

**PALYNOLOGY OF 10 SAMPLES  
FOR VICTORIAN GEOLOGICAL SURVEY**

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**BY:       ROGER MORGAN**

# MORGAN PALAEO ASSOCIATES

PALYNOLOGICAL/PETROLEUM GEOLOGICAL CONSULTANTS

POSTAL ADDRESS: Box 161, Maitland, South Australia 5573

DELIVERIES: 1 Shannon Tce, Maitland, South Australia 5573

Phone (088) 322795 Fax (088) 322798

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February 1992

Ref:OTW.VICGEOSUR



I SUMMARY

- Wannaeeue 33, at 71ft: lower wonthaggiensis Zone : late Neocomian : non-marine with significant lacustrine influence : mature for oil : normally lower Pretty Hill Formation in the Otway Basin.
- Sunnyside Beach (1) : lower wonthaggiensis Zone : late Neocomian : non-marine with very minor lacustrine influence : marginally mature for oil : normally lower Pretty Hill Formation.
- Sunnyside Beach (4) : upper asperus to lower tuberculatus zones : early Oligocene : non-marine : immature.
- Barrabool Hills (A) and (B) : both indeterminate : although significant organic matter is present, recognisable spores and pollen are not and so the samples cannot be dated.
- Yan Yan Gurt YC 533504 ?Eastern View : actually Pliocene - Recent : non-marine : immature (=younger coastal deposits).
- Yan Yan Gurt YC 532505 ?Demons Bluff : mid asperus Zone : Late Eocene : nearshore marine : immature for hydrocarbons (= basal Demons Bluff).
- Cressy 35/91/3 YC 324825 : very lean and leafy : age indeterminate but the sample contains fresh angiosperms and spores (?Plio-Pleistocene) and rare Paleogene (late (Paleocene - Early Eocene) elements : repeat sampling might yield better.
- Newham BU 896683 Newham Diatomite : contains abundant fungal debris and very lean palynomorphs dominated by Compositae pollen (daisy). Apparently Pleistocene to Recent : non-marine : immature.

Nirranda-8 : 1137-1140.3m, core : lower L. balmei Zone.

Paleocene : marginally marine : immature : consistent with  
a lower Pebble Point Formation assignment.

Narrawaturk-3 : 637.6-643.7m, core : upper M. diversus Zone :

Early Eocene : nearshore marine : immature : consistent  
with a Dilwyn Formation assignment.

