuylisporites</u> aff. <u>waterbolki</u> Potonié | R |
| | <u>Laevigatosporites major</u> (Cookson) | R |
| | <u>L. ovatus</u> Wilson & Webster | C |
| | <u>Osmundacidites</u> sp. | R |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | R |
| | <u>Trilites</u> sp. | R |
| | <u>Verrucosisporites kopukiensis</u> (Couper) | R |
| Pollen: | <u>Anacolosidites acutullus</u> Cookson & Pike | R |
| | <u>Cupanieidites orthoteichus</u> Cookson & Pike | C |
| | <u>Casuarinidites cainozoicus</u> Cookson & Pike | R |
| | <u>Cycadopites</u> sp. | C |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R |
| | <u>Dilwynites granulatus</u> Harris | C |
| | * <u>Microcachyridites antarcticus</u> Cookson | R |
| | * <u>Myrtaceidites eugeniioides</u> Cookson & Pike | R |
| | <u>Nothofagidites emarcidus</u> (Cookson) | (Ab) |
| | <u>N. brachyspinulosus</u> (Cookson) | (C) |
| | <u>N. cinctus</u> (Cookson) | R |
| | <u>Phyllocladidites mawsonii</u> Cookson | R |
| | <u>Podocarpidites ellipticus</u> Cookson | R |
| | <u>Polycolpites</u> sp. | R |
| | <u>Proteacidites annularis</u> Cookson | R |
| | <u>P. incurvatus</u> Cookson | R |
| | * <u>P. pachypolus</u> Cookson & Pike | C |
| | <u>P. reticuloscabratus</u> Harris | R |

Upper low Namere
to low middle
N aspers
on microplankton

| | | |
|----------------|---|-----------------------|
| | <u>P. subscabratus</u> Couper | Ab |
| | <u>P. tuberculiformis</u> Harris | R |
| | <u>P. spp.</u> | C |
| | <u>Santalumidites cainozoicus</u> Cookson & Pike | R |
| | <u>Tricolporites prolata</u> Cookson | Ab |
| | <u>Tiliaepollenites notabilis</u> Harris | R |
| | <u>Triorites harrisii</u> Couper | Ab |
| Microplankton: | <u>Baltisphaeridium</u> sp. | R |
| | <u>Cordasphaeridium capricornum</u> Cookson & Eisenack | R |
| | <u>Deflandrea cf. delineata</u> Cookson & Eisenack | R |
| | <u>Schematophora speciosa</u> Deflandre & Cookson | R * |
| | <u>Hemiplacophora semilunifera</u> Cookson & Eisenack | |
| Remanié: | <u>Nuskoisporites</u> sp. - Permian | |
| | <u>Cicatricosisporites australiensis</u> (Cookson) |) Lower Cretaceous |
| | <u>Foraminisporis asymmetricus</u> (Cookson & Dettmann) | |

core 7, 1996-2013 feet

The sample yielded a sparse assemblage of well preserved spores and pollen grains. Examples of the following species were observed:

| | | |
|----------|--|---|
| Spores: | <u>Cyathidites splendens</u> Harris | <i>P. antarcticus to Verrucosus</i> |
| | <u>Gleicheniidites circinidites</u> (Cookson) | |
| | * <u>Verrucosporites speciosus</u> Harris | |
| Pollen: | <u>Dacrydioidites florinii</u> Cookson & Pike | |
| | * <u>Microcachryidites antarcticus</u> Cookson | |
| | <u>Proteacidites incurvatus</u> Cookson | |
| Remanié: | <u>Nuskoisporites</u> sp. - Permian | |

core 8, 2178-88 feet

An abundant assemblage of well preserved spores and pollen grains was extracted from the sample. Dinoflagellate cysts also occur infrequently. The following types were identified:

| | | | |
|---------|--|----|-------------------|
| Spores: | <u>Cyathidites australis</u> Couper | Ab | <i>Verrucosus</i> |
| | <u>C. splendens</u> Harris | R | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | C | |
| | * <u>Latrobosporites crassus</u> Harris | R | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | C | |
| | <u>Verrucosporites kopukuensis</u> (Couper) | R | |
| | <u>Trilites tuberculiformis</u> Cookson | R | |
| Pollen: | <u>Araucariacites australis</u> Cookson | R | |
| | <u>Casuarinidites cainozoicus</u> Cookson & Pike | R | |
| | <u>Cupanioidites orthoteichus</u> Cookson & Pike | R | |
| | <u>Malvacipollis diversus</u> Harris | Ab | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | R | |
| | <u>Myrtaceidites eugenioides</u> Cookson & Pike | Ab | |
| | <u>M. tenuis</u> Harris | R | |
| | <u>Proteacidites annularis</u> Cookson | R | |
| | <u>P. dilwynensis</u> Harris | R | |

| | | | |
|----------------|--|----|------------|
| | * <u>P. ornatus</u> Harris | R | |
| | <u>P. pachypolus</u> Cookson & Pike | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | <u>P. reticulosabratus</u> Harris | R | |
| | <u>P. cf. scaboratus</u> Couper | R | |
| | <u>Polycopites</u> sp. | R | |
| | <u>Polyporina fragilis</u> Harris | R | |
| | <u>Tricolporites prolata</u> Cookson | C | |
| | <u>Triorites harrisii</u> Couper | Ab | |
| | <u>Tiliaepollenites notabilis</u> Harris | R | |
| | <u>Tricolpites</u> sp. | R | |
| Microplankton: | <u>Cordosphaeridium</u> sp. | R | |
| | <u>Kenylea</u> sp. | R | |
| Remanié: | <u>Nuskoisporites</u> sp. - Permian | | |
| | <u>Cicatricosisporites australiensis</u> (Cookson) |) | Cretaceous |
| | <u>Pilosporites notensis</u> Cookson & Dettmann |) | |

core 10, 2569-81 feet

The assemblage is diverse and well preserved, containing abundant spores and pollen grains and infrequent microplankton. Species identified include:

| | | | |
|---------|--|----|------------|
| Spores: | * <u>Baculatisporites comaumensis</u> (Cookson) | R | Upper |
| | * <u>Cyathidites australis</u> Couper | C | M diversus |
| | <u>C. splendens</u> Harris | R | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | R | |
| | <u>Lycopodiumsporites</u> sp. | R | |
| Pollen: | * <u>Verrucatosporites speciosus</u> Harris | R | |
| | <u>Anacardosidites acutullus</u> Cookson & Pike | R | |
| | <u>Araucariacites australis</u> Cookson | R | |
| | <u>Casuarinidites cainozoicus</u> Cookson & Pike | R | |
| | * <u>Cupanioidites orthoteichus</u> Cookson & Pike | R | |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R | |
| | <u>Microcachryidites antarcticus</u> Cookson | C | |
| | <u>Malvacipollis diversus</u> Harris | Ab | |
| | * <u>Myrtaceidites eugenioides</u> Cookson & Pike | R | |
| | * <u>M. tenuis</u> Harris | R | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | C | |
| | <u>N. cinctus</u> (Cookson) | R | |
| | <u>Polyporina fragilis</u> Harris | R | |
| | <u>Podocaroidites ellipticus</u> Cookson | Ab | |
| | <u>Proteacidites annularis</u> Cookson | R | |
| | * <u>P. pachypolus</u> Cookson & Pike | R | |
| | <u>P. crassus</u> Cookson | C | |
| | <u>P. reticulosabratus</u> Harris | C | |
| | <u>P. dilwynensis</u> Harris | R | |
| | <u>P. tuberculiformis</u> Harris | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | <u>P. spp.</u> | Ab | |
| | <u>Santaluminidites cainozoicus</u> Cookson & Pike | R | |
| | <u>Tiliaepollenites notabilis</u> Harris | R | |

| | | |
|----------------|--|----|
| | <u>Triorites harrisii</u> Couper | Ab |
| | <u>Tricolporites prolata</u> Cookson | C |
| | <u>T. microreticulatus</u> Harris | R |
| | <u>Tricolpites</u> spp. | R |
| Microplankton: | <u>Cordosphaeridium</u> sp. | R |
| | <u>Hystriosphera ramosa</u> | |
| | <u>Veryhachium</u> sp. | |
| Remanié: | <u>Nuskoisporites</u> sp. - Permian | |
| | <u>Pilosporites notensis</u> Cookson & Dettmann - Lower Cretaceous | |

