



PALAEONTOLOGICAL REPORT
SHELL/FROME MOYNE FALLS NO. 1 WELL

by

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- III - 1. Moyne Falls No. 1 - Otway Basin
- Distribution of Foraminifera

1. SUMMARY

Moyne Falls-1 encountered Middle Miocene limestones and marls of the Heytesbury group from 181 to 700 feet, and Lower Miocene marls from 700 to 1,030 feet.

The following zonules could be recognised

Zonule D		210-±	500 feet
" E	±	500-	700 feet
" F		700-	840 feet
" G		840-	1,020 feet
" ? H		1,020-	1,050 feet

The Clifton formation (basal unit of the Heytesbury group) appears to be of Zonule H age, the lowest sample (1,080-1,100 feet) being possibly as old as uppermost Zonule I-1.

No in situ foraminifera were found in samples below 1,100 feet.

2. INTRODUCTION

Selected cutting samples between 150 and 2,380 feet in Moyne Falls-1 were examined for foraminifera; the stratigraphically significant species are documented below. The zonation used is that of Taylor (1966) for the Gippsland, Bass and Otway Basins, which has been outlined in SDA Report 96 (see references).

Mud contamination and caving was severe while drilling through the Heytesbury group and resulted in mixing of faunas and blurring of faunal boundaries. Few precise time boundaries can be given in the Heytesbury group. No foraminifera were found in situ in the interval 1,100-2,380 feet which is assigned to the Otway group. Faunas found in this interval are entirely derived from Heytesbury group caving.

3. THE FORAMINIFERAL SUCCESSION

210-240 feet. Zonule D. A shallow water grainstone containing few foraminifera. Based on the presence of Orbulina universa, the sample is no older than Zonule D (Middle Miocene). O. universa ranges from this zonule to the Recent, but no Heytesbury group carbonates younger than Zonule D have been found in the Otway Basin, so that a Zonule D age seems very probable.

300-330 feet. Zonule D. The fauna includes Orbulina universa and rare Globigerinoides glomerosus glomerosus -- circularis. The latter indicates a position in the lower part of Zonule D.

390-420 feet. Zonule D. Same species as above, with two dubious specimens of Globigerinoides glomerosus glomerosus. Other components of the fauna include Globigerinoides glomerosus circularis, Orbulina universa, O. suturalis, Globorotalia barisanensis, G. mayeri, Globigerinoides ruber, G. trilobus, Globerigerina woodi, G. apertura and Globoquadrina dehiscens.

480-510 feet. Zonules D-E. Problematical in age, since the fauna is essentially the same as that listed above. However, Globigerinoides glomerosus glomerosus

3. THE FORAMINIFERAL SUCCESSION (Cont'd)

(one of the index species for Zonule E) is present in very small numbers, with moderately abundant Globigerinoides glomerosus circularis. The presence of Globorotalia sp.-5 (=G. cf. conica Jenkins) also suggests that this sample may be close to the Zonule D-E boundary.

570-600 feet. Zonule E (Middle Miocene). Globorotalia conica (restricted to Zonule E) and Globigerinoides glomerosus glomerosus are present.

660-690 feet. Zonule E (low). Globigerinoides bisphericus is abundant for the first time. The fauna is dominated by different species than those in younger samples. Globigerinoides trilobus is the most abundant species. Globigerinoides bisphericus, Globigerinoides glomerosus curvus, Globigerina woodi, G. bulloides, Globigerinoides immaturus, Globigerina cf. venezuelana and Uvigerina cf. canariensis assume new importance. Globigerina apertura, Globigerinoides ruber, Globoquadrina dehiscens, Globorotalia conica, and Orbulina suturalis continue from above; the last named is contamination. The early stage of the glomerosus lineage (Globigerinoides glomerosus curvus) indicates a position fairly low in Zonule E.

690-720 feet. This is a mixed and heavily contaminated sample which cannot be assigned to either Zonule E or F with any confidence.

720-750 feet. Zonule F. The sample is dominated by Globigerinoides bisphericus without significant numbers of the Globigerinoides glomerosus group, and can be assigned to Zonule F (see footnote).