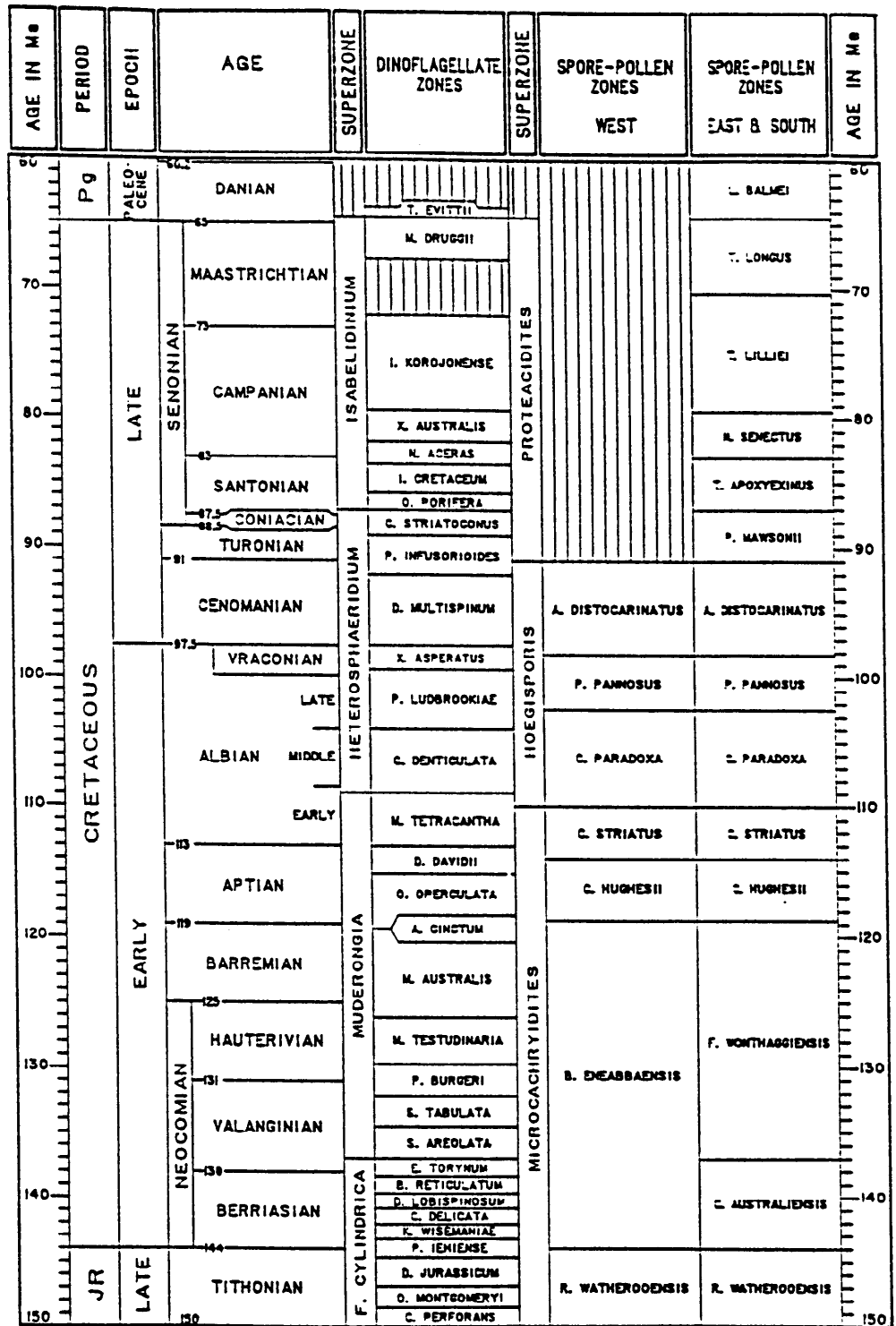


Figure 1 ZONATION FRAMEWORK - LATEST JURASSIC TO PALEOCENE (from Helby et al, 1987)

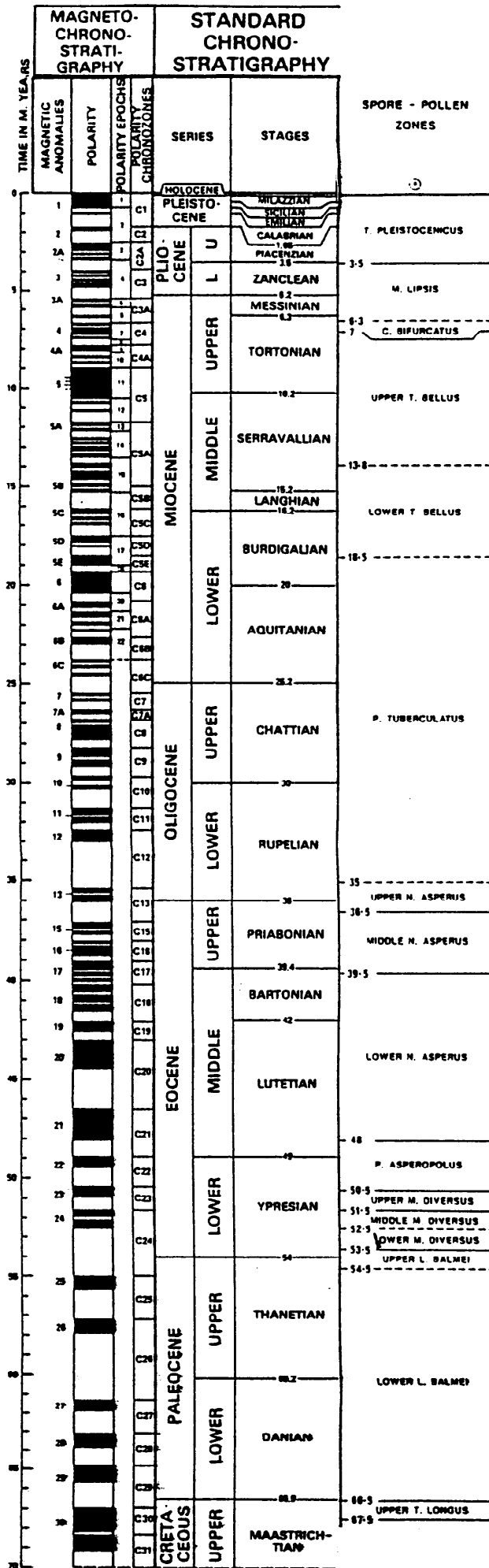


Figure 2 TERTIARY ZONATION FRAMEWORK.

