



PALYNOLOGICAL ANALYSIS
COBIA-2, GIPPSLAND BASIN

by

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SUMMARY

Ten sidewall cores and five conventional core samples were processed for palynomorphs in Cobia-2. Examination of the samples gave the following subdivision:

<u>Unit</u>	<u>Zone</u>	<u>Depth(in feet)</u>	<u>Age</u>
Lakes Entrance Formation	<u>P. tuberculatus</u>	7836 to 7844	Early Oligocene

Top of Latrobe	UNCONFORMITY in 8 feet barren interval.		

Latrobe Group Coarse Clastics	Lower <u>M. diversus</u> and <u>W. hyperacantha*</u>	7852 to 7855	Early Eocene

DISCONFORMITY			
	Upper <u>L. balmei</u> (<u>W. homomorpha*</u>)	7883 to 7995	Late Paleocene

*Dinoflagellate Zones

T.D. 8200

All samples examined are listed on Table-1. The spore, pollen and dinoflagellate species identified in the samples are given on the attached distribution charts while the confidence ratings for the zone intervals are given on the attached Data Sheet. A revised Data Sheet for Cobia-1 is also attached.

GEOLOGICAL COMMENTS

The key horizon in Cobia-2 is in Core-1 between 7853 to 7856 feet (drilled depth). Samples from this interval although giving only low yields contain diagnostic species of the Wetzeliella hyperacantha Dinoflagellate Zone and can be correlated with the assemblage from the sidewall core at 8012 feet in Cobia-1 (Partridge 1972). The assemblage from this sample in Cobia-1 has been revised and is also referred to the W. hyperacantha Zone. Previously the sample had been referred to the L. balmei Zone based on the presence of several specimens of Lygistepollenites balmei. However, on re-examination the mangrove pollen Spinozonocolpites prominatus and the dinoflagellate Wetzeliella hyperacantha were found. These species are diagnostic of and do not range below the W. hyperacantha Zone. The presence of L. balmei pollen (which is not considered to range above the zone of that name) at 8012 feet is therefore interpreted as reworking (see Partridge 1976, p. 76).

This correlation is supported by the identification of the top of the Upper L. balmei Zone in core-1 at 7883-84 feet in Cobia-2 and in coal from cutting between 8110-8170 feet in Cobia-1. The coals in Cobia-1 have a corrected E-log depth of 8080-8086 feet and would correlate with the coals in Cobia-2 in core-1 at 7884 feet and 7892 feet.

The above correlations mean that there is an additional 190 feet of section, of Lower M. diversus Zone age in Cobia-1 which is missing at the unconformity at the top of the Latrobe Group in Cobia-2. In this extra section in Cobia-1 spore-pollen assemblages were only recovered from between 7821 to 7882 feet which lies within the gross oil column of that well. The assemblages are characterised by the very common occurrence of the pollen Proteacidites grandis. This species is not recorded in any of the samples from Cobia-2.

The initial E-log correlation between Cobia-1 and Cobia-2 was to correlate the section in the oil column as essentially flat between the two wells and to invoke a facies change to account for the differences in detail. Although this correlation is no longer maintained it is important to stress that a facies change over the short distance between Cobia-1 and Cobia-2 would not be sufficient to explain the dominance of Proteacidites grandis in the Cobia-1 section and its absence in Cobia-2. Especially given that P. grandis is common in the Lower M. diversus Zone throughout the rest of the basin at levels above the W. hyperacantha Zone. (e.g. Morwong-1, Swordfish-1).

DISCUSSION OF ZONES

Upper Lygistepollenites balmei Zone 7883 to 7995 feet.

The common occurrence of the gymnosperm pollen Lygistepollenites balmei and presence of Polycolpites langstonii, Gambierina rudata are diagnostic of the L. balmei Zone. The Upper subdivision of this zone is indicated by presence of Banksiaeidites elongatus, Cyathidites gigantis and Verrucosporites kopukuensis. The dinoflagellates present support the Upper L. balmei age. Although the zone indicator Wetzeliella homomorpha was only identified in two samples the whole L. balmei Zone is most likely referable to the dinoflagellate zone of that name, based on a consideration of the sections in adjacent wells.

The lowest 205 feet intersected in Cobia-2 remains undated. Although eleven sidewall cores were shot in this interval none were suitable for palynology.

