Nolton Haven

Highlights

Nolton Haven is the only exposure of the South Wales Pennant Formation in Pembrokeshire, and provides an important comparison with coeval strata in the main part of the South Wales Coalfield.

Introduction

This is a coastal exposure of part of the Nolton–Newgale Coalfield, between Druidston and Newgale, Dyfed [SM 861 173]–[SM 854 208], (Figure 4.11). It is a detached area of Coal Measures lying to the north of the main outcrop of Upper Carboniferous in Pembrokeshire. It was mentioned in a number of early geological studies on Pembrokeshire (e.g. Martin, 1806; De la Beche, 1846), and was described in detail by Cantrill *et al* (1916). Jenkins (1962) was the first to establish the complete stratigraphical succession, which provided the background for sedimentological studies by Williams (1966, 1968).

Description

Lithostratigraphy

The Nolton Haven sequence is faulted into five discrete blocks. By correlating these five sequences, Jenkins (1962) established a complete stratigraphical succession of *c.* 600 m thick (a summary log is shown in (Figure 4.12)). Most of the strata are sandstones with subsidiary shales. Williams (1966) also noted nineteen coals, although only four are sufficiently prominent to have been named: the Cliff, Black Cliff, Rickets Head (Figure 4.13) and Madoc's coals.

Williams (1966) interpreted the sequence as being mainly fluvial point-bar accretions, and over-bank and/or crevasse splay deposits. The energy regime was generally high, and probably reflects deposition in an alluvial setting. However, the presence of coal seams suggests that the distributary channels were subject to active confinement, allowing temporarily stable inter-distributary bay environments to develop. There is considerable variation in palaeocurrent vectors, but Williams demonstrated a statistically significant westward transport direction.

Biostratigraphy

Non-marine bivalves

Shells have been recorded from nine horizons in this sequence (Trueman, 1934; Jenkins, 1954, 1960, 1962). They yield assemblages mostly with *Anthraconauta phillipsi* (Williamson) and varying proportions of *A. tenuis* (Davies and Trueman). Jenkins (1962) placed the boundary between the *A. phillipsi* and *A. tenuis* zones somewhere between his beds III and IV at Druidston Haven, since the upper bed has yielded as many *A. tenuis as A. phillipsi.* As with other areas, however, the junction between the two zones is gradational here and it is difficult to fix a boundary accurately (Cleal, 1984a).

The topmost horizon, found near Maidenhall Point, has yielded a slightly different assemblage. It includes *Neuropteris ovata* Hoffmann and *Lobatopteris* cf. *micromiltoni* (Bertrand) Wagner, and indicates the *Linopteris bunburii* Zone (Cleal and Thomas, 1992). On this evidence, it is possible to place the Bolsovian–Westphalian D boundary somewhere between 420 and 550 m above the base of the sequence.

Plant macrofossils

Identifiable plant fossils occur at nine levels in this section, and are listed by Goode (1913), Cantrill *et al.* (1916) and Dix (1934). Most of these horizons yield assemblages including *Laveineopteris rarinervis* (Bunbury) Cleal *et al.,*

Macroneuropteris scheuchzeri (Hoffmann) Cleal *et al., Reticulopteris muensteri* (Eichwald) Gothan, *Mariopteris nervosa* (Brongniart) Zeiller, *Renaultia chaerophylloides* (Brongniart) Zeiller, *Annularia sphenophylloides* (Zenker) Gutbier and *Sphenophyllum emarginatum* Brongniart. Such assemblages belong to the *Paripteris linguaefolia* Zone, and thus indicate the Bolsovian Stage.

Interpretation

This is the only extensive exposure in the Nolton–Newgale Coalfield. Jenkins (1962) mentions some inland exposures between Nolton and Newgale, but they are all much smaller than that available along the coast.

The lithology of the strata is clearly similar to that of the South Wales Pennant Formation (De la Beche, 1846; Cantrill *et al.,* 1916), and the biostratigraphical evidence suggests that they correlate with the Rhondda Beds. The Earlswood Road Cutting (see below) sequence is in many ways similar to that at Nolton Haven, except that the palaeocurrents indicate a southerly rather than easterly derivation of the sediments. Kelling (1974) argued that this either indicated separate drainage systems for the two areas, or that there was a local environmental anomaly in Pembrokeshire, similar to that which he had identified earlier in the Rhondda Beds of the Margam–Maesteg area (Kelling, 1968).