## II INTRODUCTION

Steve Tickell of the Victorian Geological Survey submitted 10 samples from various Victorian locations in three batches. In the Cretaceous, the zonation used is that of Helby, Morgan and Partridge (1987) as shown in figure 1. In the Tertiary, the zonation is largely that summarised by Partridge (1976), since modified in unpublished work, and shown in figure 2.

## III PALYNOSTRATIGRAPHY

### A Wannaeue 33 : 71 ft : lower wonthaggiensis Zone

A rich and diverse spore pollen assemblage is dominated by Cyathidites and Osmundacidites wellmannii with frequent Triporoletes simplex. Assignment to the lower wonthaggiensis Zone is indicated by Dictyotosporites speciosus without younger indicators. The presence of Cooksonites variabilis, Murospora florida and Retitriletes watheroensis is consistent. Cicatricosisporites spp are absent.

Non-marine environments are indicated by the common and diverse spore pollen and lack of dinoflagellates. Lacustrine influence is suggested by the algal acritarchs Microfasta evansii (2% of palynomorphs) and Schizosporis reticulatus.

These features are consistent with the lower Pretty Hill Formation in the Otway Basin.

Light to mid brown spore colours indicate maturity for oil generation and marginal maturity for gas/condensate.

3 Sunnyside Beach 1 : lower wonthaggiensis Zone

A rich assemblage contains common O. wellmannii with frequent Couperisporites tabulatus, Cyathidites spp and Retitriletes. Assignment to the lower wonthaggiensis Zone is indicated by D. speciosus and C. hughesi without younger indicators. R. watherooensis is present. Cicatricosisporites spp are absent.

Non-marine environments are indicated by the common and diverse spores and pollen and lack of dinoflagellates. Minor lacustrine influence is suggested by rare M. evansii.

These features are consistent with lower Pretty Hill Formation in the Otway Basin.

Light brown spore colours indicate marginal maturity for oil and immaturity for gas/condensate.

C Sunnyside Beach 4 : upper asperus to lower tuberculatus zones

A lean yield of a diverse microflora is dominated by Haloragacidites harrisii with frequent Phyllocladidites mawsonii, Cyathidites, Lygistepollenites florinii and Nothofagidites emarcidus. Age diagnostic are Granodiporites nebulosus and Beaupreadites verrucosus, indicating the upper N. asperus or lower P. tuberculatus zones. The absence of Cyatheacidites annulatus suggests the upper asperus Zone, but is not conclusive in lean samples.

Non-marine environments are suggested by the total absence of microplankton.



These features are normally seen in the Nirranda Group or correlative Demons Bluff Formation or Eastern View, in the Otway Basin.

Yellow spore colours indicate immaturity for hydrocarbon generation.

D Barrabool Hills (A) and (B) : basal conglomerate : barren

Sample (A) contains abundant plant debris (cuticle, tracheid etc) and inertinite, but only a few longranging spores. It is thus indeterminate perhaps because the spores and pollen were sorted out by current energy during dsposition. The few spores seen were light to mid brown indicating early maturity for oil generation.

Sample (B) contains frequent inertinite with little else. It is therefore also indeterminate.

E Yan Yan Gurt YC 533504 : Pliocene - Recent

A rich microflora contains common Cingulatisporites bifurcatus with frequent Compositae (Fenestrites) (daisies), Graminiae (grasses) and Cyperaceae. Rare elements include Acaciapollenites (wattle) and Myrtaceidites eucalyptoides (gum tree). Nothofagidites were absent. These elements indicate a Pliocene to Recent age, and probably indicate a local flora much like the Modern one.

Non-marine environments are indicated by the abundant spore-pollen and lack of microplankton.

These features are typical of the younger coastal deposits of the area and certainly not the Eastern View Formation.

Colourless spore pollen indicate extreme immaturity for hydrocarbons.