Lower Malvacepollis diversus Zone 7852-7855 feet.

This zone is identified on the presence of the pollen Spinizonocolpites prominatus and Intratrirporopollenites notabilis and the common occurrence of the dinoflagellate Wetzeliella hyperacantha which also indicates the presence of the dinoflagellate zone of that name. The assemblages are not particularly diverse because of the low yield recovered from the samples. The presence of Lygistepollenites balmei at 7855 feet in interpreted as reworking.

Proteacidites tuberculatus Zone 7836 to 7844 feet.

The P. tuberculatus Zone is identified on presence of the spores Cyatheacidites annulatus and Foveotriletes lucunosus associated with undescribed Oligocene dinoflagellates. The sample from the sidewall core at 7844 feet contained a small and somewhat unusual assemblage which lacks Cyatheacidites annulatus. However, the dominant form present, which is tentatively referred to the dinoflagellate Operculodinium solarum is also found at the base of the P. tuberculatus Zone in Kingfish-7 (sidewall core at 7410 feet) where it is common and associated with C. annulatus.

REFERENCES

- Partridge, A.D. 1972, The palynology of Cobia-1, Gippsland Basin: Esso Aust. Palae. Rept. 1972/17
- Partridge, A.D. 1976, The Geological expression of Eustacy in the Early Tertiary of the Gippsland Basin: APEA J., v. 16, pt. 1, p. 73-79.

TABLE - 1: SUMMARY OF PALYNOLOGICAL ANALYSES, COBIA-2, GIPPSLAND BASIN

<u>SAMPLE AND DEPTH</u>	<u>ZONE</u>	<u>AGE</u>	<u>CONFIDENCE RATING</u>	<u>YIELD</u>	<u>DIVERSITY</u>	<u>COMMENTS</u>
SWC 23 7836'	<u>P.tuberculatus</u>	Early Oligocene	0	Moderate	Moderate	<u>Cyatheidites annulata</u> present
SWC 21 7840'	"	" "	0	Low	Moderate	" "
SWC 20 7842'	"	" "	1	Very low	Low	" "
SWC 19 7844'	<u>P.tuberculatus</u>	" "	2	Low	Low	
SWC 18 7846'	Barren		-			
SWC 16 7850'	Indeterminant		-	Very low	Very low	
SWC 15 7852'	Lower <u>M.diversus</u>	Early Eocene	2	Low	Low	
Core-1 7853'5"	Lower <u>M.diversus</u>	Early Eocene	0	Low	Moderate	<u>Wetzeliella hyperacantha</u> Dinoflagellate Zone
Core-1 7855'6"	Lower <u>M.diversus</u>	Early Eocene	0	Low	Moderate	<u>W.hyperacantha</u> Zone
Core-1 7883'	Upper <u>L.balmei</u>	Late Paleocene	2	Low	Low	Coal lithology
Core-1 7884'	" "	" "	1	Moderate	Moderate	
Core-2 7900'	" "	" "	0	Moderate	High	<u>Wetzeliella homomorpha</u> Dinoflagellate Zone
SWC 13 7986'	" "	" "	0	Moderate	Moderate	<u>W.homomorpha</u> Zone
SWC 12 7995'	" "	" "	1	Moderate	Moderate	
SWC 8 8088'	Barren		-			

BASIN GIPPSLAND BASIN

DATE JULY 20, 1977

WELL NAME COBIA-2

ELEVATION K.B. + 83 feet

AGE	PALYNOLOGIC ZONES	HIGHEST DATA				LOWEST DATA					
		Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time	Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time
OLIG-MIO.	<u>P. tuberculatus</u>	7836	0				7844	2	7842	1	
	<u>U. N. asperus</u>										
EOCENE	<u>M. N. asperus</u>										
	<u>L. N. asperus</u>										
	<u>P. asperopolus</u>										
	<u>U. M. diversus</u>										
	<u>M. M. diversus</u>										
	<u>L. M. diversus</u>	7852	2	7853	0		7855	0			
	<u>U. L. balmei</u>	7883	2	7884	1		7995	1			
PALEOCENE	<u>L. L. balmei</u>										
	<u>T. longus</u>										
	<u>T. lilliei</u>										
LATE CRETACEOUS	<u>N. senectus</u>										
	<u>C. trip./T. pach.</u>										
	<u>C. distocarin.</u>										
	<u>T. pannosus</u>										
EARLY CRETACEOUS											
PRE-CRETACEOUS											

COMMENTS: Wetzeliella hyperacantha Dinoflagellate Zone 7853 to 7855 feet

Wetzeliella homomorpha Dinoflagellate Zone 7900 to 7986 feet

- RATINGS: 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 spore and pollen or microplankton, or both.
- 4; CUTTINGS, NO CONFIDENCE, assemblage with non-diagnostic spores, pollen and/or microplankton.

