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A REAPPRAISAL
of the
STRATIGRAPHIC PALYNOLOGY
of
KYARRA No. 1,
(Eocene *N.asperus* Zones, 1013m to 1166m)
GIPPSLAND BASIN.

for: AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

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KYARRA No. 1 - SUMMARY OF STRATIGRAPHIC PALYNOLOGY.

Depth (m)	Spore Pollen Zone	Dinoflagellate Zone	Age	Palaeoenvironment
1013	Upper *N. asperus*	? *P. comatum*	Late Eocene	marginal marine
1017-1098	Middle *N. asperus*	*C. incompositum*	Late Eocene	
1100		-		non marine
1106-1127.5		*C. incompositum*		marginal marine
1131		-		non marine
1148.5		*C. incompositum*		marginal marine
1164.5-1166	Lower *N. asperus*	-	Mid Eocene	non marine

INTRODUCTION

This report rezones the interval between 1013m and 1166m in Kyarra No. 1. The results do not coincide with those of Harris (1983), for the following reasons.

Harris (1983) gives Stover & Partridge (1973) and Partridge (1976) as references, but when his zone determinations are checked with his list of species determinations, they are clearly not based on the ranges given in these references. Experience subsequent to the publication of these references may show that ranges need modification, so Harris may have based his zonations on confidential and proprietal documentation. Whatever the reason, if the palynology of Wyrallah (Martin, 1984) is based on one system and that of Kyarra (Harris, 1983) on another, then correlation between the two is impossible.

This present report is based solely on the published documentation. Exactly the same system is used for Kyarra as for Wyrallah, so a correlation should be achieved.

SPORES and POLLEN

The spores and pollen identified are listed in Table 1 and the ranges of diagnostic species are shown on Figure 1. The species in Table 1 are grouped into three categories:-

1) Spores, mostly from ferns and their allies.
2) Gymnosperm pollen: pines e.g. hoop pine, Huon pine etc. These would have been mostly forest trees. Their relatives are found today in forests of Tasmania, New Zealand, New Caledonia and New Guinea. Only a few grow on the Australian Mainland and they are restricted to rainforests and the wetter climates.
3) Angiosperm pollen: flowering plants. These may have been trees or shrubs.

An assessment of the abundance of plant tissue debris is included in Table 1. Plant tissue debris is abundant in non marine swamps but less so in fresh water lakes. Plant tissue debris is not abundant in marine environments unless the location is close to a river outlet. However, other factors are involved with the abundance of plant tissue debris, e.g. preservation. Poor preservation may destroy or render unrecognisable much of the plant tissue debris.

Spore pollen zonation follows Stover & Partridge (1973). Partridge (1976) modified the ages of the zones somewhat and subdivided some of the zones. The Lower *N. asperus* Zone of Stover & Partridge (1973) is subdivided into an older Lower and a younger Middle *N. asperus* Zone, without diagnosis or description (Partridge 1976). A discussion of the Middle *N. asperus* Zone in Stover & Partridge (1982) shows that it is based on the species which first appear in the upper part of the Lower *N. asperus* Zone (in Stover & Partridge, 1973), e.g. *Triorites magnificus*. This discussion in Stover & Partridge (1982) is used as a diagnosis of the Middle *N. asperus* Zone.

1. 1164.5 to 1166m - Lower *N. asperus* Zone, Mid Eocene.

Nothofagidites vansteenisii, *Proteacidites recavus*, *P. reflexus* and *Tricolporites leuros* first appear at the base of the Lower *N. asperus* Zone and are found in this interval. *Nothofagidites* spp. are very abundant, another characteristic of the Lower *N. asperus* Zone. The presence of *Verrucosisporites cristatus* is contradictory, for its range begins within the Middle *N. asperus* Zone. *Proteacidites asperopolus* is present in 1164.5m and its range does not extend into the Middle *N. asperus* Zone. Thus the major part of the evidence indicates the Lower *N. asperus* Zone.

