



PALYNOLOGICAL REPORT ON ENDEAVOUR GANNET No. 1 WELL

At the request of Endeavour Oil Company N.L. ten samples of sidewall cores taken from Gannet No.1 well in Bass Strait have been examined palynologically. The samples are documented as being representative of the Latrobe Valley Coal Measures, which occupies the interval between (2242 and 2318 feet, and the underlying Strzelecki Group from between \* (2318 and 4786 feet. However, some confusion exists as to the precise sampling depths of the sidewall cores. The Schlumberger depths ascribed to the samples are thought to be at variance with lithological data as follows (see also Company's letter 2nd September, 1970):

<u>Schlumberger</u> <u>S.W.C. No.</u>	<u>Schlumberger</u> <u>Depth (ft.)</u>	<u>"Possible Depth"</u>
1	4563	4563
2	4425	4425
3	4268	4271
5	3915	4085
7	3053	3918
10	2310	3452
12	2285	3053
14	2266	2864
16	2247	2420
18	4271	2310

The samples were prepared for palynological analyses by a method involving the use of hydrofluoric acid, zinc bromide, and short exposure to ultrasonic vibration. The resultant residues were found to contain good concentrations of moderately carbonised plant matter including fair to poorly preserved spores, pollen grains, and fragments of wood and cuticle. Further treatment of the residues was considered unnecessary and portion of each was mounted in unstained glycerine jelly on glass microscope slides for microscopic examination.

Specific analyses of the microfloras indicates that the sequence

examined is of Lower Cretaceous age with a possible extension into the

\* Note that the top of Latrobe is now taken as 2215 feet and the top of the Strzelecki as 2317 feet.

Upper Jurassic. Moreover, the microfloras enable palynological subdivision of the sequence in terms of Dettmann and Playford's (1969) spore-pollen zonation scheme of the eastern Australian Cretaceous. Sediments represented by sidewall cores nos. 3,5,7,10,12,14, and 16 are considered to be from the basal portion of the Cyclosporites hughesi Subzone and thus of Neocomian-Aptian age (see Dettmann and Playford 1969, Evans and Hawkins 1967). The horizon from which sidewall core no. 8 was taken is referred to the uppermost Jurassic-lowermost Cretaceous Crybelosporites stylosus Zone, and sidewall cores nos. 1 and 2 although lacking zonal indices are shown to be of uppermost Jurassic or lowermost Cretaceous age. None of the samples contain plant microfossils of Upper Cretaceous or Tertiary age.

#### Microfloral Assemblages

The majority of samples provided abundant plant material including reasonably diverse spore-pollen assemblages. Preservation quality of the contained microfossils is fair to poor and the majority of forms present in the individual assemblages are identifiable at specific level. Specific content of each assemblage is documented below with reference to the sidewall core no. rather than depth.

#### Sidewall core 1

The sample provided a high yield of plant microfossils including fair to poorly preserved spores and pollen grains. Species identified include:

Spores Aequitriradites spinulosus (Cookson & Dettmann)  
Baculatisporites comaumensis (Cookson)  
Ceratosporites equalis Cookson & Dettmann  
Biretisporites spectabilis Dettmann  
Contignisporites cooksonii (Balme)  
Coronatispora perforata Dettmann  
Cyathidites australis Couper  
C. minor Couper  
Dictyophyllidites crenatus Dettmann

Foramnisporites dailyi (Cookson & Dettmann)  
Klukisporites scaberis (Cookson & Dettmann)  
Leptolepidites verrucatus Couper  
Lycopodiumsporites austroclavatioides (Cookson)  
L. facetus Dettmann  
L. nodosus Dettmann  
Neoraistrickia truncata (Cookson)  
Staplinisporites caninus (Balme)  
Stereisporites antiquasporites (Wilson & Webster)  
Pollen Araucariacites australis Cookson  
Alisporites grandis (Cookson)  
A. similis (Balme)  
Microcachrydioides antarcticus Cookson  
Podocarpidites cf. ellipticus Cookson  
Tsugaepollenites dampieri (Balme)  
Incertae Schizosporis spriggi Cookson & Dettmann  
Sedis