NOTE: If a sample cannot be assigned to one particular zone, then no entry should be made. Also, if an entry is given a 3 or 4 confidence rating, an alternate depth with a better confidence rating should be entered, if possible.

DATA RECORDED BY: Alan Partridge DATE July 20, 1977

DATA REVISED BY: _____ DATE _____

BASIN GIPPSLAND

DATE _____

WELL NAME COBIA-1

ELEVATION K.B. + 32'

AGE	PALYNOLOGIC ZONES	HIGHEST DATA				LOWEST DATA					
		Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time	Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time
OLIG-MIO.	<u>P. tuberculatus</u>	7817	1				7817	1			
	<u>U. N. asperus</u>										
EOCENE	<u>M. N. asperus</u>										
	<u>L. N. asperus</u>										
	<u>P. asperopolus</u>										
	<u>U. M. diversus</u>										
	<u>M. M. diversus</u>										
	<u>L. M. diversus</u>	7821	1				8012	2	7882	1	
	<u>U. L. balmei</u>	8110	3	8150	0		8150	0			
PALEOCENE	<u>L. L. balmei</u>										
	<u>T. longus</u>										
	<u>T. lilliei</u>										
LATE CRETACEOUS	<u>N. senectus</u>										
	<u>C. trip./T.pach.</u>										
	<u>C. distocarin.</u>										
	<u>T. pannosus</u>										
	<u>EARLY CRETACEOUS</u>										
<u>PRE-CRETACEOUS</u>											

COMMENTS: Wetz. hypercacantha Zone at 8012 feet (rating 2)
Wetz. homomorpha Zone at 8150 feet (rating 1)

- RATINGS: 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 spore and pollen or microplankton, or both.
 4; CUTTINGS, NO CONFIDENCE, assemblage with non-diagnostic spores, pollen and/or microplankton.

NOTE: If a sample cannot be assigned to one particular zone, then no entry should be made. Also, if an entry is given a 3 or 4 confidence rating, an alternate depth with a better confidence rating should be entered, if possible.

DATA RECORDED BY: A.D. Partridge DATE September, 1972; January, 1975

DATA REVISED BY: A.D. Partridge DATE July 20, 1977

SAMPLE TYPE *	S	S	S	S	S	S	C	C	C	C	C	S	S						
DEPTHS	7836'	7840'	7842'	7844'	7850'	7852'	7853'	7855'	7883'	7881'	7900'	7986'	7995'						
PALYNOMORPHS																			
<i>A. qualumis</i>																			
<i>A. acutullus</i>																			
<i>A. luteoides</i>																			
<i>A. oculus</i>																			
<i>A. sectus</i>																			
<i>A. triplaxis</i>																			
<i>A. obscurus *</i>																			
<i>B. disconformis</i>																			
<i>B. arcuatus</i>																			
<i>B. elongatus</i>																			
<i>B. mutabilis</i>																			
<i>B. otwayensis</i>																			
<i>B. elegansiformis</i>																			
<i>B. trigonalis</i>																			
<i>B. verrucosus</i>																			
<i>B. bombaxoides</i>																			
<i>B. emaciatus</i>																			
<i>C. bullatus</i>																			
<i>C. heskermensis</i>																			
<i>C. horrendus</i>																			
<i>C. meleosus</i>																			
<i>C. apiculatus</i>																			
<i>C. leptos</i>																			
<i>C. striatus</i>																			
<i>C. vanraadshoovenii</i>																			
<i>C. orthoteichus/major</i>																			
<i>C. annulatus</i>	/	/	/																
<i>C. gigantis</i>	/	/	/																
<i>C. splendens</i>																			
<i>D. australiensis</i>																			
<i>D. granulatus</i>	/	/	/				/	/	/	/	/	/	/						
<i>D. tuberculatus</i>	/	/	/				/	/	/	/	/	/	/						
<i>D. delicatus</i>																			
<i>D. semilunatus</i>																			
<i>E. notensis</i>																			
<i>E. crassiexinus</i>																			
<i>F. balteus</i>	/	/	/																
<i>F. crater</i>	/	/	/							cf									
<i>F. lucinosus</i>	/	/	/																
<i>F. palaequetrus</i>	/	/	/																
<i>G. edwardsii</i>																			
<i>G. rudata</i>																			
<i>G. divaricatus</i>																			
<i>G. gestus</i>																			
<i>G. catathus</i>																			
<i>G. cranwellae</i>																			
<i>G. wahooensis</i>																			
<i>G. bassensis</i>																			
<i>G. nebulosus</i>																			
<i>H. harrisii</i>	/	/	/	/	/	/	/	/	/	/	/	/	/						
<i>H. astrus</i>																			
<i>H. elliotii</i>	/	/	/																
<i>I. anguloclavatus</i>																			
<i>I. antipodus</i>																			
<i>I. notabilis</i>																			
<i>I. gremius</i>																			
<i>I. irregularis</i>	/	/	/																
<i>J. peiratus</i>																			
<i>K. waterbolkii</i>																			
<i>L. amplus</i>																			
<i>L. crassus</i>																			
<i>L. ohaiensis</i>																			
<i>L. bainii</i>																			
<i>L. lanceolatus</i>																			
<i>L. balmeri</i>																			
<i>L. florinii</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>M. diversus</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>M. duratus</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>M. grandis</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>M. perimagnus</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

