



PE990415

PALYNOLOGICAL ANALYSIS OF FLOUNDER-5

by Alan Partridge

Palaeontology Report 1975/7

March 27, 1975.

SUMMARY

The following eight spore-pollen zones are recognized in the Flounder-5 well. The youngest two of the important *Wetzeliiella* dinoflagellate zones are also identified in the Flounder Formation which is most similar to the sequence through the Flounder Formation penetrated in Flounder-1.

Most depths quoted in this report are from sidewall cores and these have all been corrected for the error in the logging cable.

<u>Age</u>	<u>Zone</u>	<u>Data and Rating (Depth in feet)</u>	
		<u>Highest</u>	<u>Lowest</u>
Miocene	<i>T. bellus</i>	6021 (1)	6187 (2)
	DISCONFORMITY		
Oligocene	<i>P. tuberculatus</i>	6268 (0)	6268 (0)
	DISCONFORMITY		
Middle Eocene	Lower <i>N. asperus</i>	6278 (2)	6278 (2)
	DISCONFORMITY		
Early Eocene	<i>P. asperopolus</i>	6328 (0)	7173 (1)
	Dinoflagellate zones within <i>P. asperopolus</i> zone.		
	<i>W. edwardsii</i>	6328 (2)	6566 (1)
	<i>W. thompsonae</i>	7030 (1)	7030 (1)
Early Eocene	Upper <i>M. diversus</i>	7332 (1)	7332 (1)
	DISCONFORMITY		
Paleocene	Upper <i>L. balmei</i>	7360 (1)	7930 (3)
Paleocene	Lower <i>L. balmei</i>	8244 (1)	8244 (1)
Maastrichtian	<i>T. longus</i>	8394 (2)	8394 (2)

ANALYSIS

The *Triporopollenites bellus* Zone was identified at 6021 feet on the spores *Rugulatisporites micraulaxus* and *Klukisporites lachlanensis* and the grass pollen *Monoporites media*. The samples at 6117 and 6187 feet did not yield diagnostic zone fossils but are nevertheless referable to the zone on the overall composition of the assemblages.

The *Proteacidites tuberculatus* Zone was identified at 6268 feet on the presence of the zone indicator species *Cyatheacidites annulatus*.

Flounder Formation

At the top of the Flounder Formation the rather poor sample at 6278 feet is referred to the Lower *Nothofagidites asperus* Zone because of the occurrence of the dinoflagellates *Areosphaeridium diktyoplopus* (Klump) Eaton and *Phthanoperidium* n.sp. which have previously only been recorded from this zone. One specimen of *Wetzeliiella thompsonae* was identified but this was interpreted as reworked. The age of the sample was unexpected because it comes from near the top of the Flounder Formation as interpreted from the logs. None of the other Flounder wells have this zone at the top of the Flounder Formation. However, in Flounder-4 (Partridge 1974/3) the green-sand at the base of the Oligocene (*P. tuberculatus* Zone) contained reworked fossils from the Lower *N. asperus* Zone (i.e. Gurnard Formation equivalents) and in this well a similar interpretation of some reworking of the unconformity surface between the Flounder Formation and Lakes Entrance Formation must apply.

Within the Flounder Formation in this well only the *Proteacidites asperopolus* and Upper *Malvacepollis diversus* Zones are recognized.

The *P. asperopolus* Zone is at least 850 feet thick and represents the bulk of the formation. It also contains the *Wetzeliella thompsonae* and *W. edwardsii* dinoflagellate zones. The limits of these zones are restricted to those samples which actually contain the zone fossils, and the base of the zones are defined by the first occurrence of the designated fossils. In the sample at 6328 feet *W. thompsonae* and *W. edwardsii* occur together. In the earlier Flounder wells their occurrences were mutually exclusive. However, they do have overlapping ranges in New Zealand (Wilson 1967). It is therefore suggested that the entire *W. edwardsii* Zone may not be present, especially when comparing with Flounder-1, and that the upper portion containing the range of *W. edwardsii* without *W. thompsonae* is missing. The alternative hypothesis that *W. thompsonae* is reworked into the *W. edwardsii* Zone is considered unlikely considering the dominance of the former fossil. The base of the *P. asperopolus* Zone is identified on the occurrence of the indicator species, *Clavastephanocolporites meleosus* at 7173 feet.

The Upper *M. diversus* Zone identified in the sample at 7332 feet which is directly above the base of the Flounder Formation, represents only the highest portion of the zone as it contains the pollen *Santalumidites cainozoicus*. The sample contains abundant dinoflagellates and probably belongs to the *Wetzeliella ornata* Zone even though the zone fossil was not found in the material examined.

The entire Flounder Formation in this well is interpreted as shallow marine, on the basis of the samples examined, with the exception of the samples from 6717 to 6877 feet and 7278 to 7285 feet. Both these sets of samples were indeterminate because of the lack of fossils and interestingly enough lie at the interpreted zone boundaries. The samples lack or are low in dinoflagellates compared to the other samples in the Flounder Formation and are poorly preserved and it is therefore suggested that they represent slight regressive events with concurrent exposure and oxidation of the sediments.