F Yan Yan Gurt YC 532505 : mid asperus Zone

A rich microflora is dominated by Nothofagidites (especially N. emarcidus and N. falcatus) and Proteacidites spp. Zonal assignment is indicated by Triorites magnificus and Proteacidites reticulatus. Rare Cretaceous reworking was seen.

Nearshore environments are indicated by subordinate low diversity dinoflagellates including Deflandrea phosphoritica.

These features are typical of the lower Demons Bluff Formation.

These spore colours indicate immaturity for hydrocarbons.

G Cressy YC 324825 at 279-81m core : indeterminate.

This sample yielded abundant leaf material but few spores and pollen. Amongst the recognizable taxa are some fresh angiosperms (Echiperiporopollenites spp) and spores (Laevigatosporites) suggesting a Pleistocene-Modern origin (?drilling fluid) and rare Paleogene elements (Cupaneidites orthoteichus, common H. harrisii, Intratriporopollenites notabilis) suggesting an upper balmei (late Paleocene) to asperopolus (Early Eocene age range. No Jurassic elements were seen.

Non-marine environments are indicated by the lack of dinoflagellates amongst these spore pollen.

The observed assemblage is not definitive but is consistent with a Paleocene age. Repeat sampling of a

finer lithology might provide a better assemblage.

Yellow spore colours indicate immaturity for hydrocarbons.

H Newham BU 896683 : apparently Pleistocene to Recent.

This sample was dominated by fungal debris and some residual diatoms not dissolved in processing. Rare pollen are dominated by Compositae (daisies). Other elements include C. bifurcatus, Haloragacidites haloragoides and Myrtaceidites eucalyptoides. Nothofagidites were absent. Clearly a Pliocene to Recent age is indicated and the Compositae dominance suggests a Pleistocene to Recent age. These elements could conceivably be Modern contaminants from outcrop.

Non-marine environments are suggested by the lack of microplankton.

These data are consistent with the upper Pliocene to Pleistocene age currently ascribed to the Newham Diatomite.

Spores and pollen are colourless.

I Nirranda-8 : core at 1137-40.3m : lower balmei

This assemblage is dominated by waxy globules but contains a good microflora including common Proteacidites and frequent P. mawsonii. Rare but key elements include Gambierina rudata and Lygistepollenites balmei without younger elements and indicate the zonal assignment.

Rare dinoflagellates indicate a marginal marine environment.

These features are consistent with the lower Pebble point Formation in the Otway Basin.

Yellow spore colours indicate immaturity for hydrocarbons.

J Narrawaturk-3 : core at 637.6-43.7m : upper diversus

A rich assemblage is dominated by cuticle fragments but includes common H. harrisii and Proteacidites and frequent Malvacipollis diversus. Rare age diagnostic elements are Anacolosidites acutullus, Intratropopollenites notabilis, Kuylisporites waterbolkkii, Myrtacidites tenuis, Proteacidites ornatus, P. pachypolus and Spinozonocolpites prominatus, indicating the zonal assignment. Rare Early Cretaceous reworking was seen.

Dinoflagellates are frequent with Adnatosphaeridium multispinosum and Homotriblium tasmaniense frequent in a low diversity assemblage. Nearshore marine environments are indicated by the dinoflagellate content (20%) and diversity, amongst the rich diverse spores-pollen.

These features are consistent with the Dilwyn Formation in the Otway Basin.

Yellow spore colours indicate immaturity for hydrocarbons.

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10 SAMPLES FROM VICTORIAN DEPT. OF MINES

MORGAN PALAEO ASSOCIATES  
BOX 161, MAITLAND, SOUTH AUSTRALIA, 5573  
PHONE: (088) 322795 FAX: (088) 322798

C L I E N T: VICTORIAN DEPARTMENT OF MINES

W E L L: 10 SAMPLES

F I E L D / A R E A: GIPPSLAND BASIN / OTWAY BASIN

A N A L Y S T: ROGER MORGAN






D A T E : MARCH 1992

N O T E S:

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RANGE CHART OF GRAPHIC ABUNDANCES BY ALPHABETICAL WITHIN GROUP

Key to Symbols

-  = Very Rare
-  = Rare
-  = Few
-  = Common
-  = Abundant
- ? = Questionably Present
- . = Not Present