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

SAMPLE TYPE *	S		S		S		C		C		C		S		S	
	7836'	7840'	7842'	7844'	7850'	7852'	7853'	7855'	7883'	7884'	7900'	7986'	7995'			
DEPTHS																
PALYNOMORPHS																
<i>A. qualumis</i>																
<i>A. acutulus</i>																
<i>A. luteoides</i>																
<i>A. oculus</i>																
<i>A. sectus</i>																
<i>A. triplaxis</i>																
<i>A. obscurus</i>																
<i>B. disconformis</i>																
<i>B. arcuatus</i>																
<i>B. elongatus</i>																
<i>B. mutabilis</i>																
<i>B. otwayensis</i>																
<i>B. elegansiformis</i>																
<i>B. trigonalis</i>																
<i>B. verrucosus</i>																
<i>B. bombaxoides</i>																
<i>B. emaciatus</i>																
<i>C. bullatus</i>																
<i>C. heskermensis</i>																
<i>C. horrendus</i>																
<i>C. meleosus</i>																
<i>C. apiculatus</i>																
<i>C. leptos</i>																
<i>C. striatus</i>																
<i>C. vanraadshoovenii</i>																
<i>C. orthoteichus/major</i>																
<i>C. annulatus</i>		A														
<i>C. gigantis</i>																
<i>C. splendens</i>																
<i>D. australiensis</i>																
<i>D. granulatus</i>								A								
<i>D. tuberculatus</i>																
<i>D. delicatus</i>																
<i>D. semilunatus</i>																
<i>E. notensis</i>																
<i>E. crassiellinus</i>																
<i>F. balteus</i>																
<i>F. crater</i>									cf							
<i>F. lucunosus</i>																
<i>F. palaequetrus</i>																
<i>G. edwardsii</i>																
<i>G. rudata</i>																
<i>G. divaricatus</i>																
<i>G. gestus</i>																
<i>G. catathus</i>																
<i>G. cranwellae</i>																
<i>G. wahoensis</i>																
<i>G. bassensis</i>																
<i>G. nebulosus</i>																
<i>H. harrisii</i>									A							
<i>H. astrus</i>																
<i>H. elliotii</i>																
<i>I. anguloclavatus</i>																
<i>I. antipodus</i>																
<i>I. notabilis</i>																
<i>I. gremius</i>																
<i>I. irregularis</i>																
<i>J. peiratus</i>																
<i>K. waterbolkii</i>																
<i>L. amplius</i>																
<i>L. crassus</i>																
<i>L. ohaiensis</i>																
<i>L. bainii</i>																
<i>L. lanceolatus</i>																
<i>L. balmei</i>																
<i>L. florinii</i>									RW	A	A	A	A			
<i>M. diversus</i>									A	A	A					
<i>M. duratus</i>																
<i>M. grandis</i>																
<i>M. perimagnus</i>																

