



PALYNOLOGICAL EXAMINATION OF TERTIARY SAMPLES  
FROM WELL PECTEN 1A, OTWAY BASIN, AUSTRALIA

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CONTENTS

	Page
SUMMARY	
1. INTRODUCTION	1
2. DISCUSSION OF RESULTS	1
3. CONCLUSION	2
4. REFERENCES	2

ENCLOSURES

1. Palynological Percentage Distribution Chart, Well Pecten 1A.
2. Lower Tertiary Correlation, Otway Basin.

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### SUMMARY

Results of a palynological examination of 11 samples from well Pecten 1A are correlated with the section described on land from the nearby Princetown area. Three correlative horizons appear to be of value for future work.

#### 1. Introduction

Sample material available consisted of 10 sidewall samples of fair to good quality and one core. Plant microfossil content proved to be poor to fair. The majority of the 102 types distinguished could be referred to published species or genera. Nomenclature of these species is adopted mainly from HARRIS (1965). A type collection has been assembled in which 91 species are represented by one or more single grain preparations. All samples were counted and the results are presented as percentages on the accompanying distribution chart (Encl.1).

#### 2. Discussion of Results

The microfloral succession as exhibited on the distribution chart is characterized by striking variations. Since the number of samples is rather small, it is difficult to know how far local environmental changes are responsible for these changes. However, by reference to the microfloral succession described by HARRIS (1965) from the nearby Princetown area, it proved possible to recognize three correlative horizons of probably time-stratigraphic value. In the following the succession encountered in Pecten 1A will be discussed from older to younger.

The sidewall samples at 4022' and 3695' have a similar microflora, characterized by the dominance of Po3.20 (Triorites edwardsii), Po3.21 (Triorites crassipora) and by the absence of many types which are common in the younger samples. Microplankton is present in low percentages and is composed exclusively of two species of Deflandrea. This microflora of this interval corresponds closely with the Triorites edwardsii assemblage zone of HARRIS. Its age is given by HARRIS as Middle Paleocene, but, since the lower limit of the zone has not been defined and the main marker species, Triorites edwardsii, is known to range down into the Upper Cretaceous, the possibility that the interval 3695'-4022' is wholly or partly of Cretaceous age has to be considered. The main evidence against an Upper Cretaceous age is the absence of characteristic Cretaceous microplankton species. It would therefore seem reasonable to correlate both samples with the lower part of the Wangerrip group (Pebble Point Formation and lower part of Dilwyn clay).

The sidewall sample at 3456' shows a dominance of winged Conifer grains as well as an abundance of microplankton, mainly Hystrichosphaerids. It is possible that this reflects a change in facies and the sample cannot be assigned to a zone.

The sidewall samples at 3362' and 3338' show again a markedly different microfloral composition. Po3.19 (Triorites harrisii), Po5.69 (Malvacipollis diversus), Pco.39 (Nothofagidites emarcida) and Pcs.41 (Myrtacidites parvus) are dominant, while microplankton is absent. Both Po3.20 (Triorites edwardsii) and Pcs.60 (Duplopollis orthoteichus) are also absent and this makes the interval hard to place in HARRIS' succession. He recognizes a Triorites edwardsii - Duplopollis orthoteichus concurrent range zone, but the characteristic overlap in the range of these marker species has not been observed in Pecten 1A. However, the presence of Po5.69 (Malvacipollis diversus) and Pcs.41

(Myrtaceidites parvus) renders it more likely that the samples under discussion can be correlated with this transitional zone, rather than with the Triorites edwardsii zone. In this connection it must be emphasized that the pollen content of this interval is poor and that additional counting may very well reveal the presence of the marker species.

The sidewall samples from 3280'-2632' show continuous presence of Pcs.60 (Duplopollis orthoteichus) in addition to the regular presence of Po2.52 (Banksieidites minimus), Po3.92 (Proteacidites ornatus), Po3.61 (Proteacidites dilwynensis), Pcs.51 (Myrtaceidites tenuis), Pcs.45 (Duplopollis major). Microplankton occurs regularly and Hystrichosphaerids are dominant. This assemblage is characteristic for the Duplopollis orthoteichus assemblage zone as defined by HARRIS who considers the zone to be of Upper Paleocene age. This interval is therefore correlatable with the upper part of the Dilwyn clay above the Turritella bed (cf. HARRIS, fig.2). Of special interest is the occurrence of 2% Po3.47 (Proteacidites pachypolus) in the sample at 2632'. This species was originally taken by COOKSON (1954) as index species for "Microflora C". HARRIS, however, would limit its value for correlation to a very broad usage and indicates a range from Upper Paleocene - Upper Eocene. It is therefore striking that, both in Pecten-1A and in the land section studied by HARRIS, the species is restricted to the uppermost part of the Wangerrip group and it would appear that its base occurrence is a valuable correlative horizon of considerable time-stratigraphic significance. In fact, correlation of the sidewall sample at 2632' in Pecten-1A with the Princetown member (HARRIS' sample S 218) is fairly certain on the occurrence of Proteacidites pachypolus alone.

The core at 1892', which is assigned to the Heytesbury group, carries, as would be expected, a different flora, mainly characterized by dominance of Pco.39 (Nothofagidites emarcida), Po3.19 (Triorites harrisii) and Hystrichosphaerids. This assemblage cannot at present be assigned to a floral zone due to lack of information on the younger succession.

The resulting correlation is presented on Enclosure 2. Top Cretaceous is defined in the Princetown area by the contact between Otway group and Wangerrip group and in Pecten-1A by the contact between Curdies formation (Sherbrook group) and Wangerrip group. In the latter well top Curdies had been indicated at 3972' on geological evidence, but palynological data would suggest a slightly lower position, below 4022'. Top Triorites edwardsii zone can not, unfortunately, be accurately placed in either section because of large sample gaps. Base Duplopollis orthoteichus zone and base Proteacidites pachypolus on the other hand are well defined stratigraphically. From the correlation shown it would appear that the interval top Cretaceous - base Duplopollis orthoteichus zone is of approximately equal thickness in both sections, while the interval base Duplopollis orthoteichus zone - base Proteacidites pachypolus is much thicker in Pecten-1A than in the Princetown area.

### 3. Conclusion

A fair measure of agreement exists between the floral succession in the Tertiary of Pecten-1A and on land in the Princetown area. The main correlative horizons which are of value for future work are top Triorites edwardsii zone, base Duplopollis orthoteichus zone and base Proteacidites pachypolus. For more detailed studies an average sampling distance of 50' for sidewall cores is recommended.

### 4. References:

- COOKSON, I.C., 1954 : The occurrence of an older Tertiary microflora in Western Australia.  
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