Sidewall core 2

Plant material extracted from the sample includes fairly common spores and pollen grains together with plentiful woody fragments. Spores and pollen grains exhibit fair to poor preservation and include the following species:

Spores Baculatisporites comauensis (Cookson)  
Ceratosporites equalis Cookson & Dettmann  
Contignisporites cooksonii (Balme)  
Cyathidites australis Couper  
C. minor Couper  
Dictyophyllidites crenatus Dettmann  
Foramnisporites dailyi (Cookson & Dettmann)  
Klukisporites scaberis (Cookson & Dettmann)  
Leptolepidites verrucatus Couper  
L. major Couper  
Lycopodiumsporites circolumenus (Cookson & Dettmann)  
L. eminulus Dettmann  
L. reticulumsporites (Rouse)  
L. austroclavatioides (Cookson)  
Neoraistrickia truncata (Cookson)  
Pollen Alisporites grandis (Cookson)  
Araucariacites australis Cookson  
Microcachrydioides antarcticus Cookson  
Podocarpidites cf. ellipticus Cookson

Sidewall core 3

A profuse assemblage of fair to poorly preserved plant microfossils was extracted from the sample. The following species of spores and pollen grains were identified:

- Spores Aequitriradites spinulosus (Cookson & Dettmann)  
Baculatisporites comaumensis (Cookson)  
Biretisporites spectabilis Dettmann  
Ceratosporites equalis Cookson & Dettmann  
Cicatricosisporites ludbrooki Dettmann  
Contignisporites cooksonii (Balme)  
C. multimuratus Dettmann  
Coronatispora perforata Dettmann  
Cyclosporites hughesi (Cookson & Dettmann)  
Cyathidites australis Couper  
C. minor Couper  
Dictyotosporites speciosus Cookson & Dettmann  
Foraminisporis dailyi (Cookson & Dettmann)  
Klukisporites scaberis (Cookson & Dettmann)  
Leptolepidites verrucatus Couper  
L. major Couper  
Lycopodiumsporites austroclavatidites (Cookson)  
Murospora florida (Balme)
- Pollen Alisporites grandis (Cookson)  
Araucariacites australis Cookson  
Microcachryidites antarcticus Cookson  
Podocarpidites cf. ellipticus Cookson  
Tsugaepollenites dampieri (Balme)

Sidewall core 5

Abundant plant material composed chiefly of woody tissue was obtained from the sample. Spores and pollen grains are infrequent and exhibit fair preservation. The following species are represented in the residue:

- Spores Cicatricosisporites australiensis (Cookson)  
Cyathidites australis Couper  
C. minor Couper  
Dictyotosporites speciosus Cookson & Dettmann  
Lycopodiumsporites austroclavatidites (Cookson)  
Stereisporites antiquasporites (Wilson & Webster)
- Pollen Araucariacites australis Cookson  
Podocarpidites cf. ellipticus Cookson

Sidewall core 7

A diverse assemblage of the following species of fairly preserved spores and pollen grains was extracted from the sample:

- Spores Aequitriradites spinulosus (Cookson & Dettmann)  
Baculatisporites comaumensis (Cookson)  
Biretisporites spectabilis Dettmann

Cicatricosisporites ludbrooki Dettmann  
Coronatispora perforata Dettmann  
Cyathidites asper (Bolkhovitina)  
C. australis Couper  
C. minor Couper  
Dictyophyllidites crenatus Dettmann  
Dictyotosporites speciosus Cookson & Dettmann  
Foraminisporis wonthaggiensis (Cookson & Dettmann)  
Klukisporites scaberis (Cookson & Dettmann)  
Leptolepidites major Couper  
Lycopodiumsporites austroclavatidites (Cookson)  
Matonisporites cooksoni Dettmann  
Stereisporites antiquasporites (Wilson & Webster)  
Pollen Alisporites grandis (Cookson)  
A. similis (Balme)  
Araucariacites australis Cookson  
Podocarpidites cf. ellipticus Cookson  
Tsugaepollenites dampieri (Balme)  
Incertae Schizosporis spriggi Cookson & Dettmann  
Sedis

Sidewall core 10

Fair to poorly preserved spores and pollen grains occur commonly in the residue which also contains abundant wood and cuticular tissue.

