



From W.C.R. Vol. II

APPENDIX

PALYNOLOGICAL ANALYSIS OF EAST HALIBUT-1
GIPPSLAND BASIN, SOUTHEASTERN AUSTRALIA

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INTRODUCTION

Nineteen sidewall core samples were examined for palynomorphs from East Halibut-1. Occurrences of spore-pollen and dinoflagellate species in each sample are recorded on the enclosed range chart. Tables 1 and 2 summarize interpretative and basic palynological data.

SUMMARY TABLE

AGE	FORMATION	PALYNOLOGY ZONE	DINOFLAGELLATE ZONE
Oligocene	Lakes Entrance Formation	<u>P. tuberculatus</u> (2393.0 m)	-
----- log break at 2393.9 m -----			
Late Paleocene	Latrobe Group	Upper <u>L. balmei</u> (2504.0-2415.5 m)	<u>A. homomorphum</u> (2526.0-2415.5m)
Paleocene	Latrobe Group	Lower <u>L. balmei</u> (2711.5-2508.0 m)	
----- T.D. 2721.0 m -----			

NOTE: All depths quoted in this report are in metres K.B.

GEOLOGICAL COMMENTS

1. Palynological analysis of the section of Latrobe Group (2721.0-2393.9 m) penetrated in East Halibut-1 indicates that it ranges from the Lower to Upper L. balmei Zone. The presence of these zones is consistent with the geophysical seismic markers and palynological correlations with surrounding wells, such as Halibut-1 and Teraglin-1. Although a section of Turrum Formation was intersected in Teraglin-1, there was no evidence for this unit in East Halibut-1. In the latter well, the coarse clastics of the Latrobe Group are overlain by sediments from the P. tuberculatus Zone, and these are correlated with the basal Lakes Entrance Formation.
2. The samples examined from the predominantly shale-sandstone sequence between the top of the Latrobe Group (2393.9 m) and approximately 2526 m frequently contain dinoflagellate assemblages of low diversity and yield that belong to the A. homomorphum Zone. It is suggested that these were deposited in a nearshore to restricted marine environment. The most diverse dinoflagellate assemblage was recorded at 2453.0 m (SWC 17) and it contains some typically marine taxa.
3. It was not considered worthwhile analysing samples from between 2690-2550 m because the interval is extremely sandy. Samples above and below this section belong to the Lower L. balmei Zone.

BIOSTRATIGRAPHY

The spore-pollen zones have been identified using the criteria proposed by Stover & Partridge (1973). The dinoflagellate zones are modifications on the scheme of Partridge (1976). Discussions of the dinoflagellate assemblages and their zonal assignments are given with the descriptions of their associated spore-pollen assemblages.

Lower Lygistepollenites balmei Zone 2711.5-2508.0 m.

Samples from this interval are typical of the Lower L. balmei Zone in that they are frequently pyritized and poorly preserved, and can be characterized by the often frequent occurrence of the zonal species. The presence of Nothofagidites kaitangata, Tetracolporites textus, T. verrucosus, Gambierina rudata, Haloragacidites harrisii, Integricorpus antipodus, Polycolpites langstonii and Tricolpites waiparaensis, without taxa typical of the Upper L. balmei Zone, is also indicative of the Lower L. balmei Zone.

Dinoflagellates occur sporadically in many samples of the Lower L. balmei Zone and include Senegalinium dilwynense, Glaphrocysta rextintexta, and Apectodinium homomorphum. The first occurrence of A. homomorphum at 2526.0 m marks the base of the A. homomorphum Zone. The low diversity and yield assemblages of the A. homomorphum Zone within this interval (2526.0-2508.0 m) are believed to be indicative of nearshore-restricted marine environment.

Upper Lygistepollenites balmei Zone 2504.0-2415.5 m.

The base of the Upper L. balmei Zone is placed at the first occurrence of Proteacidites annularis at 2504.0 m. The first occurrences of Proteacidites incurvatus, P. latrobensis, and Triporopollenites ambiguus at 2453.0 m within

this interval are also useful markers of the Upper L. balmei Zone. Consistent with this subdivision is the frequent occurrence of Lygistepollenites balmei, and the presence of Haloragacidites harrisii, Cyathidites splendens, Polycopites langstonii, Malvacipollis subtilis, and Proteacidites adenanthoides.