core 12, 2953-48 feet

An abundant and well preserved microflora containing the following spore, pollen, and microplankton species was extracted from the sample:

| | | | |
|----------------|--|----|--------------------------|
| Spores: | * <u>Baculatisporites comaumensis</u> (Cookson) | R | <i>Upper M. diversus</i> |
| | * <u>Cyathidites australis</u> Couper | C | |
| | * <u>C. minor</u> Couper | R | |
| | * <u>Gleicheniidites circinidites</u> (Cookson) | R | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | R | |
| | <u>Peromonolites densus</u> Harris | R | |
| | * <u>Verrucatosporites speciosus</u> Harris | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | R | |
| Pollen: | <u>Anacolosidites acutullus</u> Cookson & Pike | R | |
| | <u>Cupaniidites orthoteichus</u> Cookson & Pike | C | |
| | <u>Dilwynites granulatus</u> Harris | C | |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R | |
| | <u>Malvacipollis diversus</u> Harris | C | |
| | <u>Microcachryidites antarcticus</u> Cookson | R | |
| | <u>Myrtaceidites tenuis</u> Harris | R | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | Ab | |
| | <u>N. cinctus</u> (Cookson) | R | |
| | <u>Podocarpidites ellipticus</u> Cookson | R | |
| | <u>Polyporina fragilis</u> Harris | R | |
| | <u>Polycolpites</u> sp. | R | |
| | <u>Proteacidites annularis</u> Cookson | R | |
| | <u>P. dilwynensis</u> Harris | R | |
| | * <u>P. ornatus</u> Harris | R | |
| | <u>P. crassus</u> Cookson | R | |
| | <u>P. tuberculiformis</u> Harris | R | |
| | <u>P. subscabratus</u> Couper | C | |
| | <u>Triorites harrisii</u> Couper | Ab | |
| | <u>Tricolporites prolata</u> Cookson | C | |
| | <u>Tiliaepollenites notabilis</u> Harris | R | |
| Microplankton: | <u>Spiniodinium essoii</u> Cookson & Eisenack | R | * |
| | <u>Hystriosphera</u> sp. | | |
| Remanié: | <u>Nuskoisporites</u> sp. - Permian | | |
| | <u>Aequitriradites spinulosus</u> (Cookson & Dettmann) |) | Lower |
| | <u>Dictyotosporites speciosus</u> Cookson & Dettmann |) | Cretaceous |

core 16, 3599-3611 feet

The microflora is well preserved and is notable by the abundance of Dilwynites granulatus. The following types were identified:

| | | | |
|----------|--|----|---------------------|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | C | <i>M diversus</i> |
| | <u>Clavifera</u> sp. | R | |
| | <u>Cyathidites minor</u> Couper | C | |
| | <u>C. splendens</u> Harris | R | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | C | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | C | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | R | |
| | <u>Verrucatosporites speciosus</u> Harris | R | |
| Pollen: | <u>Araucariacites australis</u> Cookson | R | |
| | <u>Anacolosidites acutullus</u> Cookson & Pike | R | |
| | <u>Cycadopites</u> sp. | R | |
| | <u>Dacrydimites florinii</u> Cookson & Pike | R | |
| | <u>Dilwynites granulatus</u> Harris | Ab | |
| | <u>Malvacipollis diversus</u> Harris | C | |
| | <u>Microcachryidites antarcticus</u> Cookson | R | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | R | |
| | <u>N. cf. brachyspinulosus</u> (Cookson) | R | |
| | <u>Phyllocladidites mawsonii</u> Cookson | C | |
| | <u>Podocarpidites ellipticus</u> Cookson | C | |
| | <u>Polyporina fragilis</u> Harris | R | |
| | <u>Proteacidites adenanthoides</u> Cookson | R | |
| | <u>P. crassus</u> Cookson | R | |
| | <u>P. dilwynensis</u> Harris | R | |
| | <u>P. reticuloscabratus</u> Harris | Ab | |
| | <u>P. subscabratus</u> | Ab | |
| | <u>Tiliaepollenites notabilis</u> Harris | R | |
| | <u>Tricolporites prolata</u> Cookson | C | |
| | <u>Triorites harrisii</u> Couper | Ab | |
| Remanié: | <u>Nuskoisporites</u> sp. - Permian | | |
| | <u>Aequitriradites spinulosus</u> (Cookson & Dettmann) |) | Lower Cretaceous |
| | <u>Cicatricosisporites australiensis</u> (Cookson) |) | |
| | <u>Pilosisporites notensis</u> Cookson & Dettmann |) | |

core 17, 3736-51 feet

Abundant and well preserved spores and pollen grains were extracted from the sample. Types identified include:

| | | | |
|---------|--|----|-------------------|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | C | <i>M diversus</i> |
| | <u>Cyathidites australis</u> Couper | Ab | |
| | <u>C. minor</u> Couper | Ab | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | C | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | C | |
| | * <u>Latrobosporites crassus</u> Harris | C | |
| | <u>Tillites gigantis</u> Cookson | R | |

| | | |
|---------|--|----|
| Pollen: | * <u>Cupanieidites orthoteichus</u> Cookson & Pike | R |
| | <u>Casuarinidites cainozoicus</u> Cookson & Pike | R |
| | <u>Cycadopites</u> sp | C |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R |
| | <u>Dilwynites granulatus</u> Harris | C |
| | <u>Malvacipollis diversus</u> Harris | C |
| | <u>Microcachryidites antarcticus</u> Cookson | R |
| | * <u>Myrtaceidites eugeniioides</u> Cookson & Pike | C |
| | <u>Nothofagidites emarcidus</u> (Cookson) | C |
| | <u>N. cinctus</u> (Cookson) | R |
| | <u>Polyporina fragilis</u> Harris | R |
| | <u>Podosporites microsaccatus</u> (Couper) | R |
| | <u>Podocarpidites ellipticus</u> Cookson | R |
| | <u>Proteacidites adenanthoides</u> Cookson | C |
| | <u>P. dilwynensis</u> Harris | R |
| | * <u>P. grandis</u> Harris | R |
| | <u>P. reticulscabratus</u> Harris | R |
| | <u>P. scaboratus</u> Couper | C |
| | <u>P. subscabratus</u> Couper | Ab |
| | <u>Tricolporites prolata</u> Cookson | R |
| | <u>Triorites harrisii</u> Couper | Ab |
| | <u>Tricolpites</u> sp. | R |

core 18, 3902-20 feet

The well preserved microfossils recovered from the sample include abundant spores and pollen grains and infrequent microplankton as follows:

| | | |
|---------|--|----|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | R |
| | <u>Cyathidites australis</u> Couper | C |
| | <u>C. minor</u> Couper | Ab |
| | <u>C. splendens</u> Harris | R |
| | <u>Clavifera</u> sp. | R |
| | <u>Gleicheniidites circinidites</u> (Cookson) | R |
| | <u>Laevigatosporites major</u> (Cookson) | R |
| | <u>Peromonolites densus</u> Harris | R |
| | <u>Trilites gigantis</u> Cookson | R |
| Pollen: | <u>Araucariacites australis</u> Cookson | C |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R |
| | <u>Dilwynites granulatus</u> Harris | R |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab |
| | <u>Malvacipollis diversus</u> Harris | R |
| | * <u>Myrtaceidites eugeniioides</u> Cookson & Pike | R |
| | <u>Nothofagidites emarcidus</u> (Cookson) | R |
| | <u>N. cf. brachyspinulosus</u> (Cookson) | R |
| | <u>Polyporina fragilis</u> Harris | C |
| | * <u>Phyllocladidites mawsonii</u> Cookson | R |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab |
| | <u>Proteacidites annularis</u> Cookson | C |
| | <u>P. crassus</u> Cookson | C |