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

SAMPLE TYPE *	DEPTHS															
	S	S	S	S	S	S	C	C	C	C	S	S				
PALYNOFORMS	7836'	7840'	7842'	7844'	7850'	7852'	7853'	7855'	7885'	7881'	7900'	7986'	7995'			
<i>P. rectomarginis</i>	•															
<i>P. reflexus</i>	•															
<i>P. reticulatus</i>	•															
<i>P. reticulocavatus</i>	•															
<i>P. reticulosabratu</i>	•															
<i>P. rugulatus</i>	•															
<i>P. scitus</i>	•															
<i>P. stipplatus</i>	•															
<i>P. tenuixinus</i>	•									/	/	/				
<i>P. truncatus</i>	•															
<i>P. tuberculatus</i>	•															
<i>P. tuberculiformis</i>	•															
<i>P. tuberculotumulatus</i>	•															
<i>P. xestoformis</i> (Prot.)	•															
<i>O. brossus</i>																
<i>R. boxatus</i>																
<i>R. stellatus</i>																
<i>R. mallatus</i>																
<i>R. trophus</i>																
<i>S. cainozoicus</i>																
<i>S. rotundus</i>																
<i>S. digitatoides</i>																
<i>S. marlinensis</i>																
<i>S. rarus</i>																
<i>S. meridianus</i>											/					
<i>S. prominatus</i>							/	/								
<i>S. uvatus</i>																
<i>S. punctatus</i>												/				
<i>S. regium</i>													/			
<i>T. multistrixis</i> (CP4)									A		/	/	/			
<i>T. textus</i>							/		/							
<i>T. verrucosus</i>								/								
<i>T. securus</i>									/							
<i>T. confessus</i> (C3)																
<i>T. gillii</i>							/									
<i>T. incisus</i>																
<i>T. longus</i>																
<i>T. phillipsii</i>											/	/				
<i>T. renmarkensis</i>																
<i>T. sabulosus</i>																
<i>T. simatus</i>																
<i>T. thomasii</i>																
<i>T. waiparaensis</i>																
<i>T. adelaiddensis</i> (CP3)				/							/					
<i>T. angurium</i>																
<i>T. delicatus</i>																
<i>T. geraniodes</i>																
<i>T. leuros</i>																
<i>T. lilliei</i>																
<i>T. marginatus</i>																
<i>T. moultonii</i>																
<i>T. paenestriatus</i>								cf								
<i>T. retequetrus</i>																
<i>T. scabratus</i>																
<i>T. sphaerica</i>																
<i>T. magnificus</i> (P3)																
<i>T. spinosus</i>																
<i>T. ambiguus</i>																
<i>T. chnosus</i>																
<i>T. helosus</i>																
<i>T. scabratus</i>																
<i>T. sectilis</i>																
<i>V. attinatus</i>																
<i>V. cristatus</i>																
<i>V. kopukuensis</i>		/	/									/				
<i>A. cruciformis</i>								/								

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

SAMPLE TYPE *	S	S	S	S	S	S	C	C	C	C	C	S	S																													
DEPTHS	7836'	7840'	7842'	7844'	7850'	7852'	7853'	7855'	7883'	7884'	7900'	7986'	7995'																													
PALYNOMORPHS																																										
Nemat. balcombiana	/																																									
Spinif. cingulata	/																																									
Emsl. australiensis	/																																									
Dinosph. mamillatus	/																																									
Polysp. fibrosum	/																																									
Dinosph. scabroellipticus	/			/																																						
Operc. centrocarpum	/							/					/																													
Spiniferites spp.	/											/	/																													
H/kolpoma rigaudae	/	/																																								
Crasso. concinna	/	/																																								
Lingul. machacrophorum	/	/																																								
Dinosph. simplex	/	/	/	/																																						
Penta. laticinctum	/	/	/	/																																						
Operc. solarum	/	/			A																																					
Wetz. hyperacantha	/	/					/	/	/																																	
Achomo. crassipellis	/	/																																								
Prae. indentata	/	/																																								
Defl. pachyceros	/	/																																								
Defl. dilwynensis	/	/																																								
Defl. medcalfi	/	/																																								
Wetz. homomorpha	/	/											/	/																												
Spinidinium spp.	/	/											/	/																												

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