

PALYNOLOGICAL REPORT ON PECTEN 1A WELL,

3618 FEET - 3833 FEET



PE990117

by

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In a further attempt to locate the Cretaceous/Tertiary boundary in Shell Pecten 1A well, five samples of sidewall cores from between 3618 feet and 3833 feet were submitted by Shell Development (Australia) Pty. Ltd. for palynological examination. The samples were treated according to the method outlined previously (Dettmann 1967c) and the preservation of the contained plant microfossils is documented in Table 1. The well preserved microfloras obtained from the four productive samples include abundant spores and pollen grains and rare microplankton and the species identified are documented below. Assessment of this data in the light of present knowledge on the distinction between Australian Cretaceous and Tertiary sediments by palynological means indicates that the horizon at 3618 feet is of Middle Paleocene age, whilst sediments between 3695 feet and 3833 feet cannot be more precisely dated than uppermost Cretaceous or earliest Tertiary.

MICROFLORAL CONTENT AND AGE OF SAMPLES

3618 feet, sidewall core 16

✓ 2 lower 2 3 4 5

The well preserved microflora extracted from the sample includes abundant spores and pollen grains and rare microplankton. The following forms were identified:

- Spores: Cyathidites australis Couper
C. splendens Harris
Camazonosporites amplus (Stanley)
C. bullatus Harris
Exavigatosporites major (Cookson)
Stereisporites antiquasporites (Wilson & Webster)
Trilites tuberculiformis Cookson
- Pollen: ✓ Dacrydioidites balmei Cookson
D. ellipticus Harris
Microcachryidites antarcticus Cookson
Nothofagidites emarcidus (Cookson)
Phyllocladidites mawsonii Cookson
Podocarpidites ellipticus Cookson
Podosporites microsaccatus (Couper)
Proteacidites parvus Cookson
- P. reticulosabratus Harris ??
P. cf. rectomarginus Cookson
P. subscabratus Couper
P. sp.
- Tricolpites gillii Cookson
✓ Triorites edwardsii Cookson & Pike
aff. T. edwardsii Cookson & Pike
Triorites harrisii Couper
- Microplankton: ✓ Baltisphaeridium sp.
- Deflandrea bakeri Deflandre & Cookson

The microflora obtained from the sample lacks diagnostic components of Dettmann and Playford's (1968) Nothofagidites Microflora and exhibits close conformity with Harris's (1965) Triorites edwardsii Assemblage. On this basis an early Tertiary (Middle Paleocene) age is assigned to the sediment.

3695 feet

The sample, which had previously been washed for foraminiferal examination, yielded a small residue of plant microfossils. Species identified include the following forms of spores, pollen, and microplankton:

- Spores: Laevigatosporites ovatus Wilson & Webster
 Pollen: Nothofagidites emarcidus (Cookson) *Nov* *L. balmei*
Phyllocladidites mawsonii Cookson *small*
 * Podocarpidites exiguus Harris
Proteacidites parvus Cookson
P. subscabratus Couper
 * Triorites edwardsii Cookson & Pike
 aff. T. edwardsii Cookson & Pike
 Microplankton: Cyclonephelium retiintextum Cookson

With the exception of Proteacidites parvus, all forms identified in the sample are known from both late Cretaceous and early Tertiary deposits. Proteacidites parvus may be indicative of a Tertiary age (see Dettmann 1967 c).

3797 feet, sidewall core 15.

Abundant spores and pollen grains and rare microplankton occur in the sample. The following forms were identified:

- Spores: Baculatisporites comamensis Cookson *small to*
Cyathidites australis Couper *small to large*
 - Camarozonosporites amplus (Stanley)
 cf. Camarozonosporites sp.
Ceratospores sp.
Gleicheniidites circinidites (Cookson)
Laevigatosporites major (Cookson)
L. ovatus Wilson & Webster
Stereisporites antiquasporites (Wilson & Webster)
 Pollen: - Dacrydiiumites balmei Cookson
D. ellipticus Harris
Microcachryidites antarcticus Cookson
Nothofagidites emarcidus (Cookson)
N. senectus Dettmann & Playford
Phyllocladidites mawsonii Cookson
Podocarpidites ellipticus Cookson
Podosporites microsaccatus (Couper)
Polyporina fragilis Harris
Proteacidites adenanthoides Cookson
P. parvus Cookson
 - P. scaboratus Couper
P. subscabratus Couper
P. sp.
 - Tricolpites gillii Cookson
T. cf. fissilis Couper
T. pachyexinus Couper
 - Triorites edwardsii Cookson & Pike
 aff. T. edwardsii Cookson & Pike
 Microplankton: Epicephalopyxis indentata Deflandre & Cookson
 Ramanie Nuskoisporites sp. - Permian
Striatites sp. - Permian