M. densus

| | | |
|----------------|--|----|
| | <u>P. crassipora</u> Harris | R |
| | * <u>P. pachypolus</u> Cookson & Pike | R |
| | <u>P. subscabratus</u> Couper | C |
| | <u>Podosporites microsaccatus</u> (Couper) | R |
| | <u>Tiliaepollenites notabilis</u> Harris | C |
| | <u>Tricolporites prolata</u> Cookson | C |
| | <u>T. microreticulosus</u> Harris <i>atus</i> | R |
| | <u>Triorites harrisii</u> Couper | Ab |
| Microplankton: | <u>Deflandrea cf. obliquipes</u> Deflandre & Cookson | R |
| | <u>Baltisphaeridium</u> s p. | |

core 19, 4083-96 feet

The well preserved microflora is composed of the following species of spores and pollen grains:

| | | | |
|----------|--|----|----------------------|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | R | |
| | <u>Cyathidites australis</u> Couper | C | <i>M. distinctus</i> |
| | <u>C. minor</u> Couper | C | |
| | <u>C. splendens</u> Harris | R | |
| | <u>Clavifera</u> sp. | R | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | Ab | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | Ab | |
| | <u>L. major</u> (Cookson) | R | |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C | |
| | <u>Trilites tuberculiformis</u> Cookson | R | |
| | <u>Verrucatosporites speciosus</u> Harris | C | |
| Pollen: | <u>Anacolosidites luteoides</u> Cookson & Pike | R | |
| | <u>Cycadopites</u> sp. | C | |
| | <u>Dacrydiomites florinii</u> Cookson & Pike | R | |
| | <u>Dilwynites granulatus</u> Harris | Ab | |
| | <u>Malvacipollis diversus</u> Harris | R | |
| | <u>Microcachryidites antarcticus</u> Cookson | C | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | R | |
| | <u>Podosporites microsaccatus</u> (Couper) | R | |
| | <u>Podocarpidites ellipticus</u> Cookson | C | |
| | <u>Proteacidites annularis</u> Cookson | R | |
| | <u>P. crassus</u> Cookson | C | |
| | <u>P. adenanthoides</u> Cookson | R | |
| | * <u>P. dilwynensis</u> Harris | R | |
| | * <u>P. reticulosabratus</u> Harris | C | |
| | <u>P. rectomarginus</u> Cookson | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | * <u>P. tuberculiformis</u> Harris | R | |
| | <u>Triorites harrisii</u> Couper | Ab | |
| | <u>Tiliaepollenites notabilis</u> Harris | R | |
| Remanié: | <u>Balmeisporites holodictyus</u> Cookson & Dettmann |) | Lower |
| | <u>Dictyotosporites speciosus</u> Cookson & Dettmann |) | Cretaceous |

core 20, 4234-52 feet

Well preserved spores and pollen grains occur abundantly in the sample. The following types were identified:

| | | | |
|----------|--|----|--------------------|
| Spores: | * <u>Baculatisporites comaumensis</u> (Cookson) | Ab | |
| | <u>Cyathidites australis</u> Couper | C | |
| | <u>C. minor</u> Couper | R | |
| | <u>C. splendens</u> Harris | R | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | C | <i>M. diversus</i> |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C | |
| | <u>Verrucatosporites speciosus</u> Harris | C | |
| Pollen: | <u>Araucariacites australis</u> Cookson | C | |
| | <u>Dacrydiiumites florinii</u> Cookson & Pike | C | |
| | <u>Dilwynenites granulatus</u> Harris | C | |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab | |
| | <u>Malvacipollis diversus</u> Harris | C | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | R | |
| | <u>Polyporina fragilis</u> Harris | C | |
| | <u>Phyllocladidites mawsonii</u> Cookson | R | |
| | <u>Podosporites microsaccatus</u> (Couper) | R | |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab | |
| | <u>Proteacidites annularis</u> Cookson | R | |
| | <u>P. adenanthoides</u> Cookson | R | |
| | <u>P. crassus</u> Cookson | C | |
| | * <u>P. dilwynensis</u> Harris | R | |
| | * <u>P. grandis</u> Cookson | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | * <u>P. tuberculiformis</u> Harris | R | |
| | <u>Tricolporites prolata</u> Cookson | R | |
| | <u>Triorites harrisii</u> Couper | Ab | |
| | <u>Tricolpites</u> sp. | C | |
| Remanié: | <u>Contignisporites cooksonii</u> (Balme) - Lower Cretaceous | | |

core 21, 4402-16 feet

An abundant and well preserved spore-pollen suite occurs in the sample and includes the following species:

| | | | |
|---------|--|----|--------------------|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | Ab | <i>M. diversus</i> |
| | <u>Cyathidites australis</u> Couper | C | |
| | <u>C. minor</u> Couper | C | |
| | <u>C. splendens</u> Harris | R | |
| | <u>Clavifera</u> sp. | R | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | Ab | |
| | <u>Laevigatosporites ovatus</u> (Wilson & Webster) | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | R | |
| | <u>Trilites tuberculiformis</u> Cookson | R | |

Pollen:

| | |
|--|----|
| <u>Araucariacites australis</u> Cookson | R |
| * <u>Cupanieidites orthoteichus</u> Cookson & Pike | R |
| <u>Cycadopites</u> sp. | R |
| <u>Dacrydiumites florinii</u> Cookson & Pike | R |
| <u>Dilwynites granulatus</u> Harris | Ab |
| <u>Malvacipollis diversus</u> Harris | R |
| <u>Nothofagidites emarcidus</u> (Cookson) | R |
| <u>Phyllocladidites mawsonii</u> Cookson | R |
| <u>Podosporites microsaccatus</u> (Couper) | R |
| <u>Podocarpidites ellipticus</u> Cookson | Ab |
| <u>Polyporina fragilis</u> Harris | R |
| <u>Proteacidites annularis</u> Cookson | R |
| <u>P. crassus</u> Cookson | R |
| * <u>P. dilwynensis</u> Harris | R |
| * <u>P. reticuloscabratus</u> Harris | R |
| <u>P. subscabratus</u> Couper | Ab |
| <u>Tricolporites prolata</u> Cookson | C |
| <u>Triorites harrisii</u> Couper | R |

core 22, 4586-99 feet

Well preserved microfossils extracted from the sample include

abundant spores and pollen and rare microplankton as follows:

Spores:

| | |
|--|----|
| <u>Baculatisporites comaumensis</u> (Cookson) | Ab |
| <u>Cyathidites australis</u> Couper | Ab |
| <u>C. minor</u> Couper | Ab |
| <u>C. splendens</u> Harris | R |
| <u>Clavifera</u> sp. | R |
| <u>Gleicheniidites circinidites</u> (Cookson) | C |
| <u>Laevigatosporites ovatus</u> Wilson & Webster | R |
| <u>Lycopodiumsporites</u> sp. | R |
| <u>Trilites gigantus</u> Cookson | R |
| <u>Verrucatosporites speciosus</u> Harris | R |

M. dilwynensis

Pollen:

| | |
|--|----|
| <u>Banksiaeidites</u> sp. | R |
| * <u>Cupanieidites orthoteichus</u> Cookson & Pike | R |
| <u>Cycadopites</u> sp. | R |
| <u>Dacrydiumites florinii</u> Cookson & Pike | C |
| <u>Dilwynites granulatus</u> Harris | C |
| <u>Microcachryidites antarcticus</u> Cookson | Ab |
| <u>Nothofagidites emarcidus</u> (Cookson) | R |
| <u>N. cinctus</u> (Cookson) | R |
| <u>Polyporina fragilis</u> Harris | C |
| * <u>Phyllocladidites mawsonii</u> Cookson | R |
| <u>Podocarpidites ellipticus</u> Cookson | Ab |
| <u>Proteacidites crassus</u> Cookson | C |
| * <u>P. dilwynensis</u> Harris | R |
| * <u>P. reticuloscabratus</u> Harris | R |
| <u>P. subscabratus</u> Couper | Ab |
| <u>Tricolporites prolata</u> Cookson | C |
| <u>Triorites harrisii</u> Couper | C |

Microplankton: Spiniodinium essoi Cookson & Eisenack * R *Upper M diversus*
 Remanié: Coptospora paradoxa (Cookson & Dettmann)
Crybelosporites striatus (Cookson & Dettmann) Lower and/or
Cicatricosisporites australiensis (Cookson) early Upper
Rouseisporites reticulatus Pocock Cretaceous

core 23, 4785-98 feet

Well preserved spores and pollen grains were recovered in good concentrations from the sample. The following types occur:

