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# Benson's Brook

## Highlights

Benson's Brook is the only good exposure of the Productive Coal Formation in the Titterstone Clee Coalfield, and provides important information concerning the northern margins of the Wales–Brabant Barrier.

## Introduction

Exposures along this stream, on the southern slopes of Titterstone Clee, 8 km ENE of Ludlow, Shropshire [SO 593 772]–[SO 596 773], show the Cornbrook Sandstone and Productive Coal formations of the Titterstone Clee Coalfield. The geology is mentioned by Dixon *in* Kidston *et al.* (1917), and is described in detail by Jones and Owen (1961). The palynomorph biostratigraphy of the section has been discussed by Turner and Spinner (1990).

## Description

### Lithostratigraphy

About 130 m of Upper Carboniferous strata are exposed. The lower 55 m are massive sandstones of the Cornbrook Sandstone Formation, which lie with an uneven erosive base on Lower Old Red Sandstone. The basal beds are thick conglomerates, but the formation fines upwards into pebbly yellow sandstones. Palaeocurrent directions suggest that the sediments were derived from the WNW.

Above the Cornbrook Sandstone are beds of the Productive Coal Formation. The contact between the formations was described by Dixon *in* Kidston *et al.* (1917) as unconformable, but Jones and Owen (1961) argued that the apparent angular discordance was due to faulting. The 75 m of Productive Coal Formation consists mainly of thick seat earths and 'espley' type sandstones, i.e. lenticular bodies of coarse green or white sandstones with conglomerate bands (Hains and Horton, 1969), although there is also a grey mudstone with ironstone nodules. There are a number of coaly smuts, and near the eastern end of the site are the remains of a bell-pit which used to work the Great Coal, although the seam does not crop out in the stream.

### Biostratigraphy

The only biostratigraphical evidence found here are plant macrofossils and palynomorphs. From the mudstone with ironstone nodules in the lower part of the Productive Coal Formation, Jones and Owen (1961) record *Neuropteris gigantea* Sternberg and *Cyclopteris* sp. The former species, which in fact belongs to the form-genus *Paripteris*, occurs mainly in the Langsettian and Duckmantian. However, it is frequently confused with *Paripteris pseudogigantea* (Potonié) Laveine, which does not occur below the Duckmantian. The material in question clearly needs to be revised.

From just below the Great Seam, near the top of the section, Jones and Owen list a more diverse assemblage, including *Sphenophyllum myriophyllum* Crepin, *Fortopteris latifolia* (Brongniart) Boersma and *Neuropteris cf. subplicata* Kidston (probably a synonym of the better documented *Neuropteris chalaridii* Laveine). Particularly if the identity of the neuropterid were confirmed, the assemblage strongly points to the lower *Paripteris linguaeifolia* Zone, indicative of the lower Bolsovian (or very possibly topmost Duckmantian).

Turner and Spinner (1990) have reported palynomorph assemblages of both Langsettian and early Duckmantian age.

## Interpretation

This is the only good exposure of the Productive Coal Formation in the Titterstone Clee Coalfield. The presence of Upper Carboniferous strata in the Clee Hills, which Dixon *in* Kidston *et al.* (1917) claimed to be over 400 m thick, has been used

as evidence of the existence in the early Westphalian of the Herefordshire Straits — a narrow area of deposition crossing the Wales–Brabant Barrier (Wills, 1956). However, Dixon has probably overestimated the thickness of these strata. For instance, he claimed that there is 531 feet (162 m) between the thick sandstones and conglomerates, which probably belong to the Cornbrook Sandstone, and the Great Coal. At Benson's Brook, however, this interval is only 75 m thick; thicknesses of a similar order also occur on the northern side of Titterstone Clee (Greig *et al.*, 1967). Dixon also claimed that 750 feet (229 m) of 'Coal Measures' overlay the Great Coal, but it is far from clear on what evidence he based this. If instead, the 130 m of Cornbrook Sandstone and Productive Coal formations, as seen at Benson's Brook, is taken as nearer to the true thickness for the coalfield, then there is no great discrepancy from what is seen in the nearby Wyre Forest Coalfield (Whitehead and Pocock, 1947). Although there is evidence of a Herefordshire Straits in the very late Westphalian (Cleat, 1987), its existence prior to this is unlikely.

This site also provides important exposures of the Cornbrook Sandstone. Unlike Cornbrook Dingle, no fossils have been found here. However, it clearly shows the erosive base of the formation, and sedimentary structures allow palaeocurrent directions to be determined.

## **Conclusions**

Benson's Brook is the only good exposure of rocks of the Productive Coal Formation in the Titterstone Clee Coalfield. These rocks are about 310 million years old, and represent the deposits formed near the southern edge of the area of deposition known as the Pennine Basin. They are thus much thinner than successions of similar age found further north in the Yorkshire and Lancashire coalfields.

## **[References](#)**