1017 to 1148.5m - Middle *N. asperus* Zone, Late Eocene.

Triorites magnificus is restricted to the Middle *N. asperus* Zone, but it has a very sporadic distribution. The dinoflagellate *Vozzhennikovia extensa* also has a range confined to the Middle *N. asperus* Zone, and it is found at 1148.5m. There are a number of species whose ranges terminate at the top of the Middle *N. asperus* Zone (see Fig. 1) and they are found throughout this interval, including *Proteacidites adenanthoides* at 1017m.

1013m - Upper *N. asperus* Zone, Late Eocene.

Granodiporites nebulosus and *Proteacidites tuberculatus* occur at this level and both begin their ranges at the base of the Upper *N. asperus* Zone. *Proteacidites stipplatus* is the most common of the *Proteacidites* spp. and this is also characteristic of the Upper *N. asperus* Zone. *Vozzhennikovia extensa*, whose range terminates at the top of the Middle *N. asperus* Zone is present also, so this level probably represents the very base of the Upper *N. asperus* Zone.

DINOFLAGELLATES

Dinoflagellate zonation follows Stover, Helby & Partridge (1979). The zones in this reference are much the same as those in Partridge (1976), with some minor amendments in the former. Neither of these references describe or diagnose the zones. In this report, zone determination relies upon the ranges of a few selected species (see Fig. 2).

For dinoflagellates identified, see Table 1.

1. 1017 to 1148.5m - *Corrudinium incompositum* Zone (= *Vozzhennikovia extensa* Zone), Late Eocene.

There is one occurrence of the nominate species, *C. incompositum*. However, *V. extensa*, whose range is restricted to the *C. incompositum* Zone, first appears in 1017m and is found in most of the assemblages.

Within this interval, there are two non-marine assemblages at 1100m and 1131m which do not contain dinoflagellates.

2. 1013m - ? *Phthanoperidium comatum* Zone (= *P. coreoides* Zone), Late Eocene.

The nominate species has not been identified here. This assemblage is otherwise in agreement with the zone, except for the presence of *V. extensa*, whose range is confined to the *C. incompositum* Zone. The pollen evidence for the Upper *N. asperus* Zone is unequivocal, so the presence of *V. extensa* is thought to indicate the base of this zone.

PALAEOECOLOGY

The Lower *N. asperus* Zone is non-marine.

The Middle *N. asperus* Zone is marginal marine, except for two assemblages at 1100m and 1131m, which are non-marine. The assemblages above and below 1131m, viz. 1127.5m and 1148.5m respectively, only contain a trace occurrence of dinoflagellates.

The Upper *N. asperus* Zone is marginal marine.

POSSIBLE CORRELATION OF TWO COAL SEAMS IN KYARRA WITH WYRALLAH.

The possibility of correlating two coal seams in the Middle *N. asperus* Zone, at approximately 1100m and 1131m in Kyarra with Wyrallah has been investigated.

The spore pollen assemblages have been examined closely and there is nothing that could be used to correlate these two seams with Wyrallah. However, 1100m and 1131m are the two non-marine assemblages within the otherwise marginal marine Middle *N. asperus* Zone. Coal development would be better under wholly non-marine conditions.

In Wyrallah, there are four non-marine assemblages within the Middle *N. asperus* Zone, viz. 887m, 918m, 953m and 991m. As there is no sample between 887m and 918m, it is uncertain whether these are two separate non-marine events or a single, large non-marine unit.

It is impossible to determine which, if any, of the four non-marine assemblages in Wyrallah might correlate with the two in Kyarra. The evidence here is far too limited. The two coal seams may have split to produce additional seams in Wyrallah. There may be additional non-marine events in Wyrallah which are not represented in Kyarra. Moreover, the top of the Middle *N. asperus* Zone may not be present in Wyrallah. It will require other evidence to correlate the coal seams in Kyarra with Wyrallah.

