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## Highlights

Earlswood Road Cutting and Ferryboat Inn Quarry are the best exposures of a Rhondda Member channel-fill sequence on the south crop of the South Wales Coalfield, and provides important information on the sedimentary evolution of the coalfield.

## Introduction

The cutting at Earlswood roundabout on the A48 road, and a nearby disused quarry, near Briton Ferry, West Glamorgan, Wales [SS 729 946]–[SS 732 939] provide excellent exposures of Upper Carboniferous cyclic, alluvial deposits. Details of the outcrop are provided by Owen *et al.* (1966), Kelling (1971) and Owen (1971d), and the results obtained here were incorporated into the wider, basinal analyses of the Rhondda Member in South Wales by Kelling (1968, 1969).

## Description

About 170 m of the Rhondda Member (South Wales Pennant Formation) are exposed in the road cutting and consist of a series of fining-upwards cycles (Figure 4.21) and (Figure 4.22). At the base of each cycle is a breccia with an erosive base, and containing ironstone and coal pebbles, and 'logs' of fossil wood. This is overlain by medium-grained, cross-bedded sandstones, which in turn are replaced by ripple- and parallel-laminated fine-grained sandstones. The cycle is completed by siltstones, mudstones and eventually a seat earth and coal (this last part of the sequence has sometimes been eroded by the next cycle). The cycles are interpreted as the infills of a succession of fluvial channels. Current directions are remarkably uniform towards the north-west; except at one point, indicating a sediment derivation from the southeast. This is thought to indicate that the river channels were relatively straight, perhaps braided (Kelling, 1968, 1969, 1971).

In contrast to the road cutting, the north face of the disused quarry shows the channels in cross-section. The sloping erosional surfaces and basal breccias are particularly well seen here.

There is no direct biostratigraphical control on the sequence here. However, field relationships indicate that the strata must belong to the lower Rhondda Member, and are thus very late Bolsovian in age (Cleal, 1978).