Spores: Baculatisporites comaumensis (Cookson) Ab *M. diversus*
Cyathidites australis Couper Ab
C. minor Couper Ab
Gleicheniidites circinidites (Cookson) C
Laevigatosporites ovatus Wilson & Webster R
* Latrobosporites crassus Harris R
Lycopodiumsporites austroclavatidites (Cookson) C
Stereisporites antiquasporites (Wilson & Webster) C
Verrucatosporites speciosus Harris R
Pollen: Araucariacites australis Cookson C
Dacrydiumites florinii Cookson & Pike Ab
Dilwynites granulatus Harris Ab
Malvacipollis diversus Harris C
Microcachryidites antarcticus Cookson C
* Myrtaceidites eugenioides Cookson & Pike Ab
Nothofagidites emarcidus (Cookson) R
* Phyllocladidites mawsonii Cookson C
Podocarpidites ellipticus Cookson Ab
Proteacidites crassus Cookson R
P. rectomarginus Cookson R
P. subscabratus Couper Ab
P. scaboratus Couper C
* P. reticuloscabratus Harris R
Tricolporites prolata Cookson C
Triorites harrisii Couper R
Remanié: Cicatricosisporites australiensis (Cookson) - Cretaceous

core 24, 4942-51 feet

The well preserved spore-pollen suite extracted from the sample contains the following types:

Spores: Baculatisporites comaumensis (Cookson) C *M. diversus*
Cyathidites australis Couper C
C. minor Couper Ab
Gleicheniidites circinidites (Cookson) C
Laevigatosporites ovatus Wilson & Webster R
Stereisporites antiquasporites (Wilson & Webster) Ab
Trilites gigantus Cookson R

| | | |
|----------|---|----|
| Pollen: | <u>Anacolosidites acutullus</u> Cookson & Pike | R |
| | * <u>Cupanieidites orthoteichus</u> Cookson & Pike | C |
| | <u>Araucariacites australis</u> Cookson | C |
| | <u>Cycadopites</u> sp. | R |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R |
| | <u>Dilwynites granulatus</u> Harris | R |
| | <u>Malvacipollis diversus</u> Harris | R |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab |
| | <u>Nothofagidites emarcidus</u> (Cookson) | R |
| | <u>Polyporina fragilis</u> Harris | Ab |
| | * <u>Phyllocladidites mawsonii</u> Cookson | R |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab |
| | <u>Proteacidites crassus</u> Cookson | C |
| | <u>P. crassipora</u> Harris | R |
| | <u>P. incurvatus</u> Cookson | R |
| | <u>P. Rectomarginus</u> Cookson | R |
| | * <u>P. reticuloscabratus</u> Harris | C |
| | <u>P. subscabratus</u> Couper | Ab |
| | <u>Triorites harrisii</u> Couper | Ab |
| Remanié: | <u>Nuskoisporites</u> sp. - Permian | |
| | <u>Rouseisporites reticulatus</u> Pocock - Cretaceous | |

core 25, 5013-29 feet

Spores and pollen grains occur abundantly in the microflora

which also contains rare microplankton. The following types were identified:

| | | | |
|----------------|--|----|------------------------|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | C | <i>low</i> |
| | <u>Cyathidites australis</u> Couper | Ab | <i>M. dictyonis</i> |
| | <u>C. minor</u> Couper | C | |
| | <u>C. splendens</u> Harris | R | <i>W. hyperacantha</i> |
| | <u>Gleicheniidites circinidites</u> (Cookson) | R | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | R | |
| | <u>L. major</u> (Cookson) | R | |
| | * <u>Latrosporites crassus</u> Harris | C | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C | |
| | <u>Verrucatosporites speciosus</u> Harris | C | |
| Pollen: | <u>Araucariacites australis</u> Cookson | C | |
| | <u>Cycadopites</u> sp. | Ab | |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | C | |
| | <u>Dilwynites granulatus</u> Harris | C | |
| | <u>Malvacipollis diversus</u> Harris | Ab | |
| | <u>Microcachryidites antarcticus</u> Cookson | C | |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab | |
| | <u>Polyporina fragilis</u> Harris | R | |
| | <u>Proteacidites crassus</u> Cookson | C | |
| | * <u>P. dilwynensis</u> Harris | R | |
| | * <u>P. reticuloscabratus</u> Harris | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | <u>Tricolpites</u> sp. | R | |
| | <u>Triorites harrisii</u> Couper | Ab | |
| Microplankton: | <u>Deflandrea obliquipes</u> Deflandre & Cookson * | R | |
| | <u>Epicephalopyxis indentata</u> Deflandre & Cookson | R | |

Remanié: Cicatricosisporites australiensis (Cookson)
Dictyotosporites filorus Dettmann Lower
D. speciosus Cookson & Dettmann Cretaceous
Ischyosporites punctatus Cookson & Dettmann

core 26, 5412-32 feet

Abundant spores and pollen grains occur in the sample and
comprise the following suite:

| | | | |
|----------|--|------------|----------------------|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | Ab | <i>low</i> |
| | <u>Cyathidites australis</u> Couper | C | <i>As Dict. 2000</i> |
| | <u>C. minor</u> Couper | C | |
| | <u>C. splendens</u> Harris | R | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | Ab | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | C | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C | |
| | <u>Verrucatosporites speciosus</u> Harris | R | |
| Pollen: | <u>Anacolosidites luteoides</u> Cookson & Pike | R | |
| | * <u>Cupanieidites orthoteichus</u> Cookson & Pike | C | |
| | <u>Malvacipollis diversus</u> Harris | C | |
| | * <u>Myrtaceidites eugenioides</u> Cookson & Pike | C | |
| | <u>Microcachryidites antarcticus</u> Cookson | C | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | R | |
| | <u>Phyllocladidites mawsonii</u> Cookson | R | |
| | <u>Podocarpidites ellipticus</u> Cookson | C | |
| | <u>Polyporina fragilis</u> Harris | R | |
| | <u>Proteacidites adenanthoides</u> Cookson | R | |
| | <u>P. crassus</u> Cookson | R | |
| | * <u>P. dilwynensis</u> Harris | R | |
| | <u>P. incurvatus</u> Cookson | R | |
| | <u>P. rectomarginus</u> Cookson | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | * <u>P. tuberculiformis</u> Harris | R | |
| | <u>Tricolporites prolata</u> Cookson | C | |
| | <u>Tricolpites</u> sp. | R | |
| | <u>Triorites harrisii</u> Couper | C | |
| Remanié: | * <u>Dilwynensis granulatus</u> Harris ? <i>'Dilwynella'</i> | Ab | |
| | <u>Cicatricosisporites australiensis</u> (Cookson),) | Cretaceous | |
| | <u>Contignisporites</u> sp.) | | |
| | <u>Nuskoisporites</u> sp. - Permian | | |

IV Gorae No.4 well

core 10, 2895-2915 feet

A well preserved assemblage of microfossils including the
following abundantly occurring spores and pollen grains and rare microplankton
was extracted from the sample:

