

PALYNOLOGICAL REPORT ON PLANET HEATHFIELD NO.1, CASTERTON NO.1,
AND TULLICH NO.1 WELLS

This report comprises the results of a palynological investigation of 21 core samples submitted by Planet Exploration Company Pty. Ltd. from three of the company's wells sunk in the Otway Basin. The wells and the interval examined include: Heathfield No.1 between 5396 and 7500 feet, Casterton No.1 between 2019 and 7749 feet, and Tullich No.1 between 1051 and 5863 feet. Most of the samples from these intervals provided reasonably well preserved microfloras that conform with the microfloral assemblages described by Dettmann (1965) from Lower Cretaceous deposits in south-eastern Australia. The three, successive microfloral assemblages recognised by Dettmann include: the Stylosus Assemblage of lowermost Cretaceous (Valanginian or older) age, the Speciosus Assemblage of Valanginian-Aptian age, and the Paradoxa Assemblage of Aptian-Albian age. It is shown subsequently that the two younger assemblages occur in the core samples investigated. Thus, correlations of the well sequences both with each other and with neighbouring bore successions in the Otway Basin can be achieved on microfloral evidence.

Table 1 incorporates the occurrence of selected spore species within each of the well sequences examined and a detailed discussion of the microfloral content of the deposits follows.

Heathfield No.1 Well

The five samples examined yielded fairly well preserved spores and pollen grains. Core 19 (7487-7500 feet) contains Coronatispora perforata Dettmann and Cyclosporites hughesi (Cockson & Dettmann) which are known from both the Stylosus and Speciosus Assemblages of Dettmann (1965).

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other stratigraphically significant species was observed and the samples can be regarded as either uppermost Jurassic or Lower Cretaceous (Aptian or older) in age.

Succeeding samples (between 5696 and 6900 feet) contain Dictyosporites speciosus Cookson & Dettmann, the index of the Valanginian-Aptian Speciosus Assemblage. Moreover, the presence of Cyclosporites hughesi, Coronatispora perforata and Contignisporites cooksonii (Balme) indicates that the microfloras are referable to the older category of the Speciosus Assemblage that occurs elsewhere in Valanginian and Aptian strata. Comparable assemblages have been recorded from higher in the sequence in a previous investigation by the author (1965) for Frome-Broken Hill Company Pty. Ltd. In this study the older category of the Speciosus Assemblage was found to extend as high as 4620 feet. Thus the interval between 4620 feet and 6900 feet may be regarded as Valanginian-Aptian in age and can be correlated with sediments between 3565 and 4319 feet in ODNL Penola No.1 well (see Dettmann 1965, p.114). Recent work has shown that Cooksonites variabilis Pocock, a constituent of the older category of the Speciosus Assemblage, possesses considerable stratigraphical value in south-eastern Australia. On the basis of this species the deposit at 5696 feet in Heathfield No.1 well is correlated with Penola No.1 well at 3715-21 feet.

which is diagnosed by the combined occurrence of Dictyosporites speciosus and Cyclosporites hughesi
The younger (Aptian) category of the Speciosus Assemblage has been strictly

recorded (Dettmann 1965) from between 3754 and 4145 feet in Heathfield No.1 well. This microfloral evidence enables correlation of the Heathfield deposits with Penola No.1 well between 2990 and 3000 feet.

Dettmann's (1963) Paradoxa Assemblage of Aptian-Albian age occurs in Heathfield No.1 well between 2365 and 2384 feet, and this interval is correlated with Penola No.1 well between 1200 and 2790⁸ feet.

The uppermost samples (cores 1-3) examined from Heathfield No.1 well by Dettmann (1965) are considered to be post Lower Cretaceous in age. Sediments between 1378 and 1863 feet are Upper Cretaceous in age, whilst those from 960-75 feet are uppermost Cretaceous or Lower Tertiary in age.

Casterton No.1 Well

The two lowermost samples (from 7385-95 feet and 7739-49 feet) examined from this well were found to be devoid of identifiable spores and pollen. Both contain plant material which, however, has been subjected to carbonization.

Core 15 (6763-69 feet) yielded Coronatispora perforata and Foraminisporis wonthaxiensis (Cookson & Dettmann), the latter species providing evidence for a Lower Cretaceous age. Moreover, the combined presence of these species indicates that the microflora is probably conformable with the older category of the Speciosus Assemblage. This assemblage which is diagnosed by the presence of Dictyosporites speciosus and Cyclosporites hughesi together with species such as Contiarnisporites cooksonii, Coronatispora perforata, and Biretisporites spectabilis Dettmann occurs in samples from the remainder of the sequence. Thus, sediments between 2019 and 6406 feet in Casterton No.1 well are Valanginian-Aptian in age and are considered equivalents of Heathfield No.1 well between 4620 and 6900 feet.

Tullich No.1 Well

The lowest sample examined (5860-63 feet) contains Cicatricosisporites australiensis (Cookson) and Coronatispora telata (Balme) which confirm a Lower Cretaceous age. However, no other stratigraphically significant species was observed and thus assignment to Dettmann's microfloral assemblages is precluded.

T.D. Will 5363'

Core 12 (4500-05 feet) yielded Dictyotosporites speciosus indicating conformity of the microflora with the Speciosus Assemblage. Neither Cyclosporites hughesi nor Crybelosporites striatus was observed in the residues so that reference of the microflora to either the older or younger category of the Speciosus Assemblage cannot be attempted. Nevertheless, the microfloral evidence indicates that the deposit at 4500-05 feet may be correlated with at least part of the interval between 3754 feet and 6900 feet in Heathfield No.1 well.

Succeeding samples (between 1051 and 2563 feet) contain rich and well preserved microfloras that include Coptospora paradoxa (Cookson & Dettmann) the index of the Aptian-Albian Paradoxa Assemblage. On this basis sediments between 1051 and 2563 feet in Tullich No.1 well may be correlated with Heathfield No.1 well between 2365 and 2884 feet and Penola No.1 well between 1200 and 2790^a feet.

References

- Dettmann, M.E. 1963. Upper Mesozoic microfloras from south-eastern Australia. Proc. Roy. Soc. Vict., 77, 1-148.
Dettmann, M.E. 1965. Palynological report on Planet Heathfield No.1 well. Unpublished report submitted to Frome-Broken Hill Co. Pty. Ltd. 30/8/65.

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