Geological Survey of Victoria

PALYNOLOGICAL EXAMINATION OF SAMPLES FROM THE NEPEAN 57 BORE, SOUTHERN VICTORIA

By V ARCHER

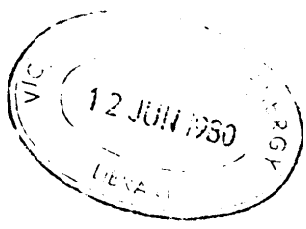
UNPUBLISHED REPORT 1980/44

DEPARTMENT OF MINERALS AND ENERGY

PALYNOLOGICAL EXAMINATION OF SAMPLES FROM THE NEPEAN 37 BORE, SOUTHERN VICTORIA

By V ARCHER

UNPUBLISHED REPORT 1980/44



PALYNOLOGICAL EXAMINATION OF SAMPLES FROM THE NEPEAN 37 BORE, SOUTHERN VICTORIA

Of the samples examined, p , r , t and u are Side Wall Core material, with the remaining samples being taken from conventional cores.
The zonation schemes used in this report are those of Stover and Partridge 1973 (revised Partridge 1975) and Dettmann 1966.

Nepean 37

(a) Depth:165.2 - 170.2m S1432
Lithology:Shelly green clay
Barren

(b) Depth 183 - 188.63m S1433
Lithology Sandstone
Barren

(c) Depth:216.0 - 221.5m S1434
Lithology:Sandy marl
Age Indeterminate
Comments: The sample yielded only a sparse and poorly preserved microfloral assemblage containing the following species:

Alisporites similis (Balme)
Cyathidites australis Couper
C. minor Couper
Malvacipollis subtilis Stover
Nothofagidites emarcidus (Cookson)
N. heterus (Cookson)

(d) Depth:283.7 - 289m S1435
Lithology: Green - grey
Barren

(e) Depth: 338.83 - 344.9m S1436
Lithology: Green - grey clay
Age: Triporopollenites bellus Zone (Middle - late Miocene)

Comments: The sample yielded a sparse microfloral assemblage which included the following species:

Cyathidites minor Couper
Foveotriletes lacunosus Partridge
Graminidites media Cookson
Haloragacidites harrisii (Couper)
Lygistepollenites florinii (Cookson & Pike)
Mantonisporites ornamentalis (Cookson)

Rugulatisporites micraulaxus Partridge
Triporopollenites bellus Partridge

The presence of T. bellus which ranges from the T. bellus Zone indicates the lower limit of the sample. Based on an absence of species from the overlying zone the sample may be no younger than T. bellus Zone, although the sparse microfloral yield may account for this and therefore a conclusive upper limit cannot be given.

(f) Depth: 403 - 408m S1437
Lithology: Green - grey clay
Barren

(g) Depth: 466 - 472m S1438
Lithology: Green - grey clay
Age: Indeterminate
Comments: Only a few, poorly preserved spores were present, with a colour range from dark brown to black.

(h) Depth 530 - 535.68m S1439
Lithology: Grey mudstone
Age: Indeterminate
Comments: The sample contained only a sparse and poorly preserved spore-pollen assemblage.
Identifiable specis are:
Araucariacites australis Cookson
Cyathidites minor Couper
Dacrycarpites australis Cookson & Pike
Haloragacidites harrisii (Couper)
Peromonolites densus Harris
Podocarpidites cf P. ellipticus Cookson
Stereisporites antiquasporites (Wilson & Webster)
Verrucatosporites speciosus Harris

(i) Depth 602.8 - 607.5m S1440
Lithology: Light grey mudstone
Age: Indeterminate.
Comments: This sample yielded only a sparse poorly preserved microfloral assemblage which included rare microplankton.
Species include:
Araucariacites australis Cookson
Cyathidites minor Couper
Haloragacidites harrisii (Couper)
Laevigatosporites ovatus Wilson & Webster
L. major (Cookson)

Microcachryidites antarcticus Cookson
Podocarpidites cf P. ellipticus Cookson
Verrucato sporites speciosus Harris
Deflandrea sp Microplankton
Hystrichosphaeridium sp Microplankton

