

PALYNOLOGY OF CORE SAMPLES FROM TERANG NO. 1, CARPENDEIT, TANDAROOK,
MEPUNGA NO. 7, PANMURE NO. 2, AND COORIEJONG NO. 1 BORES

Core samples from several Mines Department of Victoria bores sunk in the Otway Basin provided spores, pollen, and microplankton (see Table 1) which provide a basis for correlation of the bore sequences, both with each other and with sequences from elsewhere in the Otway Basin. The bores investigated comprise Terang No. 1, Carpendeit, Tandarook, Mepunga No. 7, Panmure No. 2, and Cooriejong No. 1. As outlined below these bores include sediments of Lower and Upper Cretaceous age.

TERANG NO. 1 BORE

The lowest horizons examined (2127 - 2135 feet) yielded fair concentrations of well preserved spores and pollen grains that comprise a restricted microflora referable to the Valanginian-Aptian Speciosus Assemblage. Constituent species include Dictyosporites speciosus Cookson & Dettmann and Pilosporites notensis Cookson & Dettmann. Stratigraphically higher samples (1840 - 1850 feet; 1934 - 1942 feet) contain more diverse associations which, in containing D. speciosus and Cyclosporites hughesi (Cookson & Dettmann), are conformable with the older category of the Speciosus Assemblage. Thus, horizons between 1840 and 2135 feet may be equated with at least part of the sequence between 7818 and 11,438 feet in Fergusons Hill No. 1 well and its equivalents.

The Speciosus Assemblage is also present in sediments from 1741 - 1747 feet in Terang No. 1 bore. However, the microflora is poorly preserved and neither C. hughesi nor Crybelosporites striatus (Cookson & Dettmann) was observed. Thus, assignment of the microflora to either the older or younger categories of the Speciosus Assemblage is precluded.

No plant microfossils were obtained from the upper horizons (1617 - 1637 feet) examined.

CARPENDEIT BORE

Well preserved and diverse microfloras containing Dictyosporites speciosus, Cyclosporites hughesi, and Crybelosporites striatus were recovered from samples between 1620 and 1702 feet. These associations represent an admixture of the older and younger categories of the Speciosus Assemblage and indicate an Aptian age for the sediments. Comparable microfloras that contain these three species are known from elsewhere in south-eastern Australia (see Dettmann 1963a) and in the Otway Basin occur in Comaum No. 2 bore at 708 feet. It should be noted that the Comaum deposit and the sample from 1689 - 1702 feet in Carpendeit bore both contain Dictyosporites filiosus Dettmann, a species that appears to possess stratigraphical importance in eastern Australia (see below).

The sample from 1474 - 1478 feet in Carpendeit bore yielded abundant and well preserved spores and pollen grains including D. speciosus, D. filiosus, and Crybelosporites striatus. The combined presence of these species and the absence of Cyclosporites hughesi suggests that the younger (Aptian) category of the Speciosus Assemblage is represented at these levels. The horizons may thus be correlated with sediments between 10,492 and 11,528 feet in Flaxmans No. 1 well and equivalents of the latter sequence (Dettmann 1964a, b).

Core samples from between 1166 and 1263 feet provided sparse and poorly preserved assemblages. The only stratigraphically significant species observed is Dictyotosporites speciosus, whilst diagnostic elements of the Paradoxa and younger assemblages are absent. This evidence together with that cited for stratigraphically lower horizons in the same bore indicates that the younger category of the Speciosus Assemblage is represented between 1166 and 1263 feet. The corroded preservation of the microfossils at these levels may indicate that they were derived from older horizons or that they were subjected to the effects of corrosion after deposition. The apparent absence of younger microfloral elements in the assemblages and the consistently poor preservation of all the plant microfossils within the two samples supports the latter interpretation.

From this and previous studies it is becoming increasingly apparent that Dictyotosporites filiosus possesses restricted vertical distribution and is of considerable stratigraphical value in south-eastern Australia. Its first recorded appearance is in uppermost horizons that contain the older category of the Speciosus Assemblage with a vertical extension into lowermost horizons containing the Paradoxa Assemblage.

The uppermost sample (from 1077 - 1095 feet) provided for examination contains abundant angiosperm grains including Nothofagus spp. which indicate a late Upper Cretaceous or early Tertiary age (see Evans 1962, p.7).

TANDAROOK BORE

The lower sample (from 2015 - 2028 feet) provided a diverse microflora referable to the Speciosus Assemblage. The presence of Dictyotosporites speciosus, D. filiosus, and Crybelosporites striatus indicates that the younger (Aptian) category of the Speciosus Assemblage is represented at these levels and suggests correlation with Carpendeit bore at 1474 - 1478 feet.

The other sample from 1923 - 1929 feet yielded only a few specimens of poorly preserved plant microfossils of pteridophytic and gymnospermous affinities. None of these is stratigraphically significant except that their presence together with the absence of angiosperm grains may infer a pre-Upper Albian age.

