Byre Burn

Highlights

Byre Burn is the best exposure of the upper beds in the Productive Coal Formation of the Canonbie Coalfield, and contains abundant plant fossils which have considerable biostratigraphical potential.

Introduction

Exposures along the burn and the adjoining River Esk [NY 389 778]–[NY 397 783], from Byreburnfoot to the Byreburnside viaduct, 2 km north of Canonbie, Dumfries and Galloway, Scotland, show Duckmantian strata in the Canonbie Coalfield. The site is described briefly by Peach and Horne (1903) and Lumsden *et al.* (1967), and plant fossils are described by Kidston (1903a, 1903b).

Description

Lithostratigraphy

The site offers a faulted strike section through part of what Peach and Home (1903) refer to as the Byre Burn Group. This corresponds to the upper of the two subdivisions of the Productive Coal Formation in the Canonbie Coalfield (the lower one is Peach and Horne's Rowanburn Coal Group). A detailed log of the exposed section has never been published. However, Peach and Horne provide the log of a nearby borehole which passed through essentially the same succession, which proved to be about 55 m thick.

The succession consists predominantly of grey mudstones, seat earths and coals, with only subsidiary sandstones. Three of the coals were worked here, under the names (in ascending order) Lime, Three-Quarter and Main coals. According to Lumsden *et al.* (1967), the Three-Quarter and Main coals correspond to the Seven Foot and Black Top coals in their standard classification of seams in this coalfield.

The upper part of the succession shows some evidence of red coloration. Whether this is secondary alteration or peneolcontemporaneous is not clear, but it suggests that it is not far below the junction with the Barren Red Formation, as exposed at Jockie's Syke.

Biostratigraphy

Lumsden *et al.* (1967) refer to a grey mudstone exposed here, which contains juvenile shells of *Anthracosia* and *Anthraconaia.* They compared it with a similar fauna found elsewhere in the coalfield below the Archerbeck Coal.

Kidston (1903a, 1903b) described numerous plant fossils from three localities along Byre Burn. Unfortunately, only one specimen was figured (a cordaite seed *Cordaicarpus cordai* Geinitz). The list gives a number of species (e.g. *Lyginopteris hoeninghausii* (Brongniart) Potonié, *Paripteris gigantea* (Sternberg) Gothan) that suggest the Langsettian, while others (e.g. *Alethopteris grandinii* (Brongniart) Goppert) indicate the Westphalian D. The assemblages are in clear need of revision.

Interpretation

This is the only good exposure of the upper part of the Productive Coal Formation in the Canonbie Coalfield. The exact stratigraphical position of these strata cannot yet be fixed by biostratigraphical criteria (see above), but circumstantial evidence suggests they are upper Duckmantian. The fact that there is potential for more refined biostratigraphical work here, using plant macrofossils, as well possibly as non-marine bivalves and even palynology, makes this site of considerable significance.

Conclusions

Byre Burn is the best exposure of rocks of the younger part of the Canonbie Coalfield, about 310 million years old. They contain abundant fossils of plants and freshwater bivalves, which, although in need of revision, are of considerable potential value in establishing the age of the strata.

References