(j) Depth 665 - 669m S1441
Lithology Dark fossiliferous mudstone
Age: Middle - late Proteacidites tuberculatus Zone (Middle Oligocene - E. Miocene)

Comments: The yield from this sample was poor and contained common microplankton.
Species include:
Araucariacites australis Cookson
Cyathidites minor Couper
C. subtilis Partridge
Haloragacidites harrisii (Couper)
Indusiisporites paleogenicus (Cookson & Pike)
Lycopodiumsporites austroclavatidites (Cookson)
Myrtaceidites parvus/mesocenus (Cookson & Pike)
Nothofagidites asperus (Cookson)
N. emarcidus (Cookson)
N. goniatus (Cookson)
Podocarpidites nanus Partridge
P. ostentatus Partridge
Proteacidites rectomarginus Cookson
Retiacasphaera sp Microplankton
Hystrichosphaeridium sp Microplankton
cf. Schematophora sp Microplankton
Spiniferites sp Microplankton

Cyathidites subtilis ranges from the middle of the P.tuberculatus Zone, and the presence of this species indicates the lower limit of the sample. The poor yield makes determination of the upper limit difficult but no species indicative of the overlying zone were recorded.

(k) Depth 731 - 734m S1442
Lithology: Fossiliferous Sandstone
Age: P. tuberculatus Zone. (Early Oligocene - E. Miocene)

Comments: The yield from this sample was sparse and contained common microplankton. The following species were recorded:

* Foveotriletes lacunosus Partridge
Haloragacidites harrisii (Couper)
Microfoveolatosporis sp

Phyllocladidites mawsonii (Cookson)
Stereisporites antiquasporites (Wilson & Webster)
Verrucatosporites speciosus Harris
Batiacasphaera sp Microplankton
Hystrichosphaeridium sp Microplankton

The range of Foveotriletes lacunosus commences in the P. tuberculatus Zone which indicates a lower limit for the sample.

(1) 794 - 800m S1443

Lithology: Dark sandy mudstone

Age: Upper Nothofagidites asperus Zone (Late Eocene - Early Oligocene)

Comments: This sample yielded a good assemblage of well preserved spores and pollen with some rare microplankton.

Species include:

Arecipites waitakiensis (McIntyre)
Beaupreaidites elegansiformis Cookson
Cyatheidites minor Couper
Dacrycarpites australiensis Cookson & Pike
Dictyophyllidites spp.
Dilwynites granulatus Harris
Gephyrapollenites calathus Partridge
Gleicheniidites sp.
* Granodiporites nebulosus Partridge
Haloragacidites harrisii (Couper)
Laevigatosporites ovatus Wilson & Webster
Lygistepollenites florinii (Cookson & Pike)
Malvacipollis subtilis Stover
Mantonisporites ornamentalis (Cookson)
Microcachryidites antarcticus (Cookson)
Myrtaccidites eugeniioides (Cookson & Pike)
Nothofagidites asperus (Cookson)
N. brachyspinulosus (Cookson)
N. deminutus (Cookson)
N. emarcidus (Cookson)
N. falcatus (Cookson)
N. flemingii (Couper)
N. heterus (Cookson)
Osmundacidites wellmanii Couper
Periporopollenites demarcatus Stover
P. vesicus Partridge
Peromonolites densus Harris

Phyllocladidites mawsonii (Cookson)
Podosporites microsaccatus (Couper)
Podocarpidites exiguus Harris
P. nanus Partridge
P. ornatatus Partridge
Polycolpina chenopodiaceoides Martin
Proteacidites annularis (Cookson)
P. latrobensis Harris
P. obscurus (Cookson)
P. pseudomoides Stover
P. rectomarginus Cookson
P. stipplatus Partridge
P. truncatus (Cookson)
* P. tuberculatus Cookson
Rouseisporites sp
Sapotaceoidaepollenites rotundus Harris
Stereisporites antiquasporites (Wilson & Webster)
Trilites tuberculiformis Cookson
Triorites minor Couper
Triporoletes adelaidensis Harris
T. leuros Partridge
T. sphaericus Cookson
Triporopollenites scabratus (Couper)
Verrucatosporites speciousus Harris
Verrucosisporites kopukuensis (Couper)
Baltisphaera sp Microplankton
Hystrichosphaeridium sp Microplankton

The ranges of two species, Proteacidites tuberculatus and Granodiporites nebulosus commence within the Upper N asperus Zone and there is an absence of any species characteristic of the overlying zone.

