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PALYNOLOGICAL REPORT ON WOODSIDE COLLIERS HILL No.1 WELL
4416 - 5550 FEET

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Samples of six sidewall cores taken from between 4416 and 5550 feet in Woodside Colliers Hill No.1 well were submitted for palynological examination and age determination by Woodside Oil N.L. The six samples are from the "Golden Beach Beds", an informally named rock unit which occupies about 1500 feet of sediment in the well (4132 - 5612 feet) where it underlies the Latrobe Valley Coal Measures and younger Tertiary sediments.

The six samples were processed for palynological examination by a method involving the use of hydrofluoric acid and zinc bromide (digestion and separation of mineral matter from plant material) followed by brief exposure to ultrasonic vibration. The resultant residues were then treated with Schulze solution for five minutes, washed in distilled water, briefly immersed in 1% ammonium hydroxide, and thoroughly washed in distilled water before final mounting in glycerine jelly on glass microscope slides.

All samples yielded plant material , but in two of the samples (from 4807 feet and 5040 feet) the plant material is sparse and consists entirely of small wood fragments. The other four samples (4416 feet, 4540 feet, 5425 feet, and 5550 feet) yielded abundant plant material including reasonably well preserved spores, pollen grains, plant microfossils of uncertain affinity and possibly referable to the Actritarcha, together with wood and cuticular fragments. Specific analyses of the spore-pollen bearing samples indicates that the enclosing sediments are of Upper Cretaceous age. Moreover, the plant microfossil assemblages provide a basis for subdivision of the Colliers Hill Upper Cretaceous sequence in terms of the spore-pollen zones defined by Dettmann and Playford (1969) for the Upper Cretaceous of western Victoria.

As will be shown subsequently, sediments in Colliers Hill No.1 well between 4416 feet and 4540 feet are attributable to the Tricolpites pachyexinus Zone and are thus of Senonian age. Underlying strata between 5425 feet and 5550 feet are referable to the Appendicisporites distocarinatus Zone of ?Cenomanian -?Turonian age. As noted previously, sediments at 4807 feet and 5040 feet failed to yield stratigraphically significant plant microfossils, and thus the precise age of the horizons cannot be adduced by palynological means.

Productive horizons of the Colliers Hill sequence yielded in addition to Upper Cretaceous plant microfossil assemblages, recycled spores and pollen grains of Permian, Triassic, and Lower Cretaceous age. The recycled forms, although rarely common, indicate that Permian, Triassic, and Lower Cretaceous strata provided at least some of the source material of the Colliers Hill No.1 Upper Cretaceous sequence.

PLANT MICROFOSSIL ASSEMBLAGES AND AGE DETERMINATIONS

A. 4416 - 4540 feet

4416 feet

Plant microfossils extracted from the sample are reasonably well preserved showing indications of mild carbonisation effects. The following species of spores and pollen grains were obtained:

Spores:
- Baculatisporites comaumensis (Cookson)
- Ceratosporites sp.
- Cyathidites australis Couper
- C. minor Couper
- Laevigatosporites ovatus Wilson & Webster
- Kraeuselisporites papillatus Harris

Pollen:
- Alisporites cf. grandis Cookson
- Araucariacites australis Cookson
- Cycadopites nitidus (Balme)
- Microcachryidites antarcticus Cookson

Phyllocladidites mawsonii Cookson
Podosporites microsaccatus (Couper)
Podocarpidites ellipticus Cookson
Podocarpidites exiguus Harris
Proteacidites amolosexinus Dettmann & Playford
P. subscabratus Couper
Stephanoporopollenites obscurus Harris
Tricolpites pachyexinus Couper
T. sabulosus Dettmann & Playford

Remanié: Cicatricosisporites ludbrooki Dettmann - Lower Cretaceous
Pilosisporites parvispinosus Dettmann - Lower Cretaceous

