



A PALYNOLOGICAL ANALYSIS OF
FORTESCUE-3, GIPPSLAND BASIN.

by

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I N T R O D U C T I O N

Twenty five samples were examined from Fortescue-3 consisting of five conventional core samples and twenty sidewall core sample. Overall the yields from the samples were good, however preservation was generally poor to fair, mainly owing to extensive pyrite pitting of the fossil exines.

The formation and zone subdivision of the section examined is summarised below. Table-1 lists all of the samples examined and summarises the findings, while individual fossil occurrences are recorded on the accompanying Distribution Charts. The zone limits and their confidence ratings are also given on the accompanying Data Sheet.

S U M M A R Y

<u>UNIT/FACIES</u>	<u>ZONE</u>	<u>*DEPTH (in metres)</u>
LAKES ENTRANCE FORMATION	<u>P. tuberculatus</u>	2417 - 2433m
UNCONFORMITY AT 2434m		
LATROBE GROUP (Coarse Clastics)	Middle <u>M. diversus</u>	2437 - 2448.4m
	Middle/Lower <u>M. diversus</u>	2452.5 - 2453.8m
	Lower <u>M. diversus</u> *	2476.5 - 2605.5m
	Upper <u>L. balmei</u> *	2610.5
T.D.		

- * Apectodinium (al. Wetzeliella)
hyperacantha 2589 - 2610.5
Dinoflagellate Zone.
(Extending across zone boundary)

G E O L O G I C A L C O M M E N T S

1. Dinoflagellates were present in all samples except for the coals at 2571 and 2573 metres.

* Depth shown are drillers measured depths.

2. Because of the rarity of Middle M. diversus Zone indicator species the interval between 2446.5 metres and 2535 metres can only be referred to either the Lower or Middle subdivisions of the M. diversus Zone at very low levels of confidence. The boundary between these subzones could easily be taken anywhere within the above interval without conflicting with the palynology.

Electric log correlation with adjacent wells and comparison of the thickness of the Lower M. diversus Zone between Fortescue-3 and adjacent wells suggests that the base of the Middle M. diversus Zone should be taken as low as 2501 metres. This cannot be demonstrated from the palynology although it is conceded that the only sample (i.e. at 2476.5m) assigned to the Lower M. diversus Zone above 2501 metres has been given a 2 confidence rating.

3. In this report the species hyperacantha has been transferred from the genus Wetziella to the genus Apectodinium, which affects the name of an important dinoflagellate zone in the Gippsland Basin. This change follows the recent comprehensive reviews of dinoflagellate cyst taxonomy by Lentin and Williams (1977) and Stover and Evitt (1978), which are likely to be followed in the future by the majority of workers in the field. It is anticipated that other name changes will be progressively made in future reports to bring our taxonomic terminology up to date.
4. The basal sample in the Lakes Entrance Formation at 2433 metres contains common reworked spores and pollen indicative of the P. asperopolus Zone. The reworked elements are so diagnostic that it can be stated emphatically that they cannot have been derived from the underlying Latrobe coarse clastics at the Fortescue-3 location.

DISCUSSION OF ZONES

Detailed assemblage lists for all samples examined are plotted on the accompanying Distribution Sheets. How the individual zones were identified in this well is summarised below:

Upper Lygistepollenites balmei Zone: 2610.5 metres.

The common occurrence of the gymnosperm pollen Lygistepollenites balmei in the one sample is characteristic of the Paleocene L. balmei Zone. The presence of the large spores Cyathidites gigantis and Verrucosisporites kopukuensis is diagnostic of the Upper subdivision of the Zone.

Apectodinium (al. Wetzelella) hyperacantha Zone: 2589 - 2610.5 metres.

The presence of the nominate species in the three samples in this interval is diagnostic of this zone. As in adjacent wells the zone overlaps the Upper L. balmei Zone to Lower M. diversus Zone boundary.

Lower Malvacepollis diversus Zone: 2476.5 - 2605.5 metres.

The base of this zone in Fortescue-3 is identified by the first appearance of Spinizonocolpites prominatus, Polypodiaceoisporites varus and Proteacidites biornatus in the sample at 2605.5 metres. The presence of the following species S. prominatus, P. varus, Crassiretitriletes vanraadshoovenii and Myrtaceoipollenites australis which are normally found in association and are interpreted to be indicative of "mangrove environments" and lack of any large numbers of Proteacidites grandis is characteristic of the samples between 2585 and 2605.5 metres near the base of this zone. The overlying section from 2535 to 2568.2 metres in contrast can be characterised by common P. grandis and the frequent to common occurrence of Rotverrusporites stellatus and could be regarded as more typical of assemblages from the Lower M. diversus Zone. Up to 2535 metres are less definitive but are still referred to this zone on the presence of Tetrocolporites multistrius at 2476.5 metres and absence of any Middle M. diversus Zone markers. The same rarity of marker fossils precludes assigning the overlying samples at 2452.5 and 2453.8 metres either of the Lower or Middle subdivisions of the M. diversus Zone.