(m) Depth 829 - 835m
Lithology brown clay.
Age: Indeterminate
Comments: The sample yielded a poor spore-pollen assemblage
Species recorded are:

Cyathidites minor Couper
Dacrycarpites australiensis Cookson & Pike
Haloragacidites harrisii (Couper)
Ischyosporites sp
Laevigatosporites major (Cookson)

Microcachryidites antarcticus (Cookson)
Nothofagidites deminutus (Cookson)
N. emarcidus (Cookson)
N. heterus (Cookson)
Peromonolites densus Harris
Podocarpidites nanus Partridge
Trilites tuberculiformis Cookson
Verrucatosporites speciosus Harris
Verrucosisporites kopukuensis (Couper)

(n) Depth 859 - 864m Stage
Lithology: Dark mudstone
Age:? Upper [illegible] zone (Age ?)

Comments: Sample yielded a good, well-preserved spore-pollen assemblage, with rare microplankton.
The following species were recorded:
Aglaoreidia qualumis Partridge

Camarazonosporites sherlockensis Harris
Cyathidites australis Couper
C. minor Couper
C. porospora Martin
Dacrycarpites australiensis Cookson & Pike
Dilwynites granulatus Harris
Ericipites crassiexinous Harris
Haloragacidites harrisii (Couper)
Ischyosporites sp
Kuylisporites waterbolkii Potonié
Laevigatosporites major (Cookson)
Lygistepollenites florinii (Cookson & Pike)
Malvacipollis subtilis Stover
Mantonisporites ornamentalis (Cookson)
Microcachryidites antarcticus (Cookson)
Myrtaceidites verrucosus Partridge
Nothofagidites asperus (Cookson)
N. brachyspinulosus (Cookson)
N. deminutes (Cookson)
N. emarcidus (Cookson)
N. falcatus (Cookson)
N. flemingii (Couper)
N. goniatus (Cookson)

N. heterus (Cookson)
Peromonolites densus Harris
Phyllocladidites mawsonii (Cookson)
Podocarpidites nanus Partridge
P. ostentatus Partridge
Proteacidites crassus Cookson
P. obscurus (Cookson)
P. pseudomoides Stover
P. rectomarginus Cookson
Stereisporites antiquasporites Wilson & Webster
Tricolpites reticulatus Cookson
Tricolporites adelaidensis Harris
T. leuros Partridge
Trilites tuberculiformis Cookson
Verrucosisporites kopukuensis (Couper)
Batiacasphaera sp Microplankton

The zone determination is based on the absence of species indicative of the underlying Middle N. asperus Zone.

(o) Depth 922 - 928m S1445
Lithology Brown-grey sand stone
Age: Middle N. asperus Zone (Middle - late Eocene)

Comments: The sample yielded a moderate microfloral assemblage (grains a yellowish-brown colour) which consisted of the following species:

Arecipites waitakiensis (McIntyre)
Camarazonosporites sherlockensis Harris
Cupanieidites orthoteichus (Cookson & Pike)
Cyathidites minor Couper
Dacrycarpites australiensis Cookson & Pike
Haloragacidites harrisii (Couper)
Laevigatosporites major (Cookson)
Malvacipollis subtilis Stover
Microcachryidites antarcticus (Cookson)
Nothofagidites brachyspinulosus (Cookson)
N. deminutus (Cookson)
N. emarcidus (Cookson)
N. falcatus (Cookson)
N. flemingii (Couper)
N. heterus (Cookson)

Periporopollenites demarcatus Stover
Phyllocladidites mawsonii (Cookson)
Podocarpidites ostentatus Partridge
Proteacidites annularis (Cookson)
P. obscurus (Cookson)
* Santalumidites cainozoicus Cookson
Tricolporites leuros Partridge
* T. sphaerica Cookson
Trilites tuberculiformis Cookson
Triporopollenites scabratus (Couper)
Verrucosisporites kopukuensis (Couper)

The zone is determined by the presence of Santalumidites cainozoicus, a species which ends its range in the Middle N. asperus Zone and Tricolporites sphaerica, which ranges from this Zone.