Paspaleopolus to
U. M. diversus

| | | | |
|----------------|--|------------|--|
| Spores: | * <u>Baculatisporites comaumensis</u> (Cookson) | C | |
| | <u>Cyathidites australis</u> Couper | Ab | |
| | <u>C. minor</u> Couper | Ab | |
| | <u>C. splendens</u> Harris | R | |
| | <u>Ceratospirites</u> sp. | R | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | C | |
| | <u>L. major</u> (Cookson) | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | R | |
| Pollen: | <u>Anacolosidites luteoides</u> Cookson & Pike | R | |
| | <u>Araucariacites australis</u> Cookson | R | |
| | <u>Banksiaeacidites</u> sp. | C | |
| | * <u>Cupanieidites orthoteichus</u> Cookson & Pike | C | |
| | <u>Cycadopites</u> sp. | R | |
| | <u>Casuarinidites cainozoicus</u> Cookson & Pike | R | |
| | <u>Malvacipollis diversus</u> Harris | C | |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R | |
| | <u>Myrtaceidites eugenioides</u> Cookson & Pike | C | |
| | <u>M. tenuis</u> Harris | R | |
| | <u>Microcachryidites antarcticus</u> Cookson | C | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | C | |
| | <u>Podocarpidites ellipticus</u> Cookson | C | |
| | <u>Proteacidites annularis</u> Cookson | R | |
| | <u>P. crassus</u> Cookson | R | |
| | <u>P. crassipora</u> Harris | R | |
| | * <u>P. dilwynensis</u> Harris | R | |
| | <u>P. rectomarginus</u> Cookson | R | |
| | * <u>P. tuberculiformis</u> Harris * | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | <u>Triorites harrisii</u> Couper | Ab | |
| | <u>Tiliaepollenites notabilis</u> Harris | R | |
| | <u>Tricolporites prolata</u> Cookson | Ab | |
| Microplankton: | <u>Deflandrea granulosa</u> Cookson & Eisenack ?? | R | |
| Remanié: | <u>Cicatricosisporites australiensis</u> (Cookson)) | Lower | |
| | <u>Dictyotosporites speciosus</u> Cookson & Dettmann) | Cretaceous | |
| | <u>Nuskoisporites</u> sp. - Permian | | |

core 13, 3362-79 feet

The microflora is well preserved and is composed chiefly of spores and pollen grains with occasional examples of microplankton as follows:

| | | | |
|---------|--|----|--------------------|
| Spores: | <u>Cyathidites australis</u> Couper | Ab | <i>M. diversus</i> |
| | <u>C. minor</u> Couper | C | |
| | <u>C. splendens</u> Harris | R | <i>W. harrisii</i> |
| | <u>Gleicheniidites circinidites</u> (Cookson) | R | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | R | |
| | <u>L. major</u> (Cookson) | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C | |

| | | | |
|----------------|---|-----|-------------------------|
| Pollen: | <u>Araucariacites australis</u> Cookson | C | <i>P. asperipolus</i> - |
| | <u>Beaupreaidites elegansiformis</u> Cookson | R | <i>M. diversus</i> |
| | <u>Casuarinidites cainozoicus</u> Cookson & Pike | R | |
| | * <u>Cupanieidites orthoteichus</u> Cookson & Pike | R | |
| | <u>Cycadopites</u> sp. | C | |
| | <u>Dacrydimites florinii</u> Cookson & Pike | R | |
| | <u>Malvacipollis diversus</u> Harris | C | |
| | <u>Myrtaceidites tenuis</u> Harris | R | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | (C) | |
| | <u>N. cinctus</u> (Cookson) | (C) | |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab | |
| | * <u>Phyllocladidites mawsonii</u> Cookson | R | |
| | <u>Polyporina fragilis</u> Harris | R | |
| | <u>Polycolpites</u> sp. | R | |
| | <u>Proteacidites annularis</u> Cookson | R | |
| | <u>P. crassus</u> Cookson | R | |
| | * <u>P. dilwynensis</u> Harris | C | |
| | <u>P. crassipora</u> Harris | R | |
| | <u>P. grandis</u> Cookson | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | <u>Tricolporites prolata</u> Cookson | Ab | |
| | <u>Triorites harrisii</u> Couper | Ab | |
| Microplankton: | ? <u>Cyclonephelium</u> sp. | R | |
| | <u>Cordosphaeridium</u> sp. | R | |
| Remanié: | <u>Contignisporites glebulentus</u> Dettmann - Lower Cretaceous | | |

core 16, 4095-4108 feet

Abundant spores and pollen grains and rare microplankton occur in the well preserved microflora as follows:

| | | | |
|---------|--|-----|---------------------------|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | Ab | |
| | <u>C. australis</u> Couper | C | |
| | <u>C. minor</u> Couper | C | <i>mid L. M. diversus</i> |
| | <u>C. splendens</u> Harris | R | |
| | <u>Clavifera</u> sp. | R | |
| | <u>Gleicheniidites ciricnidites</u> (Cookson) | C | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | R | |
| | <u>Verrucatosporites speciosus</u> Harris | R | |
| Pollen: | <u>Anacolosidites luteoides</u> Cookson & Pike | R | |
| | <u>Araucariacites australis</u> Cookson | C | |
| | <u>Dacrydimites florinii</u> Cookson & Pike | R | |
| | <u>Dilwynites granulatus</u> Harris | C | |
| | <u>Malvacipollis diversus</u> Harris | C | |
| | <u>Microcachryidites antarcticus</u> Cookson | C | |
| | * <u>Phyllocladidites mawsonii</u> Cookson | R | |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | (R) | |
| | <u>N. cinctus</u> (Cookson) | (R) | |
| | <u>Polyporina fragilis</u> Harris | R | |
| | <u>Proteacidites annularis</u> Cookson | R | |
| | <u>P. crassus</u> Cookson | R | |
| | * <u>P. dilwynensis</u> Harris | R | |

| | | |
|----------------|--|--------------|
| | <u>P. incurvatus</u> Cookson | R |
| | <u>P. rectomarginus</u> Cookson | R |
| | <u>P. subscabratus</u> Couper | Ab |
| | <u>P. scaboratus</u> Couper | R |
| | * <u>P. tuberculiformis</u> Harris | R |
| | <u>Tricolporites prolata</u> Cookson | C |
| | <u>Triorites harrisii</u> Couper | Ab |
| | <u>Tricolpites</u> sp. | R |
| Microplankton: | <u>Deflandrea dartmooria</u> Cookson & Eisenack * | R * |
| Remanié: | <u>Aequitriradites spinulosus</u> (Cookson & Dettmann) |) Lower |
| | <u>Pilosporites notensis</u> Cookson & Dettmann |) Cretaceous |
| | <u>Nuskoisporites</u> sp. - Permian | |

core 17, 4390-4409 feet

The following species of spores and pollen grains were observed in the abundant and well preserved plant microfossil assemblage:

| | | |
|----------|---|----------------------|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | Ab |
| | <u>Cyathidites australis</u> Couper | C |
| | <u>C. minor</u> Couper | Ab |
| | <u>Gleicheniidites circinidites</u> (Cookson) | Ab |
| | <u>Lycopodiumsporites austroclavatidites</u> (cookson) | R <i>M. diversus</i> |
| | <u>Verrucatosporites speciosus</u> Harris | C |
| Pollen: | <u>Anacolosidites acutullus</u> Cookson & Pike | R |
| | <u>Araucariacites australis</u> Cookson | Ab |
| | <u>Sasuarinidites cainozoicus</u> Cookson & Pike | R |
| | * <u>Cupanieidites orthoteichus</u> Cookson & Pike | R |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R |
| | <u>Dilwynenites granulatus</u> Harris | Ab |
| | <u>Malvacipollis diversus</u> Harris | C |
| | <u>Microcachryidites antarcticus</u> Cookson | R |
| | <u>Nothofagidites emarcidus</u> (Cookson) | C |
| | <u>Proxapertities</u> sp. | R |
| | * <u>Phyllocladidites mawsonii</u> Cookson | R |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab |
| | <u>Proteacidites crassus</u> Cookson | C |
| | * <u>P. dilwynensis</u> Harris | R |
| | <u>P. incurvatus</u> Cookson | R |
| | <u>P. subscabratus</u> Couper | Ab |
| | * <u>P. tuberculiformis</u> Harris | R |
| | * <u>P. reticuloscabratus</u> Harris | C |
| | <u>Tricolporites prolata</u> Cookson | C |
| | <u>Tiliaepollenites notabilis</u> Harris | R |
| | <u>Triorites harrisii</u> Couper | C |
| Remanié: | <u>Cicatricosisporites australiensis</u> (Cookson) - Cretaceous | |
| | <u>Nuskoisporites</u> sp. - Permian | |

core 19, 4869-87 feet

The spore-pollen suite recovered from the sample includes the following species:

