

The sequence from 375–491 m consists of interbedded doleritic conglomerate and variably coloured mudstone and pebbly mudstone as well as tuffaceous sandstone. The tuffaceous sandstone is very poorly sorted, with clasts ranging in size from 0.05 to greater than 10 mm in a clay (?volcanic) matrix. Clasts consist of quartz, intermediate volcanics, plant fragments, chert and dolerite. Montmorillonite, kaolinite and minor quartz are shown to be present in the rock by XRD.

### BIOSTRATIGRAPHY

Stratigraphic relationships between the two holes drilled at Boobyalla Plains and Durroon 1 are shown as Figure 3.

A core sample in Boobyalla 1 at 65 m (McClenaghan *et al.*, 1982, App. 7) yielded a latest Cretaceous (late Senonian) microflora belonging to either the *Tricolpites longus* or the *Tricolporites lilliei* Zone (Stover & Evans, 1973; Partridge, 1976). In samples from 65 m to 245 m an Early Mesozoic component is present. This is consistent with the recognition of clasts belonging to the Upper Parmeener Supergroup. From depths of 225 m and lower, samples yielded only meagre Late Mesozoic microfloral elements more typical of earlier Cretaceous microfloras but specific zonal assignment is not possible.

Palynological study of Boobyalla 2 indicates that the sequence drilled ranges in age from at least Late Cretaceous to Eocene. An hiatus involving at least the Paleocene and Early Eocene occurs near the top of the sequence at approximately 29 m depth (Fig. 3). There are three problems.

Firstly, reworking of palynomorphs is common to such an extent that some Cretaceous microfloras are swamped by vast numbers of early Mesozoic species probably derived from Tasmanian Late Triassic coal measures. Secondly, to aid in representation of biostratigraphic data it is desirable that the zonations, where possible, be based on the zones defined for the adjacent Gippsland Basin (Stover & Evans, 1973; Stover & Partridge, 1973). Certain key species appear either to be absent, or their ranges are different in the Boobyalla Sub-basin when compared with the Gippsland Basin, leading to difficulties in precise zone assignment. To partly overcome this problem the unpublished and interpretive data of spore-pollen ranges for the Bass Basin (Partridge, 1973) have been used, together with a broad direct comparison with Durroon 1. Thirdly, microfloras below 247 m are poor.

The distribution of selected palynomorphs in Boobyalla 2 is shown as Figure 4. At the base of Boobyalla 2 (489 m) angiosperm pollen tend to be simple forms, and indicate that the microflora is not older than Cenomanian, and probably no older than Turonian (Dettmann, 1973). A single specimen of *Clavifera cf. triplex* (Bolchovitina), which is only very slightly crenulate, may indicate that the microflora is not older than the *Clavifera triplex* Zone (Dettmann & Playford, 1969). This is supported by the occurrence of *C. triplex*, *Classopollis* sp. and *Cranwellipollis subpalisadus* Couper in similar microfloras from a few kilometres east of Boobyalla 2.

The microflora (489 m) is dominated by finely granulate to baculate to sub-verrucate trilete spores and inaperturate? forms and is comparable with a marked abundance of similar forms in Durroon 1 at 1533 m, which was assigned to the *Appendicisporites distocarinus* Zone (Dettmann & Playford, 1969) by Esso in 1973. Components of the Durroon microflora at 1387 m immediately below a sample from 1375 m which was assigned to the *C. triplex-Tricolpites pachyexinus* Zone by Esso (1973), include *Classopollis* sp. and *Herkosisporites cf. elliottii* Stover.

Several species indicate that the microflora at 255.4 m is no older than the *Nothofagidites senectus* Zone (Stover & Evans, 1973). It is considered that *Phyllocladites reticulacatus* Harris occurs earlier in Boobyalla 2 than in the Gippsland and offshore Bass Basins.

The interval from 29.2 m to 22.1 m spans a hiatus involving part of the *Tricolpites longus*, *Lugistepollenites balmei*, *Malvacipollis diversus* and *Proteacidites asperopolus* Zones of Stover and Evans (1973).

Elsewhere in the Boobyalla area Quaternary microfloras have been obtained from beds directly overlying the Cretaceous succession. At Cape Portland (Fig. 6), in an area marginal to the basin, mid-Tertiary sediments belonging to the *Proteacidites tuberculatus* Zone (Stover & Partridge, 1973) were deposited under both marine and freshwater conditions.

### INTERPRETATION OF DEPOSITIONAL ENVIRONMENT

The contrast between the conglomerates (in Boobyalla 1 and 2 holes) composed dominantly of dolerite and the quartz-rich sublitharenites implies that two different provenances were supplying the two sediment types. Figure 5 is a suggested reconstruction of the Late Cretaceous palaeogeography of the Boobyalla Plains and hinterland area.

The predominance of dolerite in the conglomerates which are often matrix supported, together with the great range of clast sizes observed, suggests that these deposits are laid down near a fault scarp. The main depositional mechanisms were probably debris flow and sheet floods (Collinson, 1978). Episodic deposition of the conglomerate, possibly initiated on occasion by fault activity, interrupted deposition of the

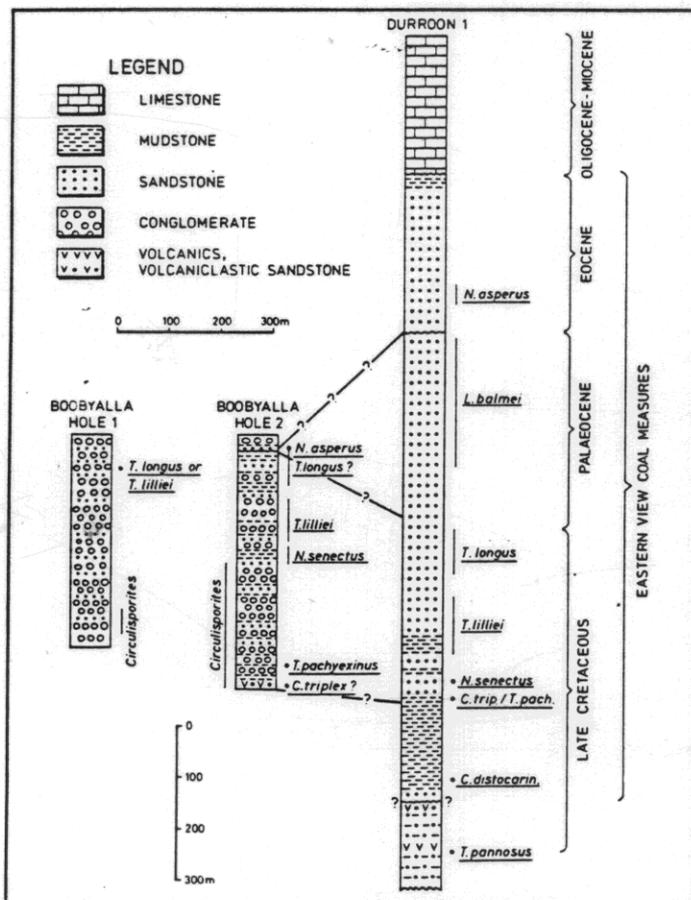


Figure 3 — Stratigraphic columns showing relationships between Boobyalla 1, Boobyalla 2 and Durroon 1.

5 cm