Middle Malvacepollis diversus Zone: 2437 - 2448.4 metres.

The presence of the pollen Proteacidites plummelus at 2443.5 metres and Tricolporites moultonii at 2448.4 metres is used to assign these and the overlying sample to this zone.

Proteacidites tuberculatus Zone: 2417 - 2433 metres.

Both Cyatheacidites annulatus and various marker species of dinoflagellates including Protoellipsodinium simplex and "Dinosphaera" mamilatus from these samples assign this interval to the P. tuberculatus Zone.

R E F E R E N C E S

LENTIN, J.K., and WILLIAMS, G.L., 1977: Fossil dinoflagellates - index to genera and species, 1977 edition: Bedford Inst. Oceanography Rept. B1-R-77-8, 209pp.

STOVER, L.E., and EVITT, W.R., 1978:
Analyses of Pre-Pleistocene Organic-walled Dinoflagellates.
Stanford Univ. Publ. Geol. Sciences. Vol. 15, 300pp.

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: + 31m GL: - 69m
WELL NAME: FORTESCUE-3 TOTAL DEPTH: 2625m

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>	2417	0				2433	2	2429	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>	2440	2	2446.5	1		2451.4	2	2446.5	1	
	Lower <i>M. diversus</i>	2476.5	2	2535	1		2605.5	0			
	Upper <i>L. balmei</i>	2610.5	0				2610.5	0			
	Lower <i>L. balmei</i>										
LATE CRETACEOUS	<i>T. longus</i>										
	<i>T. lilliei</i>										
	<i>N. senectus</i>										
	U. <i>T. pachyexinus</i>										
	L. <i>T. pachyexinus</i>										
	<i>C. triplex</i>										
	<i>A. distocarinatus</i>										
EARLY CRET.	<i>C. paradoxus</i>										
	<i>C. striatus</i>										
	<i>F. asymmetricus</i>										
	<i>F. wonthaggiensis</i>										
	<i>C. australiensis</i>										
PRE-CRETACEOUS											

COMMENTS: All depths in metres.

Apectodinium (al. Wetzeliella) hyperacantha Dinoflagellate Zone 2589m - 2610.5m.

- 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: H.E. STACY & A.D. PARTRIDGE DATE: MARCH 6, 1979

DATA REVISED BY: _____ DATE: _____

SAMPLE TYPE *	DEPTHS																								
	C	S	S	C	S	C	C	S	C	S	S	S	S	S	S	S									
PALYNOMORPHS	2417	2429	2433	2440	2446.3	2446.5	2451.4	2452.5	2456.8	2476.5	2532	2535	2537.7	2540	2557.2	2560.8	2568.2	2571	2573.2	2576	2586	2589	2605.5	2610.5	2615
APICAL																									
<i>Calig. amiculum</i>	/																								
<i>G. retiiintexta</i> *						/																			
<i>Hyst. rigaudae</i>		/	/				/																		
<i>H. varispinosum</i> ms.																									
<i>Hyst. tubiferum</i> *																							/		
<i>System. placacantha</i>		/																		/					
INTERCALARY																									
<i>Apecto. homomorpha</i> * (1.sp.)																									
<i>A. homomorpha</i> (sh. sp)						/		/	/	/										/	/	/	/	/	/
<i>A. hyperacantha</i>																									
<i>D. flounderensis</i>				/																					
<i>D. dartmooria</i>										/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>D. pachyceros</i> (sh. h).																									
<i>Palae. australinum</i>												/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>Spinidinium</i> spp.						/	/	/	/	/										/					
RECTANGULAR																									
<i>Achom. alvicornu</i>	/																								
<i>Apteo. australiense</i>																									
<i>C. inodes</i> *						/																	/		
<i>Dinosph. mamillatus</i>		/	/																						
<i>Impagidinium</i> spp.																									
<i>Lingu. machaerophorum</i> *																									/
<i>Nemat. balcombiana</i> *	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>Operculod. centrocarpum</i> *	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>O. israelianum</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>Pent. laticinctum</i> *																									
<i>P. simplex</i> ms.	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>Pyxid. pontus</i> ms.	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>S. ramosus</i> *	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>T. scabroellipticus</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>T. peligica</i> *																									
<i>Tubio. filosa</i> .						/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
COMBINATION																									
<i>Hemic. zoharqi</i> *																									
ACRITARCHS																									
<i>Cyclop. vieta</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>Paral. indentata</i>						/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

*C=core; S= sidewall core; T= cuttings.