| | | | |
|----------|---|----|-------------------|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | R | <i>low</i> |
| | <u>Cyathidites australis</u> Couper | C | <i>M diversus</i> |
| | <u>C. minor</u> Couper <u>ovatus</u> | C | |
| | <u>Laevigatosporites</u> <u>Wilson & Webster</u> | C | |
| | <u>L. major</u> (Cookson) | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C | |
| Pollen: | * <u>Araucariacites australis</u> Cookson | C | |
| | * <u>Cupanieidites orthoteichus</u> Cookson & Pike | C | |
| | <u>Cycadopites</u> sp. | R | |
| | <u>Banksiaeidites</u> sp. | R | |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R | |
| | <u>Dilwynensis granulatus</u> Harris | Ab | |
| | <u>Microcachryidites antarcticus</u> Cookson | C | |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab | |
| | <u>Polyporina fragilis</u> Harris | Ab | |
| | <u>Proteacidites annularis</u> Cookson | R | |
| | <u>P. crassus</u> Cookson | C | |
| | * <u>P. dilwynensis</u> Harris | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | <u>Tricolporites prolata</u> Cookson | R | |
| | <u>Triorites harrisii</u> Couper | Ab | |
| Remanié: | <u>Cicatricosisporites australiensis</u> (Cookson) - Cretaceous | | |
| | <u>Nuskoisporites</u> sp. - Permian | | |

core 20, 5033-44 feet

The following well preserved assemblage of spores and pollen grains was extracted from the sample:

| | | | |
|---------|--|----|-------------------|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | C | |
| | <u>Cyathidites australis</u> Couper | C | |
| | <u>C. minor</u> Couper | Ab | <i>low</i> |
| | <u>Clavifera</u> sp. | R | <i>M diversus</i> |
| | <u>Gleicheniidites circinidites</u> (Cookson) | Ab | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | C | |
| | <u>L. major</u> (Cookson) | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C | |
| Pollen: | <u>Araucariacites australis</u> Cookson | R | |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R | |
| | <u>Dilwynites granulatus</u> Harris | C | |
| | <u>Malvacipollis diversus</u> Harris | R | |
| | <u>Microcachryidites antarcticus</u> Cookson | C | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | R | |
| | * <u>Phyllocladidites mawsonii</u> Cookson | R | |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab | |
| | <u>Polyporina fragilis</u> Harris | R | |
| | <u>Proteacidites crassus</u> Cookson | Ab | |
| | * <u>P. reticuloscabratus</u> Harris | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | <u>Triorites harrisii</u> Couper | Ab | |
| | <u>Tricolpites</u> sp. | R | |

core 21, 5198-5216 feet

Abundant spores and pollen grains and rare microplankton constitute the following diverse assemblage:

| | | | |
|----------------|--|----|------------|
| Spores: | <u>Cyathidites australis</u> Couper | C | |
| | <u>C. minor</u> Couper | C | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | Ab | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | R | |
| | <u>L. major</u> (Cookson) | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | Ab | |
| | <u>Trilites tuberculiformis</u> Cookson | R | |
| | <u>T. gigantus</u> Cookson | R | |
| Spores: | <u>Araucariacites australis</u> Cookson | C | low |
| | * <u>Cupanieidites orthoteicus</u> Cookson & Pike | C | M diversus |
| | <u>Cycadopites</u> sp. | C | |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R | |
| | <u>Dilwynites granulatus</u> Harris | Ab | |
| | <u>Malvacipollis diversus</u> Harris | R | |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab | |
| | <u>Phyllocladidites mawsonii</u> Cookson | R | |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab | |
| | <u>Polyporina fragilis</u> Harris | R | |
| | <u>Podosporites microsaccatus</u> (Couper) | R | |
| | <u>Proteacidites adenanthoides</u> Cookson | R | |
| | <u>P. crassus</u> Cookson | Ab | |
| | * <u>P. dilwynensis</u> Harris | R | |
| | <u>P. incurvatus</u> Cookson | R | |
| | <u>P. rectomarginus</u> Cookson | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | <u>Tricolporites prolata</u> Cookson | C | |
| | <u>Triorites harrisii</u> Couper | R | |
| Microplankton: | <u>Deflandrea</u> sp. | R | |
| Remanié: | <u>Contignisporites cooksonii</u> (Balme) |) | Lower |
| | <u>Pilosporites notensis</u> Cookson & Dettmann |) | Cretaceous |

core 22, 5362-68 feet

Abundant spores and pollen and rare microplankton were recovered from the sample. Types identified include:

| | | | |
|---------|--|----|------------|
| Spores: | <u>Cyathidites australis</u> Couper | C | low |
| | <u>C. minor</u> Couper | Ab | M diversus |
| | <u>Gleicheniidites circinidites</u> (Cookson) | C | |
| | <u>Laevigatosporites major</u> (Cookson) | R | |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C | |
| | <u>Trilites tuberculiformis</u> Cookson | C | |
| | <u>Verrucatosporites speciosus</u> Harris | R | |
| | <u>Trilites gigantus</u> Cookson | R | |

| | | |
|----------------|--|--------------|
| Pollen: | <u>Araucariacites australis</u> Cookson | C |
| | * <u>Cupanieidites orthoteichus</u> Cookson & Pike | R |
| | <u>Cycadopites</u> sp. | C |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | C |
| | <u>Dilwynites granulatus</u> Harris | Ab |
| | <u>Dacrycarpites australis</u> Cookson & Pike | R |
| | <u>Microcachryidites antarcticus</u> Cookson | C |
| | <u>Phyllocladidites mawsonii</u> Cookson | C |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab |
| | <u>Podosporites microsaccatus</u> (Couper) | R |
| | <u>Polyporina fragilis</u> Harris | R |
| | <u>Proteacidites crassus</u> Cookson | R |
| | * <u>P. dilwynensis</u> Harris | R |
| | <u>P. incurvatus</u> Cookson | R |
| | * <u>P. reticuloscabratus</u> Harris | C |
| | <u>P. subscabratus</u> Couper | Ab |
| | <u>Tricolporites prolata</u> Cookson | R |
| | <u>Triorites harrisii</u> Couper | Ab |
| | <u>Tricolpites</u> sp. | R |
| Microplankton: | <u>Deflandrea</u> sp. | R |
| Remanié: | <u>Cicatricosporites australiensis</u> (Cookson) | } Cretaceous |
| | <u>Crybelosporites striatus</u> (Cookson & Dettmann) | |
| | <u>Rouseisporites reticulatus</u> Pocock | |

core 23, 5509-17 feet

A small residue containing the following well preserved spore-pollen suite was extracted from the sample:

| | | | |
|----------|--|----|---------------------------|
| Spores: | <u>Cyathidites australis</u> Couper | Ab | <i>low</i> At diversus |
| | <u>C. minor</u> Couper | Ab | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | C | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster) | Ab | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C | |
| | <u>Trilites tuberculiformis</u> Cookson | R | |
| | <u>Verrucatosporites speciosus</u> Harris | C | |
| Pollen: | <u>Araucariacites australis</u> Cookson | C | |
| | <u>Banksieaeidites</u> sp. | R | |
| | <u>Casuarinidites cainozoicus</u> Cookson & Pike | R | |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R | |
| | <u>Malvacipollis diversus</u> Harris | C | |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab | |
| | <u>Nothofagidites emarcidus</u> (Cookson) | C | |
| | <u>Phyllocladidites mawsonii</u> Cookson | C | |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab | |
| | <u>Proteacidites crassus</u> Cookson | C | |
| | * <u>P. dilwynensis</u> Harris | R | |
| | * <u>P. reticuloscabratus</u> Harris | C | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | <u>Tricolporites prolata</u> Cookson | R | |
| | <u>Triorites harrisii</u> Couper | Ab | |
| Remanié: | <u>Foraminisporis asymmetricus</u> (Cookson & Dettmann) - Lower Cretaceous | | |

core 24, 5637-55 feet

Abundant well preserved spores and pollen grains were extracted from the sample. Species observed include:

| | | | |
|----------|---|----|--|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | R | |
| | <u>Cyathidites australis</u> Couper | Ab | |
| | <u>C. minor</u> Couper | Ab | |
| | <u>C. splendens</u> Harris | R | |
| | <u>Clavifera</u> sp. | R | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | R | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | R | |
| | <u>L. major</u> (Cookson) | R | |
| | <u>Lycopodiumsporites austroclavatidites</u> (Cookson) | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | Ab | |
| Pollen: | <u>Araucariacites australis</u> Cookson | C | |
| | <u>Banksieacidites</u> sp. | R | |
| | <u>Cycadopites</u> sp. | C | |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R | |
| | <u>Dilwynites granulatus</u> Harris | C | |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab | |
| | <u>Phyllocladidites mawsonii</u> Cookson | Ab | |
| | <u>Podocarpidites ellipticus</u> Cookson | C | |
| | <u>Podosporites microsaccatus</u> (Couper) | C | |
| | <u>Proteacidites crassus</u> Cookson | R | |
| | * <u>P. dilwynensis</u> Harris | R | |
| | * <u>P. reticulosabratus</u> Harris | R | |
| | <u>P. scaboratus</u> Couper | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | <u>Tricolporites prolata</u> Cookson | C | |
| | <u>Triorites harrisii</u> Couper | C | |
| Remanié: | <u>Cicatricosporites australiensis</u> (Cookson) - Cretaceous | | |

low
M diversus

core 25, 5797-5805 feet

The microflora is well preserved and is composed chiefly of spores and pollen grains with rare microplankton as follows:

| | | | |
|---------|--|----|--|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | R | |
| | <u>Cyathidites australis</u> Couper | C | |
| | <u>C. minor</u> Couper | C | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | Ab | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | C | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | R | |
| | <u>Verrucatosporites speciosus</u> Harris | C | |
| Pollen: | <u>Araucariacites australis</u> Cookson | C | |
| | * <u>Cupaniidites ornateicus</u> Cookson & Pike | C | |
| | <u>Cycadopites</u> sp. | Ab | |
| | <u>Dacrydiumites florinii</u> Cookson & Pike | R | |

low
M diversus

| | | |
|----------------|---|----|
| | <u>Dilwynites granulatus</u> Harris | C |
| | <u>Malvacipollis diversus</u> Harris | R |
| | <u>Microcachryidites antarcticus</u> Cookson | Ab |
| | <u>Phyllocladidites mawsonii</u> Cookson | C |
| | <u>Podocarpidites ellipticus</u> Cookson | Ab |
| | <u>Polyporina fragilis</u> Harris | C |
| | <u>Proteacidites crassus</u> Cookson | C |
| | * <u>P. dilwynensis</u> Harris | R |
| | * <u>P. reticuloscabratus</u> Harris | C |
| | <u>P. scaboratus</u> Couper | C |
| | <u>P. subscabratus</u> Couper | Ab |
| | <u>Tricolporites prolata</u> Cookson | C |
| | <u>Triorites harrisii</u> Couper | C |
| Microplankton: | <u>Hystrichosphaeridium</u> sp. | |
| Remanié: | <u>Dictyotosporites speciosus</u> Cookson & Dettmann - Lower Cretaceous | |

core 26, 5939-47 feet

Well preserved spores and pollen grains occur abundantly in the residue and are referable to the following species:

| | | | |
|----------|--|----|-------------------|
| Spores: | <u>Baculatisporites comaumensis</u> (Cookson) | C | <i>low</i> |
| | <u>Cyathidites australis</u> Couper | Ab | <i>M diversus</i> |
| | <u>C. minor</u> Couper | C | |
| | <u>C. splendens</u> Harris | R | |
| | <u>Gleicheniidites circinidites</u> (Cookson) | R | |
| | <u>Laevigatosporites ovatus</u> Wilson & Webster | C | |
| | <u>L. major</u> (Cookson) | R | |
| | <u>Stereisporites antiquasporites</u> (Wilson & Webster) | C | |
| Pollen: | <u>Araucariacites australis</u> Cookson | Ab | |
| | <u>Cycadopites</u> sp. | C | |
| | <u>Dilwynites granulatus</u> Harris | C | |
| | <u>Microcachryidites antarcticus</u> Cookson | C | |
| | <u>Malvacipollis diversus</u> Harris | R | |
| | <u>Myrtaceidites eugenioides</u> Cookson & Pike | C | |
| | <u>Phyllocladidites mawsonii</u> Cookson | R | |
| | <u>Podocarpidites ellipticus</u> Cookson | C | |
| | <u>Proteacidites crassus</u> Cookson | C | |
| | * <u>P. dilwynensis</u> Harris | R | |
| | <u>P. crassipora</u> Harris | C | |
| | * <u>P. reticuloscabratus</u> Harris | C | |
| | <u>P. scaboratus</u> Couper | R | |
| | <u>P. subscabratus</u> Couper | Ab | |
| | <u>Triorites harrisii</u> Couper | C | |
| Remanié: | <u>Pilosporites notensis</u> Cookson & Dettmann - Lower Cretaceous | | |
| | <u>Rouseisporites reticulatus</u> Pocock - Cretaceous | | |

core 27, 6077-84 feet

A small residue containing one to several examples of the following spore, pollen, and microplankton types was extracted from the sample: *low* ? *M diversus*

Spores: Baculatisporites comaumensis (Cookson)
Cyathidites australis Couper
Trilites tuberculiformis Cookson
Verrucatosporites speciosus Harris
Pollen: Dacrydiumites florinii Cookson & Pike
Dilwynites granulatus Harris
Microcachryidites antarcticus Cookson
Podosporites microsaccatus (Couper)
Podocarpidites ellipticus Cookson
Polyporina fragilis Harris
Proteacidites crassus Cookson
P. subscabratus Couper
Triorites harrisii Couper
Microplankton: Cordosphaeridium sp,

V AGE OF SEDIMENTS

V,1 Gorae No.2 well

Sediments between 2935 feet and 5432 feet (cores 12 - 26) are characterized by a dominance and diversity of angiospermous forms, a strong representation of gymnospermous elements, and a restricted and generally numerically low pteridophytic content. Specifically, the microfloras are characterized by the fairly consistent occurrence of Cupanieidites orthoteichus, Proteacidites dilwynensis, P. reticuloscabratus, P. tuberculiformis, Tiliaepollenites notabilis, Myrtaceadites eugenioides, and Cyathidites splendens. Dilwynites granulatus, Triorites harrisii, and Proteacidites subscabratus are almost invariably represented in common to abundant proportions, whilst Phyllocladidites mawsonii and Nothofagidites usually occur infrequently.

Detailed comparison of the microfloras with those described by Harris (1965, 1970) from the Otway Basin is hampered to some extent by lack of description and photographic illustration of his new (1970) species (some of which are diagnostic of the Zonules proposed by him in 1970) and also by the lack of data relating to the precise stratigraphic relationships of each species. However, there seems little doubt that the sequence

between 2933 feet and 5432 feet in Gorae No.2 well is within Harris' (1965, 1970) Cupaneidites orthoteichus Zonule. This Zonule has been dated as Upper Paleocene although its upper age limit may be within the Lower Eocene (Harris 1965, 1970; McGowran, Lindsay, and Harris 1970). Reference of the sediments to Harris' subdivisions of the C. orthoteichus Zonule is not attempted here because of insufficient knowledge of diagnostic criteria.

Microplankton associated with the sediments here referred to the C. orthoteichus Zonule occur spasmodically and are largely undescribed or belong to species having little stratigraphic significance within the the Lower Tertiary. The presence of Spiniodinium essoii and Deflandre obliquipes lend support to a Paleocene age (see Cookson and Eisenack 1967a,b), although the precise stratigraphic significance of the species has yet to be assessed.

Cores 8 and 10 (2178 - 2581 feet) yielded assemblages broadly comparable to those of the C. orthoteichus Zonule (2933-5432 feet), but distinct by their content of Santalumidites cainozoicus, Polycolpites sp. and Verrucosisporites kopukuensis. The presence of these species suggests that the microfloras may be younger than those from underlying strata because Harris (1970, pp.6, 19) emphasizes that the first and last-named species are unknown from his C. orthoteichus Zonule, occurring only in Eocene and later sediments. Their association with species (Cyathidites giganteus, C. splendens, Proteacidites tuberculiformis, and P. reticuloscabratus), which Harris (1970, p.19) indicates extend no higher than the C. orthoteichus Zonule, is thus of interest and may suggest that the enclosing sediments represent an upward (?Eocene) extension of the C. orthoteichus Zonule.