MEPUNGA NO. 7 BORE

The Aptian-Albian *Paradoxa* Assemblage occurs in the lowest sample (3858 - 3875 feet) which yielded the following stratigraphically significant species:- *Coptospora paradoxa* (Cookson & Dettmann), *Contignisporites glebulentus* Dettmann, and *Kraeuselisporites majus* (Cookson & Dettmann). As such the microflora approximates those recorded by Dettmann (1963a, b) from Beachport No. 1 well at 2505 feet, Robe No. 1 bore at 1400 feet, and Penola No. 1 well at 1805 - 1815 feet.

The succeeding sample from 3623 - 3643 feet yielded good concentrations of well preserved microfossils including *Coptospora paradoxa* in association with *Tricolpites* sp. The first appearance of the latter species together with *C. paradoxa* indicates that an admixture of the *Paradoxa* Assemblage and Assemblage II is present at this level. Comparable associations indicative of an Upper Albian age occur at the following horizons:- Pretty Hill No. 1 well at 2928 - 2940 feet; Eumeralla No. 1 well at 3311 - 3321 feet, Timboon No. 5 bore at 3500 - 3504 feet, and Wangoom No. 2 bore at 3439 - 3443 feet (see Dettmann 1964c).

The presence of cf *Gleicheniidites* sp. in samples between 3227 and 3428 feet indicates that this interval contains Assemblage III. Microplankton are also represented; the sample from 3413 - 3428 feet includes *Deflandrea cretacea* Cookson and *Odontochitina porifera* Cookson which provide evidence for a Turonian/Senonian or later age. This microfloral evidence conforms with the Senonian (Santonian) age suggested by Taylor (1964) on the basis of foraminiferal studies.

The upper sample examined (3017 - 3025 feet) includes rare microplankton and abundant angiospermous grains including *Nothofagus* spp. and is thus probably of late Cretaceous or early Tertiary age.

PANMURE NO. 2 BORE

Very poor concentrations of spores and pollen grains were recovered from the samples between 2715 and 2880 feet. No diagnostic species was observed but *Cyathidites punctatus* (Delcourt & Sprumont), which occurs in both samples, indicates a Cretaceous age. Further, the absence of angiosperms may imply a pre-Upper Albian age.

The sample from 2593 - 2601 feet yielded cf *Gleicheniidites* sp. together with angiosperm grains and rare microplankton referable to *Hystrichosphaeridium heteracanthum* Cookson & Eisenack. Thus Assemblage III of Upper Cretaceous age is present in these beds, which in containing microplankton may have been deposited under marine influences (cf Taylor 1964).

COORIEJONG NO. 1 BORE

Only one (from 1871 - 1877 feet) of the three lower samples yielded plant microfossils and the microfossil concentration is extremely sparse. Of the species identified, Cicatricosisporites australiensis indicates a Cretaceous age.

The upper sample (1535 - 1554 feet) provided a microflora referable to Cookson's (1954) Microflora B of probable early Tertiary or late Upper Cretaceous age (see Evans 1962). This microflora is diagnosed by Triorites edwardsi Cookson & Pike and in the Cooriejong sample microplankton referable to Epicephalopyxis indentata Deflandre & Cookson are also present. The latter species has been recorded from sediments believed to be Lower Tertiary in age (see Deflandre and Cookson 1955).

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Mary E. Dettmann
Department of Geology,
University of Queensland,
St. Lucia, Queensland.

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Microspores		Mega-spore	Pol-len	Micro-plankton
Cyclosporites hughesi				
Dictyosporites speciosus				
Ischyosporites punctatus				
Cicatricosisporites australiensis				
Aequitriradites spinulosus				
Contignisporites multimiratus				
Pilososporites notensis				
Rouseisporites reticulatus				
Foraminisporis wonthaggiensis				
Foraminisporis asymmetricus				
Crybelosporites striatus				
Rouseisporites radiatus				
Dictyosporites filiosus				
Coptospora radoxa				
Rouseisporites simplex				
Trilobosporites trioreticulosus				
Contignisporites glebulentus				
Krauselisporites majus				
Cicatricosisporites hughesi				
Microfoveolatosporis canaliculatus				
Laevigatosporites ovatus				
cf. Gleichenioidites sp.				
Balmeisporites holodictyus				
Balmeisporites tridictyus				
Tricolpites sp.				
Triporate sp. A				
Polysphinctosphaeridium heteracanthum				
Deflandrea cretacea				
Odontochitina porifera				

Terang No.1					
c.AN 1741-47'		+	+	+	
c.AO 1840-50'		+	+	+	Speciosus
c.AP 1934-42'		+	+	+	
c.AQ 2127-35'		+	+	+	
c.Ali 1166-76'	?R		+	+	?Speciosus
c.AN 1258-63'	?R			+	
c.AO 1474-76'		+	+	+	
c.AP 1620-25'		+	+	+	Speciosus
c.AQ 1689-1702'		+	+	+	
c.AT 1923-29'					Indet.
c.AU 2015-28'		+	+	+	Speciosus
c.AR 3017-25'			+		?III
c.AS 3227-39'		+			III
c.AT 3415-28'					
c.AU 3623-43'		+	+	+	Paradoxa/II