(p) Depth 947.5m S1964
Lithology Carbonaceous clay
Age: Middle N asperus Zone (Middle-late Eocene)

Comments: The sample yielded a moderate - poor spore-pollen assemblage which was poorly preserved (brownish-yellow in colour) and contained rare microplankton. Species include the following:

Banksieaeidites elongatus Cookson
Beaupreaidites elegansiformis Cookson
Clavifera triplex (Bolkovitina)
Cupanieidites orthoteichus (Cookson & Pike)
Cyathidites minor Couper
Haloragacidites harrisii (Couper)
Illexpollenites anguloclavatus McIntyre
Laevigatosporites major (Cookson)
Lygiste pollenites florinii (Cookson & Pike)
Malvacipollis subtilis Stover
Microcachryidites antarcticus (Cookson)
Myrtaceidites parvus/mesonesus (Cookson & Pike)
Nothofagidites brachyspinulosus (Cookson)
N. deminutus (Cookson)
N. emarcidus "
N. goniatus "
N. heterus "
Periporopollenites demarcatus Stover
Phyllocladidites mawsonii (Cookson)
Podosporites microsaccatus (Couper)

Proteacidites annularis (Cookson)

P. leightonii Stover

P. pachypolus Cookson & Pike

Schizosporis parvus Cookson & Dettmann

Triorites magnificus Cookson

Deflandrea sp Microplankton

Hystrichosphaeridium sp Microplankton

Triorites magnificus is a zone indicator species for the middle N asperus Zone.

(q) Depth 985 - 989m S1226

Lithology: Sandy lignecus clay

Age: Middle N. asperus Zone

Comments: The sample yielded a good, well preserved spore-pollen assemblage containing rare microplankton.

Species include:

Haloragacidites harrisii (Couper)

Malvacipollis subtilis (Stover)

Nothofagidites brachyspinulosus (Cookson)

N. deminutus (Cookson)

N. emarcidus "

N. heterus "

Proteacidites annularis (Cookson)

P. grandis (Cookson)

P. latrobensis Harris

P. pachypolus Cookson & Pike

Sapotaceoidaepollenites rotundus Harris

Tricolporites adelaidensis Harris

Triporopollenites scabratus (Couper)

* Triorites magnificus Cookson

Hystrichosphaeridium sp Microplankton

The presence of T. magnificus is an indicator of the Middle N. asperus Zone.

(r) Depth 1007.9m S1565

Lithology: Coal

Age: Lower N. asperus Zone (Middle Eocene)

Comment: The sample yielded a good well preserved spore-pollen assemblage which contained the following species:

Banksieidites elongatus Cookson

Proteaidites adelosus Partridge

B. elegansiformis Cookson

B. verrucosus (Cookson)

Camarozonosporites sherlockensis Harris
Cupanieidites orthoteichus (Cookson & Pike)
Gephyrapollenites cranwellae Stover
Haloragacidites harrisii (Couper)
Laevigatosporites major (Cookson)
Microcachryidites antarcticus (Cookson)
Nothofagidites deminutus (Cookson)
N. emarcidus (Cookson)
N. goniatus "
N. heterus "
* Periporopollenites vesicus Partridge
Phyllocladidites mawsonii (Cookson)
Proteacidites annularis (Cookson)
* P. asperopolus Stover & Evans
P. concretus Harris
* P. crassus Cookson
P. lautus Harris
P. pachypolus Cookson & Pike
* Tricolporites leuros Partridge
Sapotaceoidaepollenites rotundus Harris
Santalumidites cainozoicus Cookson

The ranges of Proteacidites asperopolus and P. crassus terminate in the Lower N. asperus Zone, while Tricolporites leuros and Periporopollenites vesicus begin their ranges within this zone.

(s) Depth 1047 - 1048m S1565
Lithology Dark mudstone
Age: Indeterminate
Comments: A few black spores only were recorded from this depth.