Footnote:

"Zonule F was originally placed at the top of the Lower Miocene by Taylor, (1966). Subsequently he eliminated the usage of the term Middle Miocene, and subdivided the Miocene into Upper and Lower, the boundary being placed at the base of Zonule D (personal communication). In this report the old usage of Upper, Middle and Lower Miocene is retained, to conform with the zonation presented in SDA Report 96."

3. THE FORAMINIFERAL SUCCESSION (Cont'd)

810-840 feet. Zonule F. The abundance of Globigerinoides trilobus, Globigerina woodi and to a lesser degree, Globigerinoides bisphericus, indicates Zonule F. The relative rarity of the Globigerinoides glomerosus lineage probably indicates a position low in the zonule.

840-870 feet. Zonule G (Lower Miocene). Dominated by Globigerinoides trilobus, Globigerina woodi, and G. apertura. A further decrease in the numbers of the glomerosus group, and a decrease in the abundance of Globigerinoides bisphericus, indicates the probable top of the zonule.

900-930 feet and 990-1,020 feet. Zonule G. The greater part of the fauna here comprises varieties of Globigerinoides trilobus, with abundant Globigerina woodi.

1,020-1,050 feet. This sample may represent Zonule H (at the present considered to be basal Miocene). However the caving of Globigerinoides trilobus from Zonule G above makes this difficult to determine, as Zonule H is largely defined on the absence of this species. Globigerina cf. euapertura has been recorded before in the Lower Miocene. It is rare in this sample, and in the absence of other definite Zonule I indicators such as true G. euapertura and Victoriella conoidea, it is preferred to regard this sample as probable Zonule H.

1,080-1,100 feet. This basal sample of the Heytesbury group is difficult to date. Globigerina cf. euapertura is again present. The increased relative abundance of Globigerina bulloides and G. apertura may indicate that the sample belongs in uppermost Zonule I-1 (at present thought to be Oligocene). The sample is either low in Zonule H, or very high in Zonule I-1.

Samples below the Heytesbury group were picked at 1,140-1,170', 1,230-1,260', 1,420-1,450', 1,450-1,480', 1,540-1,570', 1,690-1,720', 1,810-1,840', 1,900-1,930', 1,930-1,960', 1,960-1,990', 2,020-2,050', 2,110-2,140', 2,170-2,200', 2,200-2,230', 2,230-2,260', 2,260-2,290', 2,290-2,320', 2,330-2,350' and 2,350-2,380'. No foraminifera were found in situ although Miocene contaminants from the Heytesbury group were fairly common.

4. ENVIRONMENT OF DEPOSITION

The Clifton formation, which forms the basal transgressive unit of the Heytesbury group, is generally a shallow water deposit. Because of the severe caving in this well, much of the fauna is masked and shallow water faunas are not obvious. There are, however, numerous fragments of bryozoa which probably indicate transgression over a moderately shallow rocky substrate .

Following deposition of the Clifton formation, the depositional environment rapidly deepens, resulting in deposition of middle and outer neritic marls which characterize most of the Heytesbury group deposits. The youngest limestones (approximately 150-250 feet) are shallow-water high energy grainstones, deposited as a result of the rapid regression of the Heytesbury group which occurred at the end of Zonule D time.

5. CONCLUSIONS

The marine sequence in Moyne Falls-1 appears to be almost entirely Miocene in age, indicating the gradual advance of the Heytesbury transgression northwards across the basin. The absence of the Lower Tertiary Nirranda and Wangerrip groups and of the Upper Cretaceous Sherbrook group is either due to erosion which took place at various levels (in the Otway Basin all groups are bounded by unconformities) or to non-deposition in this area, which could have been located north of the marine transgression.

6. REFERENCES

- Taylor, D.J. 1966 - Subsurface Biostratigraphic Scheme for Gippsland, Bass and Otway Basins in The Otway Basin; Joint Publication, South Australian and Victorian Mines Departments. (in press).
- Apthorpe, M.C. and Ribis, R.A. 1969 - Palaeontological and palynological review of the Otway Basin, Victoria. Unpublished report, Shell Development (Australia) Pty. Ltd. Report No. 96.