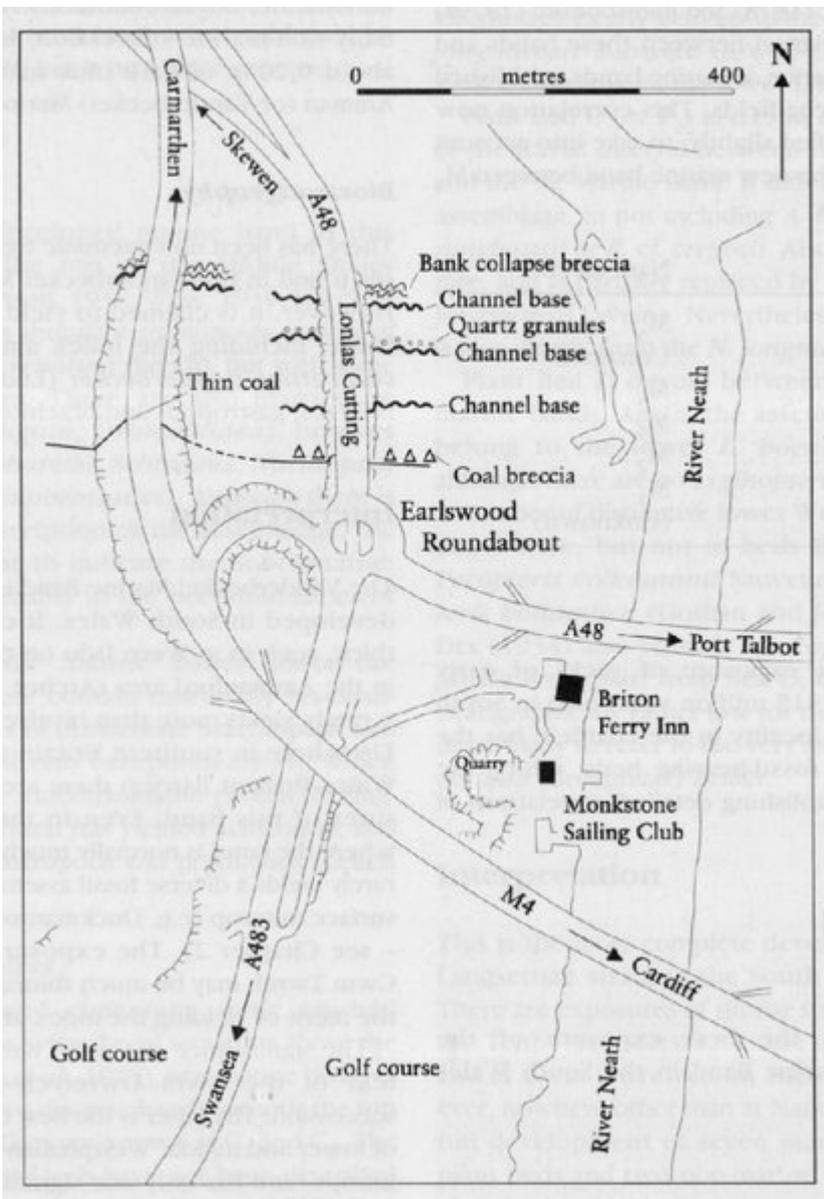
## Interpretation

This is the best and most accessible exposure of the Rhondda Member on the south crop, and provides important sedimentological information. In particular, it indicates that deposition was mainly in low-sinuosity, probably braided channels. This, together with the predominantly north-westerly palaeocurrent directions, suggests that the Earlswood sequence represents a more proximal position within the delta than the deposits found on the north crop, such as at Blaenrhondda. The change in sediment provenance between the Productive Coal and Pennant formations, as clearly demonstrated at Earlswood, is important for understanding the evolution of the South Wales Basin, and represents part of the evidence used by Kelling (1988) to develop the foreland-basin model.

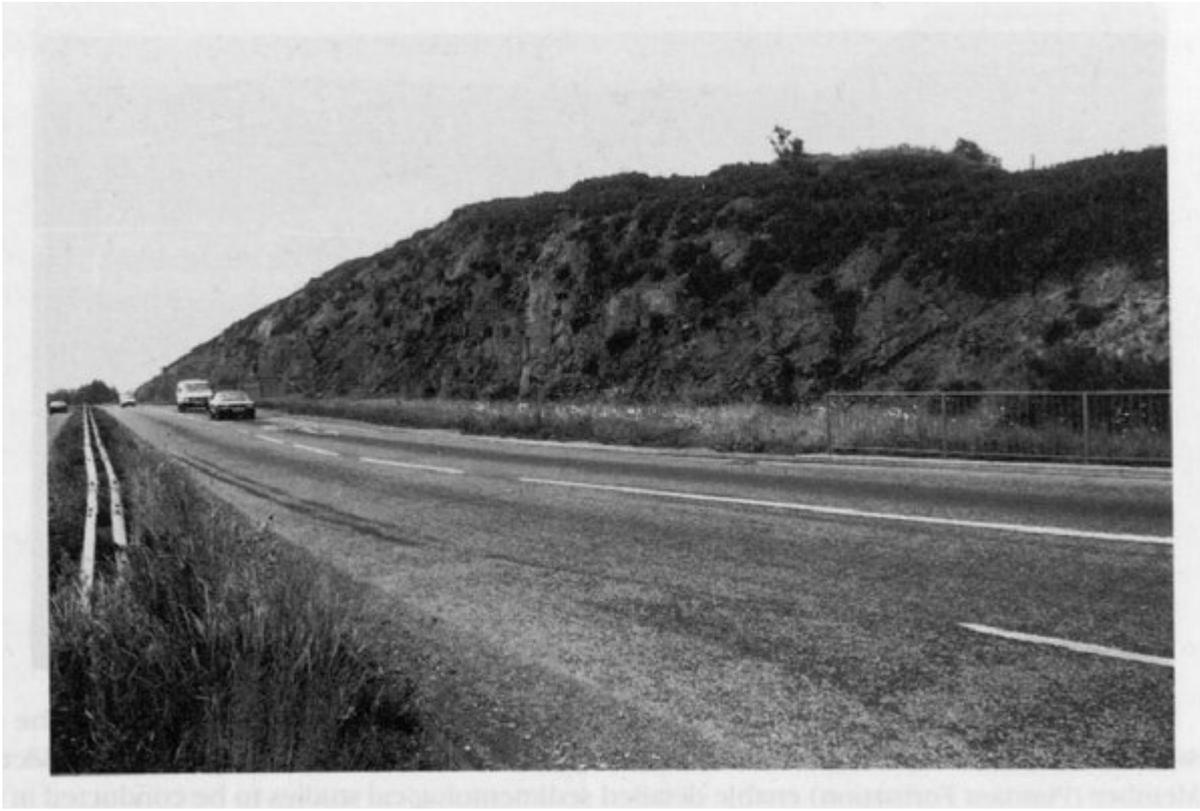
## Conclusions

The sandstones exposed at Earlswood Road Cutting and Ferryboat Inn Quarry belong to the Rhondda Member, and are 308 million years old. It can be demonstrated here that they are the remains of sediment deposited by a river flowing from an upland area in the present-day Bristol Channel. Although such fluvial sandstones are typical of this stratigraphical level within the South Wales Coalfield, this is the best available exposure on the south crop of the coalfield for the study of how they were deposited.

## [References](#)



(Figure 4.21) Exposure of Pennant Formation seen at Earlswood Road Cutting. Based on unpublished information provided by Professor G. Kelling.



(Figure 4.22) Rhondda Member of the Pennant Formation exposed at Earlswood Road Cutting (as seen in 1982). (Photo: C.J. Cleal.)