



BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS  
NOTES ON THE MICROFLORA OF F.B.H. EUMERALLA NO. 1. OTWAY BASIN

INTRODUCTION

Samples of thirteen cores from Frome-Broken Hill Company Pty. Ltd. Eumeralla No. 1 Well have been examined for their content of microspores and microplankton, mainly with the object of comparing the Eumeralla section with that encountered in F.B.H. Pretty Hill No. 1 ten miles to the east (Bain, 1962). Pretty Hill No. 1 penetrated a "basal sandstone" between 5964 and 7874 feet, two cores from which yielded Lower Cretaceous or Upper Jurassic spores (Evans, Appendix 2 in Bain, 1962). A comparable section was anticipated in Eumeralla No. 1 but no part of the well seems to be identifiable as such by lithological or electric log characteristics. The spore content of the cores from Eumeralla No. 1 shows that that well may have penetrated a correlate of the "basal sandstone" of Pretty Hill No. 1, but the alternative possibility, that a correlate of the "basal sandstone" was not encountered before the well was abandoned, is not ruled out.

Cores from top to bottom of the Lower Cretaceous of Eumeralla No. 1 have been examined as they have produced the closest comparisons yet seen in the central Otway Basin to the spore sequence of the Robe Bore (Cookson and Dettmann, 1958) and of O.D.N.L. Penola No. 1 (Evans, 1961a).

OBSERVATIONS

The cores and depths from which samples were taken and the forms of spores pollen and microplankton encountered within them are listed in Table I. *where?*

The microfossils were generally well preserved, even to total depth. The excesses of organic matter that frequently obscured detail in the Port Campbell and Flaxman's wells were not present at Eumeralla.

The Lower Cretaceous of Eumeralla No. 1 below Core 10 (5803-5805 feet) is non-marine; the hystrichosphere Michystridium sp. and the pterosporeoid Cymatospaera sp. between 0.5 and 0.10 indicate possible marine or brackish water conditions of deposition over the interval 3313 - 5805 feet.

Age Determination

Forms such as Cyathidites australis, Sphagnumsporites. spp. Baculatisporites comaumensis, Leptolepidites verrucatus, Cicatricosisporites cooksonii, Lycopodiumsporites austroclavatidites, "Ginkocycadophytus" nitidus and Vitreisporites pallidus commenced their life ranges in Jurassic or earlier times and they have no bearing on stratigraphical sub-divisions of Eumeralla No. 1. The presence of Cicatricosisporites dorogensis (al. australiensis) and Aequitriradites verrucosus at total depth indicates that the well finished in beds of Lower Cretaceous age.

The association of Dictyotosporites speciosus and Lycopodiumsporites circolumenus with C. dorogensis (in c.19 and below) may be taken to indicate the Aptian.

ELECTRONIC  
SECTION  
RECORDS

Perotrilites striatus, Balmeisporites holodictyus and Cingulatisporites euskirchenoides in core 8 signify an Albian age for the core. The spores observed between core 8 and core 19 have no meaning in terms of the accepted stage divisions of the Lower Cretaceous, partly because the Eumeralla section modifies knowledge of the ranges of certain species, and partly because there are variations in assemblage from one sample to another that have no stratigraphic significance when the ranges of their component species elsewhere are considered. Core 19, for example, contains an assemblage that was not repeated elsewhere in Eumeralla, but which is composed of species that range through thick sections at Robe and Penola. Until more work is done on the palynological meaning of the Aptian and the Albian any one of these terms will bear little precision. However, at least certain locally recognisable units are becoming apparent within the Lower Cretaceous, indications of which are demonstrated in the following discussion.

#### Comparison with Pretty Hill No. 1.

F.B.H. Pretty Hill No. 1 is the nearest deep well to Eumeralla No. 1. Pretty Hill No. 1 core 20 (7200 - 7214 feet) contained fairly common Cythathiids with L. circolumenus, D. speciosus (Evans, 1962b) and Cyclosporites hughesi (new observation). L. circolumenus was also present in core 19 of the Pretty Hill cores with horizons somewhere between Core 19 and Core 21 (8151 - 8918 feet) of Eumeralla No. 1. However, all these species occurred as low as the base of the marine Cretaceous of the Great Artesian Basin (Cookson and Dettmann, 1958), i.e. very close to the level at which C. dorogensis first appears. It is then feasible, on the basis of these comparable points of first appearance, that Pretty Hill No. 1 Core 20 could be as old as or older than the base of the Eumeralla section. Palynological data from the wells is insufficient for a decision of which of these alternative correlations is correct.

#### Comparison with Flaxman's No. 1

F.B.H. Flaxman's No. 1 well, drilled into the eastern part of the Otway Basin, penetrated an horizon from which Core 41 (10,801 - 10,817 feet) was cut and that contains relatively abundant C. dorogensis (Evans, 1962). As this epibole was not repeated at any other horizon in Flaxman's No. 1 and as it appeared at only one horizon in Eumeralla No. 1, in Core 13 (6254 - 6257 feet), it is possible that these horizons may be correlated. A similar abundance of C. dorogensis was observed in outcrop sample W - 37 from the Merino Group at Merino (Evans, 1961b).

#### Comparison with Penola No. 1

O.D.N.L. Penola No. 1 was drilled to the west of the outcropping Merino Group through a sequence that is directly comparable with that in Eumeralla No. 1. A twofold division of the Lower Cretaceous of Penola was possible (Evans, 1961a), based on the change occurring between Core 8 (2586 - 2596 feet) and Core 12 (3363 - 3373 feet). Unfortunately, inconclusive results from the intervening cores (9 - 11) prevented any attempt at refining the limits of this change. The same change occurs between Core 8 and Core 15 (4814 - 6716 feet) of Eumeralla No. 1 if the range of D. speciosus is taken as a common denominator in the lower division.

SOUTH  
VICTORIA

Correlation between Penola and Eumeralla may also be expressed in terms of the observed limits of ranges of species as in Figure 1. It is perhaps significant that this correlation places Eumeralla No. 1, Core 5 and Core 8, and Penola No. 1, Core 8, that all contained hystrichospheres into the same unit. It also links Eumeralla No. 1 Core 10 and Penola No. 1 Core 9 - Core 11, none of which yielded spores in abundance.

11th March, 1963

P. R. EVANS  
Geologist

References:

- |                                    |       |   |
|------------------------------------|-------|---|
| Bain, J. S.                        | 1962  | Well completion report, Pretty Hill No. 1, South West Victoria.<br><u>Frome-Broken Hill Co. Pty. Ltd. Rep. No. 7200-W-20 (unpubl.)</u>      |
| Cookson, I. C. and Dettmann, H. E. | 1958  | Some trilete spores from Upper Mesozoic deposits in the eastern Australian region.<br><u>Proc. Roy. Soc. Vic. 70(2), 95-128.</u>            |
| Evans, P. R.                       | 1961a | A palynological report on Oil Development N.L. Penola No. 1 Well, South Australia.<br><u>Bur. Min. Resour. Aust. Rec. 1961/76 (unpubl.)</u> |
| Evans, P. R.                       | 1961b | A palynological examination of samples from the Merino Group, Victoria.<br><u>Ibid. 1961/155 (unpubl.)</u>                                  |
| Evans, P. R.                       | 1962  | Palynological observations on F.B.H. Flaxman's Hill No. 1 Well.<br><u>Ibid. 1962/57 (unpubl.)</u>   |