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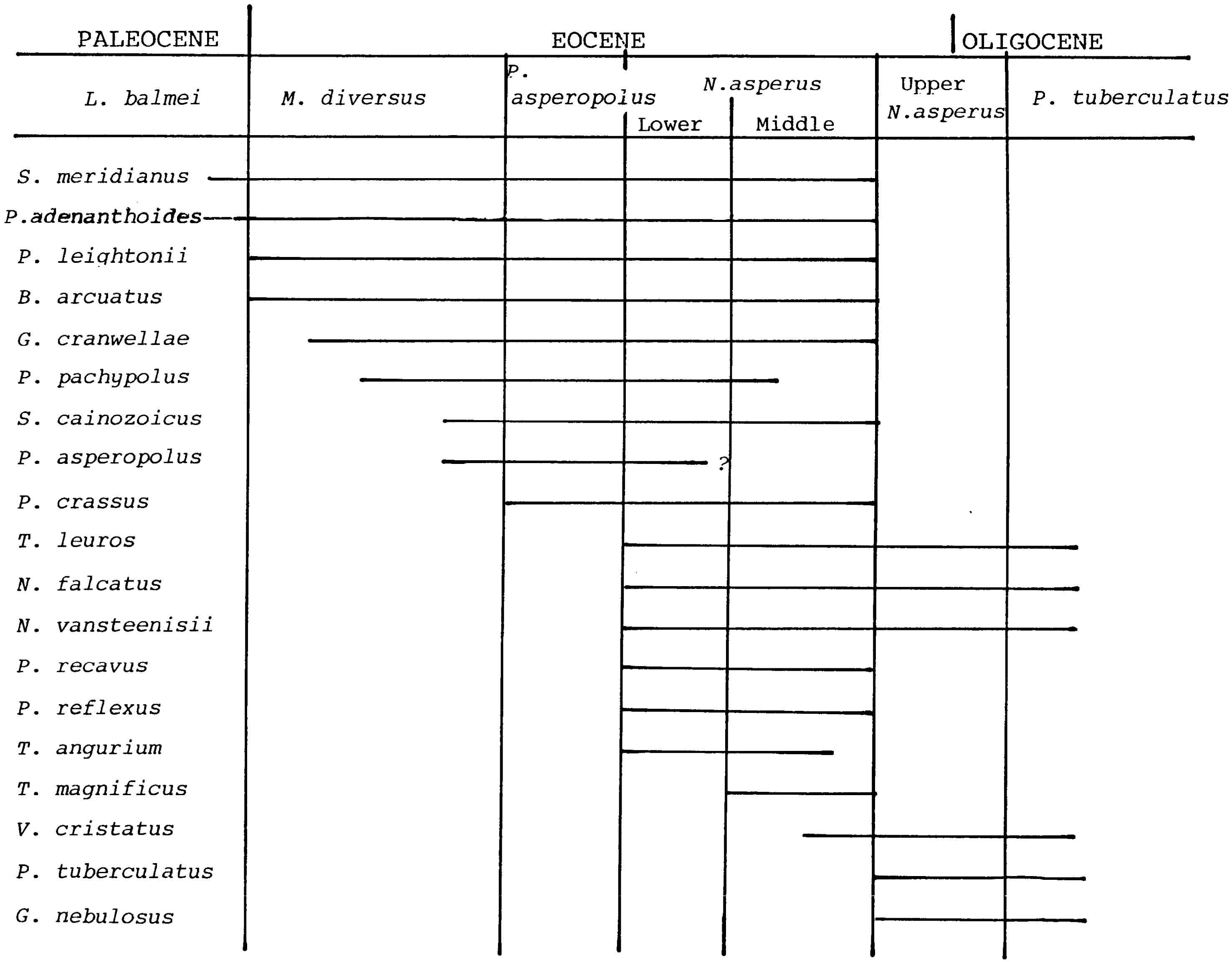

FIGURE 1: SPORE POLLEN RANGE CHART
From Stover & Partridge (1973, 1982) and Partridge (1976).