Core 7 (1996-2013 feet) contains an impoverished microflora that lacks stratigraphically significant forms.

The suite extracted from core 6 (1815-34 feet) is diverse, with abundant spores and pollen grains and less frequent microplankton. It contains the continued presence of Proteacidites reticulosabratus, P. tuberculiformis, and Cyathidites splendens together with Santalumidites cainozoicus and Verrucosisorites kopkuensis, and apart from an increase in frequency of Nothofagidites and the introduction of Kuylisporites waterbolki, is similar to those extracted from cores 8 and 10. The microplankton, however, is entirely distinct from the suites recorded from lower in the well and includes two species (Schmatophora speciosa and Hemiplacophora semilunifera) described from the Upper Eocene Browns Creek Clays (Cookson and Eisenack 1965a), together with a type similar to the Paleocene species Deflandrea delineata (see Cookson and Eisenack 1965b).

Thus, there appears to be a notable representation of both Paleocene and Eocene types within the assemblage in core 6. The precise significance of this cannot be assessed on present knowledge, but the possibility that the horizon is of Eocene age and contains a high proportion of reworked Paleocene forms, or conversely that Eocene types occur in the assemblage as contaminants, should not be dismissed.

Remanié: fossils of Cretaceous and Permian age occur fairly consistently and in conspicuous proportions (2-5%) throughout the sequence studied. The Cretaceous types are more common and appear to have mostly derived from the Dictyosporites speciosus and Coptospora paradoxa Zones (of Dettmann and Playford 1969).

The abundance of land-derived spores and pollen grains and the rarity of microplankton in the sediments suggests that they accumulated in a continental or very near shore marine depositional environment.

V, 2 Gorae No.4 well

Sediments between 2895 feet and 5947 feet yielded microfloras comparable to those extracted from between 2933 feet and 5432 feet in Gorae No.2 well. They are accordingly assigned to the Cupanieidites orthoteichus Zonule. Core 27 (6077-84 feet) which contains an impoverished microflora is tentatively assigned to the C. orthoteichus Zonule although it lacks diagnostic criteria.

Microplankton found in the Gorae No.4 sequence lend general support to a Paleocene age of the sediments. However, core 10 (2895-915 feet) yielded Deflanarea granulosa, a type known only from the Upper Eocene Browns Creek Clays (Cookson and Eisenack 1965a).

Remanié plant microfossils of Cretaceous and Permian age occur in proportions of up to 5% throughout the section; as in Gorae No.2 well, the majority of forms appear to have derived from the Dictyotosporites speciosus and Coptospora paradoxa Zones.

On the basis of the abundance of land-derived forms and the intermittent and rare occurrence of microplankton, the sediments are suggested to have accumulated in very near-shore marine to continental environments.

Vi CORRELATION OF THE SEDIMENTS

As outlined above, assemblages between 2933 feet and 5432 feet in Gorae No.2 and between 2895 feet and 6084 feet in Gorae No.4 are similar to those described by Harris (1965, 1970) as diagnostic of his Cupanieidites orthoteichus Zonule. In the Otway Basin this Zonule has been identified in the upper part of the Dilwyn Formation and in the Dartmoor Formation (Harris 1970).

Sediments in Gorae No.2 well between 1815 - 2581 feet contain

suites of younger aspect; those from 2178 - 2581 feet may be representative of younger (?Eocene) horizons of the C. orthoteichus Zone. The age of the assemblage at 1815-34 feet is uncertain, but is possibly Eocene, with a strong representation of Paleocene recycled forms.

Finally, the palynological evidence does not support the tentative lithostratigraphic subdivisions of the sequences which appear to be, at least in part, equivalents of the Dilwyn Formation. if

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11th November, 1970.

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EXPLANATION OF TABLE 1

Preservation and zonal attribution of plant microfossil assemblages in cores of Gorae No.2 well, 1815-5432 feet.

Abbreviations:

Yield expresses frequency of plant microfossils in the palynological residues as follows:-

Ab = abundant

Sp = sparse

Colour and Preservation. Spores, pollen, microplankton, wood, and cuticle present in the residues are denoted by their colour (col.) and quality of preservation (pres.) thus:-

Y = yellow

DY = dark yellow

Br = brown

good = well preserved

Spore-pollen Zonule is that defined by Harris (1965, 1970).

EXPLANATION OF TABLE 2

Preservation and zonal attribution of plant microfossil assemblages in cores of Gorae No.4 well, 2395-6084 feet.

Abbreviations:

Yield expresses frequency of plant microfossils in the palynological residues as follows:-

Ab = abundant

Sp.= sparse

Colour and Preservation. Spores, pollen, microplankton, wood, and cuticle present in the residues are denoted by their colour (col.) and quality of preservation (pres.) thus:-

Y = yellow

DY = dark yellow

Br = brown

good = well preserved

Spore-pollen Zonule is that defined by Harris (1965, 1970).

TABLE 1

| Depth (feet) | Yield | Spore-Pollen | | Microplankton | | Wood | | Cuticle | | Spore-Pollen Zonule |
|-----------------|-------|--------------|-------|---------------|-------|-------|-------|---------|-------|------------------------------|
| | | Col. | Pres. | Col. | Pres. | Col. | Pres. | Col. | Pres. | |
| 815-34 | Ab | Y | good | Y | good | DY-Br | good | Y | good | ? Eocene |
| 896-2013 | Sp | " | " | - | - | " | " | " | " | - |
| 918-88 | Ab | " | " | Y | good | " | " | " | " | ? Cupanieidites orthoteichus |
| 969-81 | " | " | " | " | " | " | " | " | " | " " |
| 993-48 | " | " | " | " | " | " | " | " | " | Cupanieidites orthoteichus |
| 999-3611 | " | " | " | - | - | " | " | " | " | " " |
| 1036-51 | " | " | " | - | - | " | " | " | " | " " |
| 1092-20 | " | " | " | Y | good | " | " | " | " | " " |
| 1083-96 | " | " | " | - | - | " | " | " | " | " " |
| 1234-52 | " | " | " | - | - | " | " | " | " | " " |
| 1402-16 | " | " | " | - | - | " | " | " | " | " " |
| 1586-99 | " | " | " | Y | good | " | " | " | " | " " |
| 1785-98 | " | " | " | - | - | " | " | " | " | " " |
| 1942-51 | " | " | " | - | - | " | " | " | " | " " |
| 2013-29 | " | " | " | Y | good | " | " | " | " | " " |
| 2412-32 | " | " | " | - | - | " | " | " | " | " " |

collected by 5/8/11

WANGGERRA GP / DUNYAN FM

GORAE -2

TABLE 2

| Depth (feet) | Yield | Spore-Pollen | | Microplankton | | Wood | | Cuticle | | Spore-Pollen Zoneule |
|-----------------|-------|--------------|-------|---------------|-------|-------|-------|---------|-------|-----------------------------|
| | | Col. | Pres. | Col. | Pres. | Col. | Pres. | Col. | Pres. | |
| 2895-2915 | Ab | Y | good | Y | good | DY-Br | good | Y | good | Cupanieidites orthoteichus |
| 3362-79 | " | " | " | " | " | " | " | " | " | " " |
| 4095-4108 | " | " | " | " | " | " | " | " | " | " " |
| 4390-4409 | " | " | " | — | — | " | " | " | " | " " |
| 4869-87 | " | " | " | — | — | " | " | " | " | " " |
| 5033-44 | " | " | " | — | — | " | " | " | " | " " |
| 5198-5216 | " | " | " | Y | good | " | " | " | " | " " |
| 5362-68 | " | " | " | " | " | " | " | " | " | " " |
| 5509-17 | " | " | " | — | — | " | " | " | " | " " |
| 5637-55 | " | " | " | — | — | " | " | " | " | " " |
| 5797-5805 | " | " | " | Y | good | " | " | " | " | " " |
| 5939-47 | " | " | " | — | — | " | " | " | " | " " |
| 6077-84 | Sp | " | " | — | — | " | " | " | " | ?Cupanieidites orthoteichus |

used by IDA
 LANCHESTER R.P. Col. of Dinosaur
 Y

GORAE - 4