Upper and Lower *Lygistepollenites balmei* Zones

Unfortunately the assemblages from these two zones are poor, and although they can be confidently assigned to the *L. balmei* Zone the determination of the Upper and Lower subdivisions is less certain and is mainly based on a comparison with the earlier Flounder wells.

Tricolpites longus Zone

Only the one sample at 8394 feet is referred to this zone and this is based on highest occurrences of *Tricolpites confessus* and *Proteacidites gemmatus*. All the sidewall cores below 8394 feet were of lithologies unsuitable for palynology.

REFERENCES

- Partridge, A.D. 1973. "The Palynology of Flounder-4, Gippsland Basin"
Palaeontology Report 1973/3.
- Wilson, G.J. 1967 "Some species of *Wetzeliella* Eisenack (Dinophyceae)
from New Zealand Eocene and Paleocene strata"
N.Z.J. Botany 5 (4) 469 - 497.

SAMPLES ANALYSED

<u>Sample</u>	<u>Depth in Feet</u>		<u>Zone</u>
	Corrected	(Uncorrected)	
SWC 59	6021 *	(6006)	<i>T. bellus</i> Zone
SWC 58	6117 *	(6102)	"
SWC 57	6187 *	(6172)	"
SWC 56	6268 *	(6252)	<i>P. tuberculatus</i> Zone
SWC 55	6278 *	(6262)	Lower <i>N. asperus</i> Zone
SWC 54	6328 *	(6312)	<i>P. asperopolus</i> Zone & <i>W. edwardsii</i> Zone
SWC 53	6416 *	(6400)	<i>P. asperopolus</i> Zone
SWC 52	6566 *	(6550)	<i>P. asperopolus</i> Zone & <i>W. edwardsii</i> Zone
SWC 51	6717	(6700)	Indeterminate
SWC 50	6877 *	(6860)	Indeterminate
SWC 49	7030 *	(7012)	<i>P. asperopolus</i> Zone & <i>W. thompsonae</i> Zone
SWC 48	7173 *	(7155)	<i>P. asperopolus</i> Zone
SWC 47	7278	(7260)	Indeterminate
SWC 46	7285	(7267)	Indeterminate
SWC 45	7332 *	(7314)	Upper <i>M. diversus</i> Zone
SWC 44	7360 *	(7342)	Upper <i>L. balmei</i>
SWC 43	7408 *	(7390)	"
Cuttings (Coal)	7830 - 40		"
Cuttings (Coal)	7930 - 40		"
SWC 38	8244	(8223)	Lower <i>L. balmei</i>
SWC 37	8394	(8373)	<i>T. longus</i>

* Dinoflagellates present in sample.

SAMPLE TYPE *	DEPTHS																				
	S	S	S	S	S	S	S	S	S	S	S	S	S	T	T	S	S				
	6021	6117	6187	6268	6278	6328	6416	6566	6717	6877	7030	7173	7278	7332	7360	7408	7830-40	7930-40	8244	8394	
PALYNOFORMS																					
<i>A. ovalumis</i>																					
<i>A. acutullus</i>							/				/										
<i>A. luteoides</i>																					
<i>A. oculatus</i>																					
<i>A. sectus</i>																					
<i>A. triplaxis</i>																					
<i>A. obscurus</i>																					
<i>B. disciformis</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. horrandus</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. crassixinus</i>													/								
<i>F. balteus</i>												/	/	/	/	/	/	/	/	/	/
<i>F. crater</i>																					
<i>F. lucunosus</i>																					
<i>F. palaequetrus</i>																					
<i>G. edwardsii</i>																					
<i>G. rufdata</i>															/					/	
<i>G. divaricatus</i>																					
<i>G. gastus</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. eliotii</i>							/	/			/									/	
<i>I. anauloclavatus</i>							/	/			/										
<i>I. antipodus</i>																					
<i>I. notabilis</i>																					
<i>I. gremius</i>		/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>I. irregularis</i>																					
<i>J. peiratus</i>																					
<i>K. waterbolckii</i>																					
<i>L. amplus</i>																					
<i>L. crassus</i>																					
<i>L. ohiensis</i>																					
<i>L. bainii</i>																					
<i>L. lanceolatus</i>																					
<i>L. balmeri</i>																					
<i>L. liorinii</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>M. diversus</i>																					
<i>M. duratus</i>																					
<i>M. grandis</i>																					
<i>M. perimagnus</i>																					

*C=cora; S=side-wall cora; T=cuttings.