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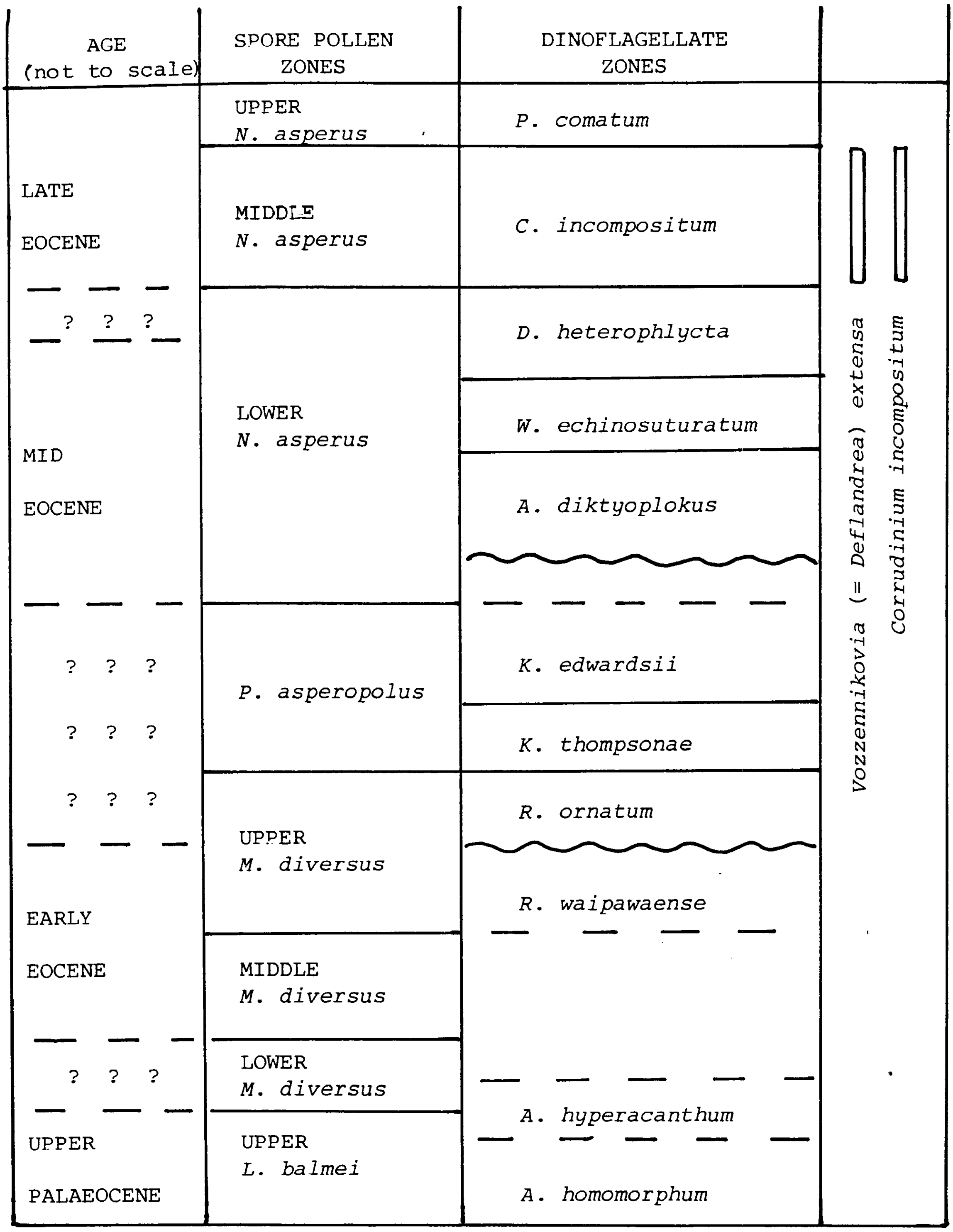

FIGURE 2: DINOFLAGELLATE RANGE CHART
From Stover, Helby & Partridge, 1979.