The sample contains the first occurrences of Dacrydiiumites balmei and D. ellipticus both of which are characteristic components of Harris's (1965) Middle Paleocene Triorites edwardsii Assemblage. It also yielded Tricolpites pachyexinus which, however, is suggestive of a late Cretaceous age (see Dettmann 1967a,b).

3833 feet, sidewall core 12

Two samples from this depth were examined. One had previously been washed for foraminiferal studies and no plant microfossils were observed in the palynological residue. The other sample yielded abundant plant material including the following species of well preserved spores, pollen, and microplankton:

and
T. longus to T. gillii
D. pellucida

- Spores:** Baculatisporites comamensis (Cookson)
Cyathidites australis Couper
C. splendens Harris
- Camarozonosporites amplus (Stanley)
cf. Camarozonosporites sp.
Densosporites velatus Weyland & Krieger
- Lavignatosporites ovatus Wilson & Webster
Lycopodiumsporites sp.
- Gleichentidites circinidites (Cookson)
- Ornamentifera sentosa Dettmann & Playford
- Pollen:** Araucariacites australis Cookson
- Bacrydiumites Florinii Cookson & Pike
Microcachryidites antarcticus Cookson
Nothofagidites cf. brachyspinulosus (Cookson)
* N. emarcidus (Cookson)
* N. senectus Dettmann & Playford
- Phyllocladidites mawsonii Cookson
Podocarpidites ellipticus Cookson
- Proteacidites amolosexinus Dettmann & Playford
- P. scabroratus Couper
P. subscabratus Couper
P. sp.
* Tricolpites pachyexinus Couper
- T. sabulosus Dettmann & Playford
aff. Triorites edwardsii Cookson & Pike
- Microplankton:** Deflandrea bakeri Deflandre & Cookson
D. delineata Cookson & Eisenack
D. pellucida Cookson & Eisenack
Svarbardella australina Cookson
- Remanic:** Nuskoisporites sp. - Permian

The spore-pollen assemblage includes Nothofagidites senectus, Ornamentifera sentosa, Proteacidites amolosexinus, Tricolpites pachyexinus, and T. sabulosus and thus exhibits close conformity with the late Cretaceous Nothofagidites Microflora. The microplankton suite, however, includes several forms hitherto known only from Victorian Tertiary deposits. These include Deflandrea bakeri, D. delineata, and Svarbardella australina, all of which are associated with Harris's (1965) Middle Paleocene Triorites edwardsii Assemblage in the basal (4ft. and 6ft. levels) of the Pebble Point Formation (see Cookson 1965, Cookson and Eisenack 1965). It should be emphasized, however, that the lower age limit of these microplankton species (and of Harris's Triorites edwardsii Assemblage) has not yet been fully determined. Thus, on present knowledge, the sediment at 5833 feet may be of late Cretaceous or earliest Tertiary age.

CONCLUSION

On microfossil evidence the Cretaceous/Tertiary boundary in Shell Pecten 1A well lies somewhere between 3908 feet and 3618 feet. Sediments at 3908 feet have been shown to be of uppermost Cretaceous age (Dettmann 1967c) and the horizon at 3618 feet is considered to be of Middle Paleocene age. Deposits examined from 3695 feet, 3797 feet, and 5833 feet contain microfloras that possess characteristics of Victorian uppermost Cretaceous microfossil assemblages and also include the first appearances of certain species that typify Victorian Lower Tertiary assemblages. The age of microfloras possessing these characteristics will undoubtedly be more precisely determined when they are recognised in sediments securely dated by means of marine faunas.

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