(t) Depth 1070.5m S1566
Lithology Grey, sandy clay
Age: Tricolpites longus Zone (Late Cretaceous, Maastrichtian)
Comments: The sample contained a moderate poorly preserved spore-pollen assemblage, with rare microplankton.
Species include:
Araucariacites australis Cookson
Camarozonosporites sp
* Gambierina rudata Stover (frequent)
Gleicheniidites sp
Laevigatosporites major (Cookson)
Lyristepollenites florinii (Cookson & Pike)

Nothofagidites brachyspinulosus (Cookson)
N. endurus (Cookson)
* N. senectus Dettmann & Playford
Osmundacidites wellmanii Couper
Podocarpidites cf P. elipticus Cookson
Podosporites microsaccatus (Couper)
* Proteacidites amolosexinus Dettmann & Playford
Rouseisporites reticulatus Pocock
Schizosporis parvus Cookson & Dettmann
Stereisporites antiquasporites Wilson & Webster
Tricolpites gillii Cookson
Tricolpites cf T. remarkensis Harris
Isugapollenites trilobatus (Balme)
Odontochitina cf O. cribropoda Microplankton

Remanié Muskoisporites gonwanensis Balme & Hennelly Permian
Vestigisporites sp Permian

Zone determination is based on the frequent occurrence of Gambierina rudata which is characteristic of this zone, the presence of Proteacidites amolosexinus and Nothofagidites senectus whose ranges terminate within this zone, and Odontochitina cf O. cribropoda which does not extend beyond the Late Cretaceous.

(x) Depth 1086.1m S1567
Lithology: Fawn sandy clay.
Age: N. senectus Zone - T. longus Zone (Santonian - Campanian)
Comments: This sample contained a poor, badly preserved spore-pollen assemblage which included the following species.
Cyathidites minor Couper
Laevigatosporites major (Cookson)
Nothofagidites brachyspinulosus (Cookson)
* N.senectus Dettmann & Playford
Osmundacidites wellmanii Couper
Podocarpidites cf P. ellipticus Cookson
* Proteacidites amolosexinus Dettmann & Playford
* Tricolporites gillii Cookson
Simplice pollis meridianus Harris

The range of zones for this sample is determined by the presence of Tricolporites gillii and Nothofagidites senectus which range from the N. senectus Zone, and Proteacidites amolosexinus whose range terminates within the I. longus Zone.

(v) Depth 1105.1m S1449

Lithology: Sandy grey clay with some coal.

Age: Base C. paradoxa Zone, D. filosus Unit (Middle Albian).

Comments: The sample contains a good though poorly preserved spore-pollen assemblage with rare microplankton. The following species are present.

Alisporites grandis (Cookson)
Araucariacites australis Cookson
Baculatisporites comaumensis (Cookson)
Ceratosporites equalis Cookson & Dettmann
Cicatricosisporites australiensis (Cookson)
C. ludbrooki Dettmann
Classopollis cf C. classoides (Pflug)
Contignisporites fornicatus Dettmann
* Coptospora paradoxa (Cookson & Dettmann)
Crybelosporites striatus (Cookson & Dettmann)
Cyathidites australis Couper
C. minor Couper
* Dictyotosporites speciosus Cookson & Dettmann
Foraminisporis assymetricus (Cookson & Dettmann)
F. dailyi (Cookson & Dettmann)
Foveosporites parviretus (Balme)
Ginkgocycadophytus nitidus (Balme)
Indusiisporites paleogenicus (Cookson & Pike)
Klukisporites scaberis (Cookson & Dettmann)
Lycopodiumsporites austroclavatidites (Cookson)
Microcachryidites antarcticus (Cookson)
Neoraistrickia truncatus (Cookson)
Osmundacidites wellmanii Couper
Podocarpidites cf P. ellipticus Cookson
P. exiguus Harris
Podosporites microsaccatus (Couper)
Rouseisporites reticulatus Pocock
Stereisporites antiquasporites
Tripartina cf T. variabilis Maljavikina
Tsugaepollenites cf T. segmentatus (Balme)

Hystrichosphaeridium sp Microplankton.

Remainié:? Lunatisporites sp Permian.