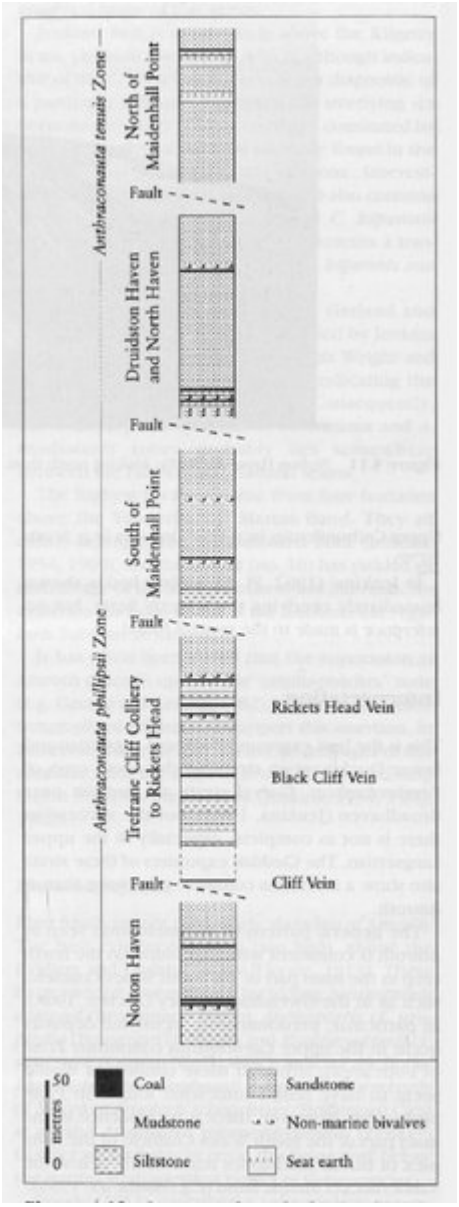
The lack of any good marker horizons at Nolton Haven makes it difficult to compare thicknesses with the main part of the South Wales Coalfield. However, the estimated 600 m thickness of the Nolton Haven sequence suggests that it is significantly thicker than coeval sections further east.

Conclusions

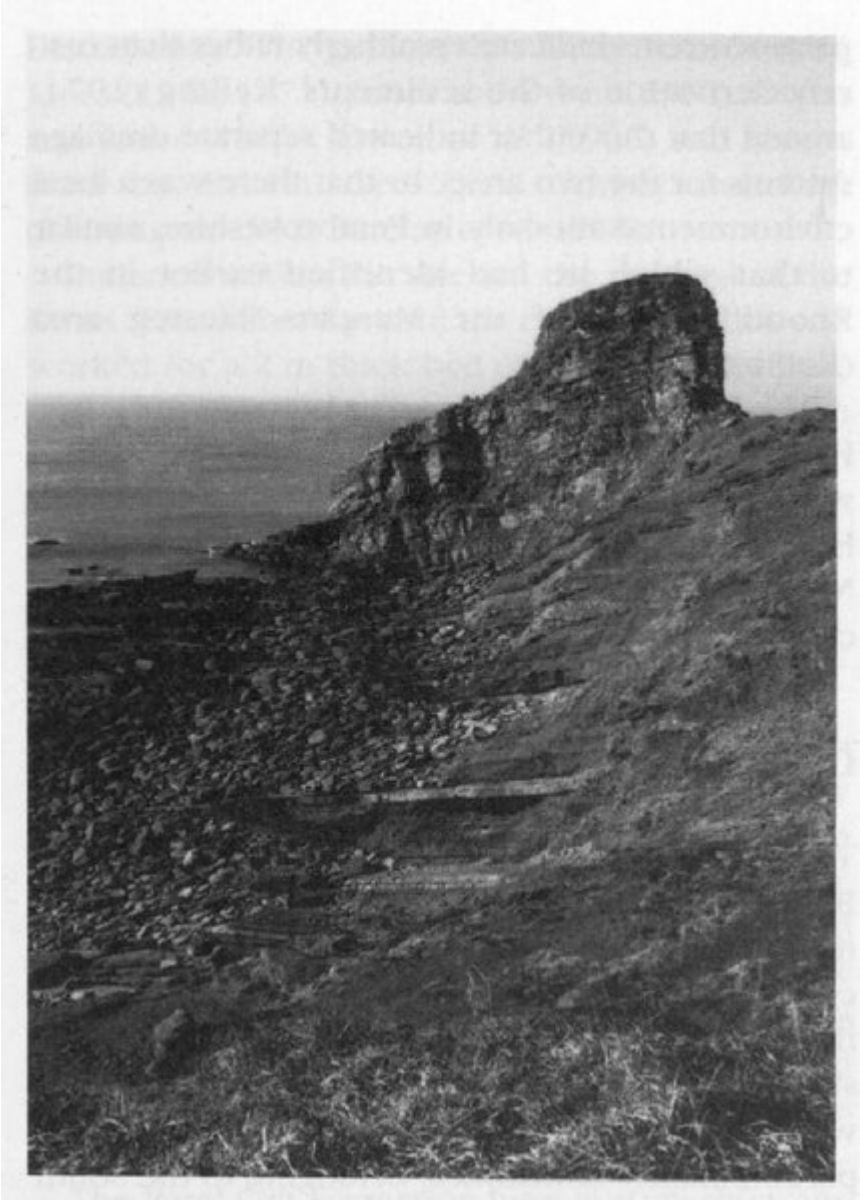
This is the best exposure in Britain of rocks of late Bolsovian to early Westphalian D age, just over 300 million years old. Not only is there extensive outcrop of the rocks, but there are also several beds that have yielded fossils (mostly non-marine bivalve shells and plants), allowing detailed correlations with other successions to be made. The rocks are predominantly sandstones, belonging to the South Wales Pennant Formation, representing sediment deposits of meandering rivers.

References

(Figure 4.11) Nolton Haven GCR site, looking north from near Rickets Head. (Photo: C.J. Cleat.)



(Figure 4.12) Sequence through the South Wales Pennant Formation exposed at Nolton Haven. Based on Jenkins (1962, fig. 7).



(Figure 4.13) Nolton Haven GCR site. Rickets Head. (Photo: C.J. Cleal.)