	MONOTROPHEKIDUM MULTISPINOSUM	OPITHIODENDRUM MULTISPINOSUM	ORFEDIAEIA SENONIENSIS	ORODUSPHEKIDUM MULTISPINOSUM	DEFLANDREI PHOSPHORITICA	DYPHES GUILDEKUBI	GLAPHYRORINOSTA PASTIELLEI	HELENIAE ACRYSTA LEPTALEN	HONDTRIBITUM TASTANIENSE	IMPAGIDINIUM VICTORIARUM	MICROMASTIA EVANSII	OPERCULONINIUM CENTROCARPUM	OPERCULONINIUM SPP	PARATOCANTHELLA UNIDENTATA	SCHEUCOPURUS RETICULATUS	SPINITERITES KUNOSUS	SYSTEMIDITOPHORA PHARACANTHA	TITANOSPHERA PELTICIA	TURBITOPHORA SP	PHALLOSPHERA HYALOSPORITES	MONOTROPHEKIDUM RETICULENSE	HEQUALITIKIDITES SPINULOSUS	HEQUALITIKIDITES VERRUCOSUS	PHOSPHOLITES CRUCIFORMIS	PHOSPHOLITES ACUTILIS	PHOSPHOLITES AUSTRIACIS	AUSTRIACOPHALLIS OBSCURUS	BANKSIIDITES UNCIATUS	BEHNCKERIIDITES ELEGANSIFORMIS	BEHNCKERIIDITES VERRUCOSUS	BIENSTADTISPORITES SPECIFICILIS	BIENSTADTISPORITES DAMPIERI																								
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WANNAENE #33  
71 feet

.....  
SUNNYSIDE BCH  
Sample 1  
Sample 4  
.....

BARRABOOL HLS  
Sample A  
.....

YAN YAN GURT  
YC 533504  
YC 532505  
.....

DRESSY  
291m CORE  
.....

NEWHAM  
BU 896683  
.....

NIRRANDA-8  
1137-1140.3mC  
.....

NARRAWATURK-3  
637.6-643.7mC  
.....

	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66			
WANNAENE #33																																				
71 feet																																				
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CHEROUZINOSPORITES TETRUBLENIS

CYATHIDITES SPP

PLEUROSPIRITES LIQUIDIS

CHEROPOLIOPSIS

CINGULATISPORITES UNICRATUS

CINCUTRILETES CLAVUS

GLAUCIFERA TRIPIER

COMPOSITAE (ANTIPODITIA)

COMPOSITAE (FENESTRITES)

CONCHOISSINISPORITES PENOLHENSIS

CONCHOISSINISPORITES VARIERRUCATUS

CONTIGNISPORITES COORSOINAE

COOKSUNITES VARIABILIS

COROLLINA TOROSUS

CORONATISPORUM PEPEROPATH

COOPERISPORITES TABULATUS

CRYBELLISPORITES STRICTUS

CUPANTEIDITES ORTHOLICHIUS

CYATHIDITES AUSTRALIS

CYATHIDITES HINDI

CYATHIDITES SPP

CYATHIDITES FULVICRURIS

CYATHISPORITES HIGHERI

CYPERACEAE

DICHTYOSPORITES MULTIPOLIFENSIS

DICTYOSPORITES COOPERI

DICTYOSPORITES SPICATUS

DILWYNITES GRANULATUS

DILWYNITES TUBERCULATUS

EQUIPERIPOROPULLENITES SP

ERICIPIES SCHROTTUS

FALCISPORITES GRANULUS

FULCISPORITES TETRAEDRUS



Sample ID	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99		
FORAMINIFERIS DALLI																																			
MONILICRINA KUDUWA																																			
GLEICHENIIDITES CIRRIINITES																																			
GRANITHE																																			
GRANULIFERITES NEBULOSUS																																			
HALORAGIIDITES HALORAGIIDES																																			
HALORAGIIDITES HARRISI																																			
HERKOSPITES ELLIOTTI																																			
ILEXPOLLENITES SP																																			
INTRATRIPOPOLLENITES NOTABILIS																																			
FLUKISPORITES SCABERIS																																			
EUVLISPORITES WATERBOLLEI																																			
LAEVIGATUSPORITES																																			
LAEVIGATUSPORITES BELFORDI																																			
LAEVIGATUSPORITES OBTUSUS																																			
LEPTOLEPIDITES MAJUK																																			
LEPTOLEPIDITES VERRUCATUS																																			
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MYRTOLEPIDITES LUNDI																																			
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