(w) Depth 1163.4m S1451

Lithology Dark claystone

Age: Base C. paradoxa Zone (Middle Albian)

Comments: The sample yielded a good, well-preserved spore assemblage which contained rare microplankton. The following species were recorded:

Arcellites reticulatus (Cookson & Dettmann)

Alisporites grandis (Cookson)

A. similis (Balme)

Balmeisporites holodictyus Cookson & Dettmann

Ceratosporites equalis Cookson & Dettmann

Classopollis cf C. classoides (Pflug)

Cicatricosisporites hughesi Dettmann

Crybelosporites striatus (Cookson & Dettmann)

Cyathidites australis Couper

C. asper (Bolkhovitina)

C. minor Couper

* Dictyotosporites speciosus Cookson & Dettmann

Dictyophyllidites crenatus Dettmann

Foraminisporis dailyi (Cookson & Dettmann)

Foveasporites canalis Balme

Foveotriletes parviretus (Balme)

Gleicheniidites sp

Indusiisporites paleogenicus (Cookson & Pike)

Leptolepidites verrucatus Couper

Lycopodiumsporites austroclavatidites (Cookson)

Osmundacidites wellmanii Couper

*Pilosisporites notensis Cookson & Dettmann

Podocarpidites exiguus Harris

Stereisporites antiquasporites Wilson & Webster

Trilobosporites purverulentus (Verbitskaya)

* T. trioreticulosus Cookson & Dettmann (C. paradoxa)

Tripartina cf T. variabilis Maljavikina

Tsugaepollenites cf T. segmentatus (Balme)

Hystrichosphaeridium sp Microplankton.

The ranges of Dictyotosporites speciosus and Pilosisporites notensis terminate within the lower C. paradoxa Zone while Trilobosporites trioreticulosus commences with this zone.

(x) Depth 1269 - 1272m S1456

Lithology: Mudstone

Age: Dictyotosporites speciosus Zone - base C. paradoxa Zone, F. assymetricus Unit - D. filosus Unit, (Middle Aptian - middle Albian)

Comments: The sample yielded a moderate - poor spore assemblage of low species diversity, the predominant species being Gymnosperms. The following species were recorded.

Alisporites grandis (Cookson)

A. similis (Balme)

Araucariacites australiensis (Cookson)

Cicatricosisporites australiensis (Cookson)

Classopollis cf C. classoides (Pflug)

Cyathidites australis Couper

C. minor Couper

Dictyophyllidites crenatus Dettmann

* Dictyotosporites filosus Dettmann

D. speciosus Cookson & Dettmann

Foraminisporis dailyi (Cookson & Dettmann)

F. wonthaggiensis (Cookson & Dettmann)

Klukisporites scaberis (Cookson & Dettmann)

Leptolepidites major Couper

L. verrucatus Couper

Lycopodiumsporites austroclavatidites (Cookson)

L.nodosus Dettmann

Microcachryidites antarcticus (Cookson)

Osmundacidites wellmanii Couper

Podocarpidites cf P. ellipticus Cookson

P. exiguus Harris

Rouseisporites radiatus Dettmann

Tsugaepollenites dampieri (Balme)

The Zone determination is based on the range of D. filosus.

REFERENCES

DETTMANN, M.E., 1968. Palynological Zonation of Lower Cretaceous Sediments in Woolsthorpe No. 1, Garvoc No. 1 and Purrumbete No. 1 Wells. Report for Shell Development (Australia) Pty Ltd. (unpublished).

———————— 1969. Palynological Zonation of Lower Cretaceous Sediments of the Otway Basin Victoria. Ibid. July 1969.

———————— & PLAYFORD, G., 1969. Palynology of the Australian Cretaceous: A review in Stratigraphy and Paleontology Essays in Honour of Dorothy Hill (K.S.W. Campbell Ed.) A.N.U. Press, Canberra.

PARTRIDGE, A.D., 1975. Symposium on Bass Strait Geology (Unpublished Report).

STOVER, L.E. & PARTRIDGE, A.D., 1973. Tertiary & Late Cretaceous Spores and Pollen from the Gippsland Basin, Southeastern Australia. Proc. R. Soc. Vict. 85 (2) : 237-286.