4540 feet

Good concnetrations of moderately carbonised spores and pollen grains were obtained from the sample. The following species were identified:

Spores:
Baculatisporites comaumensis (Cookson)
Camarozonosporites ohaiensis (Couper)
Cicatricosisporites cuneiformis Pocock
C. pseudotripartitus (Bolkhovitina)
Cyathidites australis Couper
C. minor Couper
Balmeisporites glenelgensis Cookson & Dettmann
Gleicheniidites circinidites (Cookson)
Kraeuselisporites papillatus Harris
Laevigatosporites ovatus Wilson & Webster
Foraminisporis dailyi (Cookson & Dettmann)
Stereisporites antiquasporites (Wilson & Webster)
S. viriosus Dettmann & Playford

Pollen:
Araucariacites australis Cookson
Cycadopites nitidus (Balme)
Microcachryidites antracticus Cookson
Podocarpidites ellipticus Cookson
P. exiguus Harris
Podosporites microsaccatus (Couper)
Phyllocladidites mawsonii Cookson
Stephanoporopollenites obscurus Harris
Tricolpites pachyexinus Couper
T. sabulosus Dettmann & Playford
T. sp.

Remanié:
Aequitriradites spinulosus (Cookson & Dettmann)
Crybelosporites striatus (Cookson & Dettmann)
Couperisporites sp.
Cicatricosisporites australiensis (Cookson)
C. ludbrooki Dettmann
Rouseisporites simplex (Cookson & Dettmann)
R. radiatus Dettmann

) Lower and/or early Upper Cretaceous

Spore-pollen assemblages at 4416 feet and 4540 feet include Tricolpites pachyexinus, Camarozonosporites ohaiensis, Stereisporites viriosus, and Phyllocladidites mawsonii and lack Nothofagidites spp. The samples are accordingly referred to the Tricolpites pachyexinus Zone of Senonian age (Dettmann and Playford 1969). Moreover the samples are considered to be from the upper part of the zone because of their content of Proteacidites amolosexinus and Tricolpites sabulosus which are now known to have initial appearances near the top of the Tricolpites pachyexinus Zone (cf. Dettmann and Playford 1969).

Recycled spores and pollen grains of Lower (and early Upper) Cretaceous age occur in both samples; they are rare (1%) at 4416 feet but fairly plentiful (7%) at 4540 feet. The microflora from the latter horizon also contains species (Cicatricosisporites cuneiformis, C. pseudotripartitus, Balmeisporites glenelgensis, and Foraminisporis dailyi) that are significantly more abundant than elsewhere from the Victorian Senonian and at least some of the examples may represent secondarily deposited forms.

B. 4807 - 5040 feet

Samples from 4807 feet and 5040 feet yielded small residues of plant material composed entirely of wood fragments. On stratigraphic grounds and other palynological evidence documented herein the age of the samples can be given no more precisely than ?Cenomanian - ?Turonian-?Senonian.

C. 5425 - 5550 feet

5425 feet

Abundant plant material including fairly preserved spores and pollen grains was extracted from the sample. Other plant microfossils recovered include fairly common Amosopollis cruciformis, a species possibly referable to the Acritarcha, and common wood and cuticular fragments.

The following types were identified in the microflora:

Spores: Baculatisporites comaumensis (Cookson)
Cicatricosisporites sp.
Cyathidites australis Couper
C. minor Couper
Foveotriletes sp.
Kraeuselisporites jubatus Dettmann & Playford
Laevigatosporites ovatus Wilson & Webster
Lycopodiumsporites austroclavatidites (Cookson)
L. facetus Dettmann
Leptolepidites verrucatus Couper
Gleicheniidites cf. circinidites (Cookson)
Rouseisporites reticulatus Pocock
Sestrosporites pseudoalveolatus (Couper)
Stereisporites antiquasporites (Wilson & Webster)

Pollen: Alisporites grandis (Cookson)
Araucariacites australis Cookson
Classopollis cf. classoides Pflug
Cycadopites nitidus (Balme)
Ephedra notensis Cookson
Microcachryidites antarcticus Cookson
Podocarpidites cf. ellipticus Cookson
Tricolpites pannosus Dettmann & Playford
T. spp.