The following forms were identified:

Spores Baculatisporites comaumensis (Cookson)  
Biretisporites spectabilis Dettmann  
Coronatispora perforata Dettmann  
Cyclosporites hughesi (Cookson & Dettmann)  
Cyathidites australis Couper  
C. minor Couper  
Dictyotosporites speciosus Cookson & Dettmann  
Foraminisporis dailyi (Cookson & Dettmann)  
Klukisporites scaberis (Cookson & Dettmann)  
Lycopodiumsporites austroclavatidites (Cookson)  
L. circolumenus Cookson & Dettmann  
Leptolepidites major Couper  
L. verrucatus Couper  
Pollen Alisporites grandis (Cookson)  
A. similis (Balme)  
Classopollis cf. classoides Pflug  
Microcachryidites antarcticus Cookson  
Podocarpidites cf. ellipticus Cookson  
Remanié Nuskoisporites sp. - Permian

Sidewall core 12

The fair to poorly preserved microflora is restricted in species. Other plant matter occurring in the sample includes wood and cuticular fragments.

- Spores Geratosporites equalis Cookson & Dettmann  
Coronatispora perforata Dettmann  
Cyclosporites rughesi (Cookson & Dettmann)  
Cyathidites australis Couper  
C. minor Couper  
Dictyotosporites speciosus Cookson & Dettmann  
Klukisporites scaberis (Cookson & Dettmann)  
Leptolepidites major Couper  
L. verrucatus Couper  
Lycopodiumsporites austroclavatidites (Cookson)  
L. eminulus Dettmann  
Neoraistrickia truncata (Cookson)  
Stereisporites antiquasporites (Wilson & Webster)
- Pollen Araucariacites australis Cookson  
Alisporites grandis (Cookson)  
Podocarpidites cf. ellipticus Cookson

Sidewall core 14

A diverse assemblage of fair to poorly preserved spores and pollen grains and abundant cuticular material was extracted from the sample. Spore-pollen species identified include:

- Spores Aequitriradites spinulosus (Cookson & Dettmann)  
Baculatisporites comamensis (Cookson)  
Geratosporites equalis Cookson & Dettmann  
Cicatricosisporites ludbrooki Dettmann  
Contignisporites cooksoni (Balme)  
Cyathidites australis Couper  
C. minor Couper  
C. punctatus (Delcourt & Sprumont)  
Foraminisporis dailyi (Cookson & Dettmann)  
Lycopodiumsporites austroclavatidites (Cookson)  
L. nodosus Dettmann  
Neoraistrickia truncata (Cookson)  
Stereisporites antiquasporites (Wilson & Webster)
- Pollen Alisporites grandis (Cookson)  
Araucariacites australis Cookson  
Classopollis cf. classoides Pflug  
Cycadopites nitidus (Balme)  
Microcachryidites antarcticus Cookson  
Podocarpidites cf. ellipticus Cookson
- Incertae Schizosporis reticulatus Cookson & Dettmann
- Sedis S. spriggi Cookson & Dettmann

Sidewall core 16

The sample yielded a restricted microflora in which the following species were identified:

Spores	<u>Baculatisporites comaumensis</u> (Cookson) <u>Cooksonites variabilis</u> Pocock <u>Cyathidites australis</u> Couper <u>C. minor</u> Couper <u>C. punctatus</u> (Delcourt & Sprumont) <u>Cicatricosisporites australiensis</u> (Cookson) <u>Dictyotosporites speciosus</u> Cookson & Dettmann <u>Foraminisporis dailyi</u> (Cookson & Dettmann) <u>Ischyosporites punctatus</u> Cookson & Dettmann <u>Leptolepidites major</u> Couper <u>Lycopodiumsporites austroclavatidites</u> (Cookson) <u>Neoraistrickia truncata</u> (Cookson) <u>Pilosporites notensis</u> Cookson & Dettmann
Pollen	<u>Classopollis</u> cf. <u>classoides</u> Pflug <u>Microcacnrydites antarcticus</u> Cookson <u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson
Incertae Sedis	<u>Schizosporis spriggi</u> Cookson & Dettmann

Sidewall core 18

The residue contains abundant plant matter including the following species of fair to poorly preserved spores and pollen grains:

Spores	<u>Aequitriradites spinulosus</u> (Cookson & Dettmann) <u>Baculatisporites comaumensis</u> (Cookson) <u>Ceratosporites equalis</u> Cookson & Dettmann <u>Cyclosporites hughesi</u> (Cookson & Dettmann) <u>Crybelosporites stylosus</u> Dettmann <u>Cyathidites australis</u> Couper <u>C. minor</u> Couper <u>Dictyophyllidites crenatus</u> Dettmann <u>Dictyotosporites speciosus</u> Cookson & Dettmann <u>Klukisporites scaberis</u> (Cookson & Dettmann) <u>Leptolepidites verrucatus</u> Couper <u>Lycopodiumsporites austroclavatidites</u> (Cookson) <u>L. circoluzenus</u> Cookson & Dettmann <u>L. nodosus</u> Dettmann <u>L. facetus</u> Dettmann <u>Murospora florida</u> (Balme) <u>Neoraistrickia truncata</u> (Cookson) <u>Stereisporites antiquasporites</u> (Wilson & Webster)
Pollen	<u>Alisporites grandis</u> (Cookson) <u>A. similis</u> (Balme) <u>Cycadopites nitidus</u> (Balme) <u>Microcacnrydites antarcticus</u> Cookson <u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson

Discussion

All of the samples examined yielded microfloras characteristic

of an uppermost Jurassic - Lower Cretaceous age, and are thus considered to be representative of horizons of the Strzelecki Group as penetrated by Gannet No.1 well.

Sidewall cores nos. 3,5,7,10,12,14, and 16 provided microfloras diagnostic of the lower portion of the Neocomian - Aptian Cyclosporites hughesi Subzone (see Dettmann and Playford 1969), and are typified by the presence of Dictyotosporites speciosus, Cyclosporites hughesi, Cooksonites variabilis, and Murospora florida. In a quantitative sense, the microfloras are characterized by an abundance of cyathaceous, osmundaceous, lycopodiaceous, and podocarpaceous elements, a feature consistent with microfloras from the basal portion of the Cyclosporites hughesi Subzone in the Gippsland and Otway Basins.

Sidewall core 18 yielded Crybelosporites stylosus, Dictyotosporites speciosus, Murospora florida, and Cyclosporites hughesi in an assemblage containing extremely abundant osmundaceous, lycopodiaceous forms together with common cyatheaceous, podocarpaceous, and auracariaceous elements. The sediment is accordingly assigned to the Crybelosporites stylosus Zone of uppermost Jurassic - lowermost Cretaceous age (see Dettmann and Playford 1969).

Sidewall cores nos. 1 and 2 contain spore-pollen suites which are of uppermost Jurassic - lowermost Cretaceous aspect. The presence of Staplinisporites caminus in sidewall core 1 and the lack of Dictyotosporites speciosus, Crybelosporites stylosus, and Cicatricosisporites may be significant in suggesting an Upper Jurassic rather than a Lower Cretaceous age. Quantitative features of the microfloras include abundance of osmundaceous, lycopodiaceous, and bisaccate podocarpaceous forms; cyatheaceous types are also plentiful.



Sampling Depths of Sidewall Cores

Although the palynological evidence provides no exact estimate of the sampling depth of each sidewall core, it establishes that all cores are from the Strzelecki Group. Furthermore, the stratigraphical sequence of the sidewall cores can be broadly interpreted from their zonal attribution as detailed below.

<u>Spore-pollen Zone</u>	<u>Schlumberger S.W.C. No.</u>
<u>Cyclosporites hughesi</u>	3,5,7,10,12,14,16.
<u>Crybelosporites stylosus</u>	18
uppermost Jurassic - lowermost Cretaceous	1,2

References

- Dettmann, M.E. and Playford, G. 1969. Palynology of the Australian Cretaceous - A Review; in Stratigraphy and Palaeontology, Essays in Honour of Dorothy Hill (K.S.W. Campbell Ed.); Chapter 9; 174-210. Aust. Nat. Univ. Press, Canberra.
- Evans, P.R. and Hawkins, P.J. 1967. The Cretaceous below the Murray Basin. Bur. Min. Resourc. Aust. Rec. 1967/137 (unpubl.).

21st October, 1970.

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