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SIDEWALL CORES

Depth in metres: 1013.0, 1017.0, 1020.0, 1024.0, 1026.5, 1074.0, 1098.0, 1100.0, 1106.0, 1118.0, 1122.5, 1127.5, 1131.0, 1148.5, 1164.5, 1166.0

SPORES
Baculatisporites disconformis 3
Cyathidites australis
Gleicheniidites circinidites 1
Laevigatosporites ovatus 1
Polypodiidites sp.
Verrucosisporites cristatus 3

GYMNOSPERM POLLEN
Araucariacites australis 1
Dacrycarpites australiensis 5
Lygistepollenites florinii 3
Microcachryidites antarcticus 1
Parvisaccites catastus 3
Phyllocladidites mawsonii 3
P. palaeogenicus 6
Podocarpidites spp.
Podosporites microsaccatus

ANGIOSPERM POLLEN
Banksieaeidites arcuatus 3
Beaupreaidites elegansiformis 3
B. verrucosus 3
Cupanieidites orthoteichus 3
Ericipites crassiexinus 3
Gephyrapollenites cranwellae 3
Gothanipollis bassensis 3
Granodiporites nebulosus 3
Haloragacidites harrisii 3
Ilexpollenites anguloclavatus 3
Liliacidites sp.
Malvacipollis diversus 3
M. subtilis 3
Milfordia homeopunctata 3
Myrtaceidites parvus 2
Nothofagidites asperus 3
N. brachyspinulosus 3
N. emarcidus 3
N. falcatus 3
N. flemingii 3
N. goniatus 3
N. vansteenisii 3
Periporopollenites demarcatus 3
P. vesicus 3
Polycolpites esobalteus 3
Proteacidites adenanthoides 3
P. annularis 3
P. asperopolus 3
P. bremerensis 4
P. crassus 3
P. cumulus 4
P. ivanhoensis 2
P. leightonii 3
P. obscurus 3
P. pachypolus 3
P. psuedomoides 3
P. recavus 3
P. reflexus 3
P. stipplatus 3
P. tuberculatus 3
Proteacidites spp.
Santalumidites cainozoicus 3
Simplicepollis meridianus 3
Sparganiaceaepollenites robustisporis 2
Tetracolporites palynius 4
Tricolporites adelaidensis 4
T. angurium 3
T. leuros 3
T. sphaericus 3
Triorites magnificus 3
Triporopollenites ambiguus 4
Unidentified tricolpate/tricolporates

DINOFLAGELLATES
Corrudinium incompositum 9
Deflandrea phosphoritea 8
Impagidinium dispertitum 9
Impagidinium sp.
Operculodinium centrocarpum 8
Operculodinium sp.
Spiniferites ramosus 8
Tectatodinium cf. *T. pellitum* 8
Vozzhennikovia extensa 9
Unidentified dinos

Spore pollen concentration
Spore pollen preservation
Abundance of plant tissue
Dinoflagellate concentration
Dinoflagellate preservation

SPORE POLLEN ZONE	DINOFLAGELLATE ZONE
Upper *N. asperus*	? *P. comatum*
Middle *N. asperus*	*P. incompositum*
Lower *N. asperus*	

Key to Symbols:
● good: above average
o average
ε poor: below average
? exceedingly poor: trace occurrence

References:
1 Dettmann, 1963
2 Martin, 1973
3 Stover & Partridge, 1973
4 Stover & Partridge, 1982
5 Cookson & Pike, 1953
6 Cookson & Pike, 1954
7 Lentin & Williams, 1977
8 Stover & Evitt, 1978

KYARRA No. 1 - SUMMARY OF STRATIGRAPHIC PALYNOLOGY.

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