The dinoflagellate Apectodinium homomorphum occurs in many samples between 2415.5-2504.0 m, and is used to mark the A. homomorphum Zone. All dinoflagellate assemblages are of low yield and diversity and are thought to be from a nearshore - restricted marine environment. Some of the taxa recorded are Paralecaniella indentata, Deflandrea dartmooria-medcalfii, Spinidinium sp., Senegalinium dilwynense, Palaeocystodinium sp., and Kenleyia sp., and variants of the Palaeoperidinium bassensis complex. The most diverse assemblage was recorded at 2453.0 m and it contains some typically marine taxa, such as Palaeocystodinium sp., Spinidinium sp., and Kenleyia sp.

P A L Y N O L O G Y D A T A S H E E T

B A S I N: Gippsland

ELEVATION: KB: 21.0m GL: -85.0m

WELL NAME: East Halibut-1

TOTAL DEPTH: 2721.0m

A G E	PALYNOLOGICAL ZONES	H I G H E S T D A T A					L O W E S T D A T A				
		Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
NEOGENE	<i>T. pleistocenicus</i>										
	<i>M. lipsis</i>										
	<i>C. bifurcatus</i>										
	<i>T. bellus</i>										
PALEOGENE	<i>P. tuberculatus</i>						2393.0	0			
	Upper <i>N. asperus</i>										
	Mid <i>N. asperus</i>										
	Lower <i>N. asperus</i>										
	<i>P. asperopolus</i>										
	Upper <i>M. diversus</i>										
	Mid <i>M. diversus</i>										
	Lower <i>M. diversus</i>										
	Upper <i>L. balmei</i>	2415.5	2				2504.0	1			
	Lower <i>L. balmei</i>	2508.0	2				2711.5	2			
LATE CRETACEOUS	Upper <i>T. longus</i>										
	Lower <i>T. longus</i>										
	<i>T. lilliei</i>										
	<i>N. senectus</i>										
	<i>T. apoxyexinus</i>										
	<i>P. mawsonii</i>										
	<i>A. distocarinatus</i>										
EARLY CRET.	<i>P. pannosus</i>										
	<i>C. paradoxa</i>										
	<i>C. striatus</i>										
	<i>C. hughesi</i>										
	<i>F. wonthaggiensis</i>										
	<i>C. australiensis</i>										

COMMENTS: Apectodinium homomorphum dinoflagellate Zone: 2526.0-2415.5m

- CONFIDENCE RATING:
- 0: SWC or Core, Excellent Confidence, assemblage with zone species of spores, pollen and microplankton.
 - 1: SWC or Core, Good Confidence, assemblage with zone species of spores and pollen or microplankton.
 - 2: SWC or Core, Poor Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.
 - 3: Cuttings, Fair Confidence, assemblage with zone species of either spores and pollen or microplankton, or both.
 - 4: Cuttings, No Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.

NOTE: If an entry is given a 3 or 4 confidence rating, an alternative depth with a better confidence rating should be entered, if possible. If a sample cannot be assigned to one particular zone, then no entry should be made, unless a range of zones is given where the highest possible limit will appear in one zone and the lowest possible limit in another.

DATA RECORDED BY: Neil G. Marshall DATE: 12/12/85

DATA REVISED BY: _____ DATE: _____

REFERENCES

PARTRIDGE, A.D., 1976. The Geological Expression of Eustacy in the Early Tertiary of the Gippsland Basin. APEA. J. 16, 73-79.

STOVER, L.E. & PARTRIDGE, A.D., 1973. Tertiary and Late Cretaceous spores and pollen from the Gippsland Basin, southeastern Australia. Proc. R. Soc. Victoria, 85, 237-286.