SAMPLE TYPE *	DEPTHS																				
	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	T	T	S	S	
	6021	6117	6187	6268	6278	6328	6416	6566	6717	6877	7030	7173	7278	7332	7360	7408	7830-40	7930-40	8244	8394	
PALYONOMORPHS																					
<i>M. subtilis</i>																					
<i>M. ornamentalis</i>																					
<i>M. hypolaenoides</i>																					
<i>M. homeopunctatus</i>																					
<i>M. parvus/mesonesus</i>																					
<i>M. tenuis</i>																					
<i>M. verrucosus</i>																					
<i>M. australis</i>																					
<i>N. asperus</i>																					
<i>N. asperoides</i>																					
<i>N. brachyspinulosus</i>																					
<i>N. deminutus</i>																					
<i>N. emarcidus/heterus</i>																					
<i>N. endurus</i>																					
<i>N. falcatus</i>																					
<i>N. flemingii</i>																					
<i>N. goniatus</i>																					
<i>N. senectus</i>																					
<i>N. vansteenisii</i>																					
<i>O. sentosa</i>																					
<i>P. ochesis</i>																					
<i>P. catastus</i>																					
<i>P. demarcatus</i>																					
<i>P. magnus</i>																					
<i>P. polyoratus</i>																					
<i>P. vesicus</i>																					
<i>P. densus</i>																					
<i>P. velosus</i>																					
<i>P. morganii/subatus</i>																					
<i>P. mawsonii</i>																					
<i>P. reticulosaccatus</i>																					
<i>P. verrucosus</i>																					
<i>P. crescentis</i>																					
<i>P. esobalteus</i>																					
<i>P. langstonii</i>																					
<i>P. reticulatus</i>																					
<i>P. simplex</i>																					
<i>P. varus</i>																					
<i>P. adenanthoides (Prot.)</i>																					
<i>P. alveolatus</i>																					
<i>P. amolosexinus</i>																					
<i>P. angulatus</i>																					
<i>P. annularis</i>																					
<i>P. asperopolus</i>																					
<i>P. biornatus</i>																					
<i>P. clarus</i>																					
<i>P. cleinei</i>																					
<i>P. confragosus</i>																					
<i>P. crassis</i>																					
<i>P. delicatus</i>																					
<i>P. formosus</i>																					
<i>P. grandis</i>																					
<i>P. crevillaensis</i>																					
<i>P. incurvatus</i>																					
<i>P. intricatus</i>																					
<i>P. kopiensis</i>																					
<i>P. lapis</i>																					
<i>P. latrobensis</i>																					
<i>P. leightonii</i>																					
<i>P. ebsoleabrus</i>																					
<i>P. obscurus</i>																					
<i>P. ornatus</i>																					
<i>P. otwayensis</i>																					
<i>P. pachypolus</i>																					
<i>P. pallidus</i>																					
<i>P. parvus</i>																					
<i>P. plummelus</i>																					
<i>P. prodigus</i>																					
<i>P. pseudomoides</i>																					
<i>P. recavus</i>																					

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

SAMPLE TYPE *	DEPTHS														7	7	S	S			
	S	S	S	S	S	S	S	S	S	S	S	S	S	S							
PALYNOMORPHS	6021	6117	6187	6268	6278	6328	6416	6566	6717	6877	7030	7173	7278	7332	7360	7408	7830-40	7930-40	8244	8394	
<i>P. rectamarginis</i>																					
<i>P. reflexus</i>																					
<i>P. reticulatus</i>																					
<i>P. reticuloconcavus</i>																					
<i>P. reticulosabratus</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. xestiformis (Prot.)</i>						/					/	/		/							
<i>Q. brossus</i>																					
<i>R. boxatus</i>								/													
<i>R. stellatus</i>																					
<i>R. mollatus</i>					/	/		/			/	/									
<i>R. trophus</i>																					
<i>S. canozoicus</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. multistrius (CP4)</i>					/																
<i>T. textus</i>																					
<i>T. verrucosus</i>															/				/		
<i>T. securus</i>																					
<i>T. confessus (C3)</i>																				/	
<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. thomasi</i>																					
<i>T. waiparaensis</i>																					
<i>T. edelaidensis (CP3)</i>					/	/					/	/									
<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>						/	/						/	/							
<i>T. retequetrus</i>																					
<i>T. scabratus</i>							/				/	/									
<i>T. sphaerica</i>																					
<i>T. magnificus (P3)</i>																					
<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>Rugulat. miraulaxus</i>	/	/																			
<i>Monoporites media</i>	/	/																			
<i>K. lachlanensis</i>	/	/																			
<i>C. subtilis</i>	/	/																			
<i>M. waitakiensis</i>	/	/																			

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

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	T	T	S	S		
DEPTHS	6021	6117	6187	6268	6278	6328	6416	6566	6717	6877	7030	7173	7278	7332	7360	7408	7839/40	7930/40	8244	8394	
PALYNOMORPHS																					
<i>C. glarius</i>																					
<i>Amosopollis dilwynensis</i>																					
<i>Prot. gemmatus</i>																					
DINOFLAGELLATES																					
<i>Spiniferites</i> spp.	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>N. balcombiana</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>L. machaerophorum</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>O. centrocarpum</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>C. vieta</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>S. placacantha</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>P. fibrosum</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>E. dictyoplakus</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>Phthanoperidinium</i> sp.	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>H. varispinosa</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>W. thompsonae</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>Areoligera</i> sp.	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>S. morayensis</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>W. edwardsii</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>S. essoi</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>T. pellitum</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>D. flouderensis</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>D. longispinata</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>W. homomorpha</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>K. trabeculoides</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>H. tasmaniense</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>D. dilwynensis</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
<i>A. retintextum</i>	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

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