?Acritarcha: Amosopollis cruciformis Cookson & Balme

Remanié: Dictyotosporites speciosus Cookson & Dettmann - Lower Cretaceous
Lundbladispora denmeadi (de Jersey) - Triassic
Nuskoisporites sp. - Permian

5550 feet

Spores and pollen grains extracted from the sample occur commonly and are fairly preserved. Other plant material identified includes wood and cuticular fragments. The following spore-pollen types were identified:

Spores: Baculatisporites comaumensis (Cookson)
Cicatricosisporites australiensis (Cookson)
Cyathidites australis Couper
Crybelosporites striatus (Cookson & Dettmann)
Gleicheniidites circinidites (Cookson)
Klukisporites scaberis (Cookson & Dettmann)
Laevigatosporites major (Cookson)
Lycopodiumsporites austroclavatidites (Cookson)
Stereisporites antiquasporites (Wilson & Webster)

Pollen: Alisporites grandis (Cookson)
Araucariacites australis Cookson
Classopollis cf. classoides Pflug
Microcachryidites antarcticus Cookson
Podocarpidites cf. ellipticus Cookson
Tricolpites pannosus Dettmann & Playford

Tricolpites sp.
Triorites minor Couper
Remanié: Aratrisporites sp. - Triassic
Dictyotosporites speciosus - Lower Cretaceous

Samples at 5425 feet and 5550 feet are referred to the Appendicisporites distocarinatus Zone because of their content of Tricolpites pannosus Kraeuselisporites jubatus, Triorites minor, and Amosopollis cruciformis, and lack of species diagnostic of the succeeding Clavifera triplex and Tricolpites pachyexinus Zones. The samples are thus of ?Cenomanian - ?Turonian age. Amosopollis cruciformis, which occurs frequently in the sample from 5425 feet, has been tentatively referred to the Acritarcha although Cookson & Balme (1962) suggest a comparison with angiosperm morphology. Recycled forms of Permian, Triassic, and Lower Cretaceous age occur infrequently (less than 1%) in both samples.

CONCLUSIONS

Sediments examined from the "Golden Beach Beds" in Colliers Hill No.1 well are shown to be of Upper Cretaceous age and to include horizons of the Senonian Tricolpites pachyexinus Zone (4416 - 4540 feet) and the ?Cenomanian - ?Turonian Appendicisporites distocarinatus Zone (5425 - 5550 feet). The intervening Turonian Clavifera triplex Zone was not recognized in the material studied but may be present within the interval 4540 feet - 5425 feet. On account of the presence of reworked plant microfossils within the material examined, source material of the sequence is suggested to have derived, at least in part, from Permian, Triassic, and Lower Cretaceous strata .

The tentative correlation (Fide letter 20th March, 1970) of the top of the "Golden Beach Beds" (4132 feet) in Colliers Hill No.1 well with sediments at 5378 feet in Esso Barracouta A-1 (Gippsland Shelf No.1) is not supported by the palynological evidence. From data provided by Douglas (1966)

and his determination of Nothofagidites spp. in cores 14 to 21 (5656 - 8701 feet) of Barracouta A-1, it is apparent that the Barracouta microfloras are at the oldest referable to the Nothofagidites Microflora of Dettmann and Playford (1960). Sediments containing the Nothofagidites are considered to be of Senonian - uppermost Cretaceous age and succeed the Tricolpites pachyexinus Zone (see Dettmann and Playford 1969, Table 9:4). Thus, the Colliers Hill No.1 sequence between 4416 feet and 5550 feet is older than sediments between 5656 feet and 8701 feet in Barracouta A-1.

REFERENCES

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