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1986/73. Geological observations on the Macquarie Harbour Beds at Coal Head, western Tasmania.

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Abstract

Two distinct facies are present in the Tertiary Macquarie Harbour Beds at Coal Head. A lower, coal-bearing sequence, consisting of interbedded sand and silt, was probably deposited under marginal marine conditions, and an upper sand-dominated sequence is of fluviatile origin.

Thin, impersistent coal beds are vitrinite-rich and were mined by convicts in the 1820's.

The sediments belong to the middle *Malvacapollis diversus* Zone (Early Eocene) of Stover and Partridge (1973).

INTRODUCTION

The Macquarie Harbour Beds consist of a series of semi-consolidated sands and gravels, with bands of clay and lignite, extending from the mouth of the Henty River southwards through Macquarie Harbour to the Wanderer River (Scott, 1960). A minimum thickness of 350 m has been determined by drilling north of Strahan (K. D. Corbett, pers. comm.).

Brown coal was noted on the northern shore of Macquarie Harbour in 1815 by Captain James Kelly and coal was first reported in the vicinity of Coal Head by G. W. Evans in 1822 (Bacon, 1985).

The Coal Head area [CP706140] was visited by P. W. Baillie and C. A. Bacon on 6 March 1986 as part of a survey into the coal resources of Tasmania and also as part of studies into Tasmanian onshore and offshore Mesozoic/Cainozoic sedimentary sequences. Palynology was carried out by R. Morgan (palynological/petroleum geological consultant).

FACIES DESCRIPTION

Two distinct facies are present in the Coal Head area. These are:

(1) interbedded sandstone and siltstone with minor coal, and
(2) cross-bedded sandstone

The facies were identified on the basis of differences in composition, grain size, sedimentary structures or bedding type.

Facies 1

This facies includes a variety of lithotypes which include coal, mudstone, siltstone, carbonaceous sandstone and cleaner, often cross-bedded sandstone. Bioturbation is often present, usually in the form of horizontal worm burrows. A continuum from clayey to sandy sediment types is present and begins with sandy streaks in mud and passes into lenticular, wavy and flaser bedding.

Brown coal occurs as thin beds up to 500 mm in thickness. The coaly bands comprise brown coal and carbonaceous shale with occasional black lignitised wood lenses. Maceral analysis (mineral matter free) of a single specimen indicates that the coal consists of 92% vitrinite and 8% inertinite. The whole specimen contained 24% of minerals, including clay, quartz and pyrite.

Three samples were collected and processed for microfloral determination as part of the present study. Raw data are shown as Table 1. Plant cuticle and tracheid are abundant, spores and pollen are common and moderately diverse, and no dinoflagellates were seen. Samples collected from the same strata by Esso in 1971 contained abundant dinoflagellates (L. E. Stover, pers. comm., 1971).

The common bioturbation and the abundance of marine dinoflagellates in some beds, together with the presence of flaser bedding, indicate that this facies was deposited in a marginal marine environment such as a tidal flat.

Facies 2

This facies overlies the previously described sequence, and forms prominent cliffs in the Coal Head area. The facies consists almost entirely of sandstone with large-scale trough cross-bedding (Facies St of Miall, 1977). Beds with planar crossbeds are occasionally present. The sand is usually moderately well-sorted and medium-grained to coarse-grained.

No detailed measurements could be taken in the time available but it was noted that the dominant palaeocurrent direction was strongly unimodal and to the north-west.

It is suggested that the environment of deposition was a sandy braidplain in which deposition usually took place from dunes (lower flow regime).

BIOSTRATIGRAPHY

All samples are assigned to the middle *Malvacapollis diversus* Zone as they lack younger indicators, contain *Tricolpites gillii* (limiting them to the middle *M. diversus* Zone or older), and contain:

Anacolosidites acutullus
Kuylisporites waterbolkii
Lileacidites lanceolatus
Proteacidites clarus
P. kopiensis
P. leightonii
Spinozonocolpites prominatus

all of which limit them to the middle *M. diversus* Zone or younger). *Proteacidites* spp. are common in all samples and *Cupaneidites orthotheichus*, *Intratriporopollenites notabilis* and *Periporopollenites demarcatus* are consistently present.

CONCLUSION

A regressive cycle has been recognised in the Early Eocene sediments of the Coal Head area. Coal-bearing marine sediments are overlain by sandy, braidplain deposits. The cause of the regression is unknown but may be due to:

(a) Eustatic sea level lowering, or
(b) Tectonic uplift.

The sequence is similar in age, environment and content to their correlatives in the Bass Basin - namely the thick major interbedded source/reservoir sections in the Eocene part of the upper Eastern View Group.

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Table 1. SPECIES LIST OF MICROFLORAL ELEMENTS DETERMINED IN PRESENT STUDY.

Anacolosidites acutullus (R)
Australopollis obscurus (R)
Cupanieidites orthoteichus (R)
Cyathidites splendens (R)
Dacrycarpites australiensis (R)
Dilwynites granulatus (R)
Ericipites scabratus (R)
Gleicheniidites circinidites (R)
Haloragacidites harrisii (A)
Intratriporopollenites notabilis (R)
Ischyosporites gremius (R)
Kuylisporites waterbolkii (R)
Laevigatosporites spp. (R)
Liliacidites lanceolatus (R)
Lygistepollenites florinii (R)
Malvacipollis diversus (R)
Malvacipollis subtilis (R)
Nothofagus brachyspinulosus (R)
Nothofagus deminutus (R)
Nothofagus emarcidus/heterus (C)
Nothofagus flemingii (R)
Periporopollenites demarcatus (R)
Phyllocladidites mawsonii (R)
Proteacidites (C)
Proteacidites adenanthoides (R)
Proteacidites clarus (R)
Proteacidites grandis (R)
Proteacidites incurvatus (R)
Proteacidites kopiensis (R)
Proteacidites leightonii (R)
Proteacidites tenuiexinus (R)
Spinizonocolpites prominatus (R)
Stereisporites (Tripunctisporis) punctatus (R)
Stereisporites antiquisporites (R)
Tetracolporites textus (R)
Tricolpites gillii (R)
Tricolpites sp. (R)

(A) = Abundant
(C) = Common
(R) = Rare