T A B L E - 1

SUMMARY OF PALEONOLOGICAL ANALYSIS, FORTESCUE-3, GIPPSLAND BASIN

SAMPLE	DEPTH (m)	DEPTH (ft)	ZONE	AGE	CONFIDENCE RATING	YIELD	DIVERSITY	COMMENTS
CORE 5	2417	7930	<u>P. tuberculatus</u>	Oligocene	0	Moderate	Moderate	<u>C. annulatus</u> present
SWC 27	2429	7969	<u>P. tuberculatus</u>	Oligocene	0	Moderate	High	<u>C. annulatus</u> present
SWC 26	2433	7982	<u>P. tuberculatus</u>	Oligocene	2	High	Very high	Reworked <u>P. asperopolus</u> zone fossils
CORE 6	2437 *	7995	Middle <u>M. diversus</u>	Early Eocene	2	Fair	Low	<u>P. grandis</u> , <u>Defl. flounderensis</u>
SWC 24	2446.3	8026	Indeterminate			Barren	Barren	
CORE 6	2443.5 *	8017	Middle <u>M. diversus</u>	Early Eocene	1	High	Very High	<u>P. plummelus</u> present
CORE 6	2448.4 *	8033	Middle <u>M. diversus</u>	Early Eocene	2	High	Very High	<u>T. moultonii</u> present
SWC 23	2452.5	8046	Lower/Middle <u>M. diversus</u>	" "	2	Moderate	Moderate	
CORE 7	2453.8 *	8050	Lower Middle <u>M. diversus</u>	" "				
SWC 21	2476.5	8125	Lower <u>M. diversus</u>	Early Eocene	2	High	Moderate	Highest occurrence <u>T. multistrius</u>
SWC 18	2532	8307	Lower <u>M. diversus</u>	Early Eocene	2	High	Moderate	
SWC 17	2535	8317	Lower <u>M. diversus</u>	Early Eocene	1	High	High	
SWC 16	2537.7	8326	Lower <u>M. diversus</u>	Early Eocene	1	High	High	
SWC 15	2540.5	8333	Lower <u>M. diversus</u>	Early Eocene	1	High	High	
SWC 13	2557.2	8390	Lower <u>M. diversus</u>	Early Eocene	1	High	High	
SWC 12	2560.8	8402	Lower <u>M. diversus</u>	Early Eocene	1	High	Moderate	
SWC 11	2568.2	8426	Lower <u>M. diversus</u>	Early Eocene	1	High	High	Reworked Paleocene and Early Cretaceous fossils.
SWC 10	2571	8435	Lower <u>M. diversus</u>	Early Eocene	2	Moderate	Low	Coal
SWC 9	2573.2	8442	Lower <u>M. diversus</u>	Early Eocene	1	High	Low	Coal
SWC 8	2576	8451	Lower <u>M. diversus</u>	Early Eocene	1	High	Moderate	
SWC 7	2585	8481	Lower <u>M. diversus</u>	Early Eocene	1	High	High	<u>S. prominatus</u> present
SWC 6	2589	8494	Lower <u>M. diversus</u>	Early Eocene	1	Moderate	High	<u>S. prominatus</u> , <u>A. hyperacantha</u> present
SWC 3	2605.5	8548	Lower <u>M. diversus</u>	Early Eocene	0	High	High	<u>S. prominatus</u> , <u>A. hyperacantha</u> present
SWC 2	2610.5	8565	Upper <u>L. balmei</u>	Paleocene	0	Moderate	High	<u>A. hyperacantha</u> present
SWC 1	2615	8579	(<u>P. tuberculatus</u>)	(Oligocene)	(1)	Moderate	Moderate	Mislabeled or mud contaminated SWC

* NOTE CORRECTIONS TO CORE DEPTHS:

	Labelled Depth	=	E-Log Adjusted depth
CORE-6	2440m	=	2437m
CORE-6	2446.5m	=	2443.5m
CORE-6	2451.4m	=	2448.4m
CORE-7	2456.8m	=	2453.8m