TABLE 1: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLLAGELLATE ZONE	AGE	COMMENTS
SWC 30	2393.0	<u>P. tuberculatus</u> (0)	-	Oligocene	<u>C. annulatus</u> , <u>N. balcombiana</u> , <u>N. rhizoma</u>
SWC 26	2411.0	BARREN SAMPLE			
SWC 24	2415.5	Upper <u>L. balmei</u> (2)	<u>A. homomorphum</u> (0)	Late Paleocene	<u>L. balmei</u> , <u>P. langstonii</u> , <u>A. homomorphum</u>
SWC 23	2417.5	Upper <u>L. balmei</u> (2)	<u>A. homomorphum</u> (0)	Late Paleocene	<u>L. balmei</u> , <u>A. homomorphum</u>
SWC 22	2418.5	Upper <u>L. balmei</u> (1)	-	Late Paleocene	<u>L. balmei</u> , <u>A. homomorphum</u>
SWC 20	2422.0	BARREN SAMPLE			
SWC 19	2424.0	BARREN SAMPLE			
SWC 17	2453.0	Upper <u>L. balmei</u> (1)	-	Late Paleocene	<u>L. balmei</u> , <u>P. latrobensis</u>
SWC 15	2472.0	Upper <u>L. balmei</u> (0)	<u>A. homomorphum</u> (0)	Late Paleocene	<u>L. balmei</u> , <u>P. incurvatus</u> , <u>A. homomorphum</u> , <u>P. latrobensis</u> , <u>P. annularis</u> , <u>T. ambiguus</u> , <u>P. langstonii</u> , <u>P. adenanthoides</u> , <u>M. subtilis</u>
SWC 14	2475.0	<u>L. balmei</u>	-	Paleocene	<u>L. balmei</u>
SWC 13	2499.5	<u>L. balmei</u>	-	Paleocene	<u>L. balmei</u>
SWC 12	2504.0	Upper <u>L. balmei</u> (1)	<u>A. homomorphum</u>	Late Paleocene	<u>L. balmei</u> , <u>P. annularis</u> , <u>A. homomorphum</u> , <u>P. langstonii</u>
SWC 11	2508.0	Lower <u>L. balmei</u> (2)	-	Paleocene	<u>L. balmei</u> , <u>T. walparaensis</u>
SWC 10	2512.0	Lower <u>L. balmei</u> (2)	-	Paleocene	<u>L. balmei</u> , <u>L. antipodus</u> , <u>P. langstonii</u>
SWC 9	2524.4	Lower <u>L. balmei</u> (2)	-	Paleocene	<u>L. balmei</u>
SWC 8	2526.0	Lower <u>L. balmei</u> (2)	<u>A. homomorphum</u> (0)	Paleocene	<u>L. balmei</u> , <u>A. homomorphum</u>
SWC 7	2530.0	BARREN SAMPLE			
SWC 2	2696.5	Lower <u>L. balmei</u> (2)	-	Paleocene	<u>L. balmei</u>
SWC 1	2711.5	Lower <u>L. balmei</u> (2)	-	Paleocene	<u>T. textus</u> , <u>T. verrucosus</u> , <u>T. walparaensis</u>

TABLE 2: SUMMARY OF BASIC PALYNOLOGICAL DATA

SAMPLE NO.	DEPTH (m)	YIELD		DIVERSITY		PRESERVATION	LITHOLOGY	PYRIZATION
		SPORE-POLLEN	DINOS	SPORE-POLLEN	DINOS			
SWC 30	2393.0	V. low	Low	Low	Mod.	Good	Clyst.	
SWC 26	2411.0	BARREN SAMPLE					Sst.	
SWC 24	2415.5	Mod.	Low	Mod.	Low	Good	Slst.	
SWC 23	2417.5	Low	Low	Mod.	Low	Fair	Silty sst.	
SWC 22	2418.5	Low	-	Mod.	-	Poor	Carb. sltst.	
SWC 20	2422.0	BARREN SAMPLE					Sst.	
SWC 19	2424.0	BARREN SAMPLE					Sst.	
SWC 17	2453.0	Low	Low	Mod.	Low	Fair-poor	Silty sst.	
SWC 15	2472.0	Mod.	Mod.	Mod.	Low	Good	Sst.	
SWC 14	2475.0	Low	Low	Low	Low	Poor	Sandy sltst.	
SWC 13	2499.5	Low	Low	Mod.	Low	Fair	Sst.	
SWC 12	2504.0	Mod.	Low	Mod.	Low	Poor	Carb. sh.	high
SWC 11	2508.0	V. low	V. low	Mod.	Low	Poor-fair	Silty sst.	
SWC 10	2512.0	Mod.	Low	Mod.	Low	Good	Carb. sh.	
SWC 9	2524.4	V. low	V. low	Low	Low	Poor	Slst.	
SWC 8	2526.0	Mod.	Low	Mod.	Low	Fair	Carb. sltst.	high
SWC 7	2530.0	BARREN SAMPLE					Sst.	
SWC 2	2696.5	Low	V. low	Low	Low	Poor	Sst.	high
SWC 1	2711.5	Mod.	-	Mod.	-	Good	Coal	