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# Neepsend Brickworks

## Highlights

Neepsend Brickworks is the best site for showing the Greenmoor Rock Formation and is one of the few places where interdistributary bay tidal-flat deposits can be seen in the Langsettian of the Pennine Basin (Figure 10.9).

## Introduction

This disused quarry [SK 353 890] near Woodside, north Sheffield, South Yorkshire, exposes lower Langsettian deposits in the southern part of the Pennine Basin. The geology is described by Eden *et al.* (1957) and Davies (1965, 1966, 1967).

## Description

The exposed sequence here is about 90 m thick (Figure 10.10). The lower 70 m belongs to the Greenmoor Rock Formation, and can be divided into three sedimentary cycles. At the base of each cycle are mudstones, followed by a sequence of alternating mudstones and siltstones. These siltstones show lenticular bedding thought to indicate current and wave action in shallow water. They also show a variety of trace fossils, such as *Arenicolites* burrows and *Limulicubichnus* limulid resting places (Figure 10.11). The siltstones are overlain by thin sandstones, less than 3 m thick. The latter are thinly bedded with small-scale trough cross-lamination, often developing into climbing ripples, which is thought to reflect fast deposition in a low-energy regime. The top of each cycle is marked by a seat earth, indicating emergent conditions. This is also supported by the fact that one of the sandstones also shows soft-sediment deformation structures, probably due to de-watering of the sediment.

The uppermost of these three thin sandstones is capped by a thin coal known as the Better Bed Seam, although it is not well seen here. There then follows 10 m of relatively featureless mudstone, capped by coarse sandstones of the Grenoside Sandstone Formation.

No fossils other than the traces mentioned above have been reported from here. Elsewhere in this part of Yorkshire, however, the Better Bed Seam has yielded miospores of the *Radiizonates aligerens* Zone, indicating the middle Langsettian (Smith and Butterworth, 1967).

## Interpretation

This is the best available site for examining the sedimentology of the Greenmoor Rock. Further north near Halifax, the same interval consists of thick sandstones with large-scale cross-bedding, where it is known as the Elland Flags, and which are thought to be distributary channel deposits. In contrast, the Greenmoor Rock has been interpreted as tidal-flat deposits in a large interdistributary bay.

Each cycle represents a crevasse-splay event, where the bay was flooded to form a lake, and was then progressively infilled by sediment introduced from the main distributary channel. Eventually the margins of the lake would be filled, forming tidal-flats that could be occupied by swamp vegetation. A useful account of sites showing the different facies in the Greenmoor Rock — Elland Flags complex is given by Davies (1967).

This type of lower delta-plain deposit is typical of much of the lower Westphalian of the Pennine Basin. However, most exposures tend to be in the sandstones formed in the distributary channel deposits, which are more resistant to erosion. This is one of the few sites where the sedimentology of the rather softer, tidal flat facies can be examined in detail. It is thus a key locality for understanding the deposition of the lower Westphalian in the Pennine Basin.

## Conclusions

Neepsend Brickworks has the best exposures of rocks known as the Greenmoor Rock Formation. They are in the lower part of the Coal Measures of the Pennine coalfields, and are about 315 million years old. They are of particular interest as they are the remains of tidal-flat deposits, which are very rare in the Coal Measures.

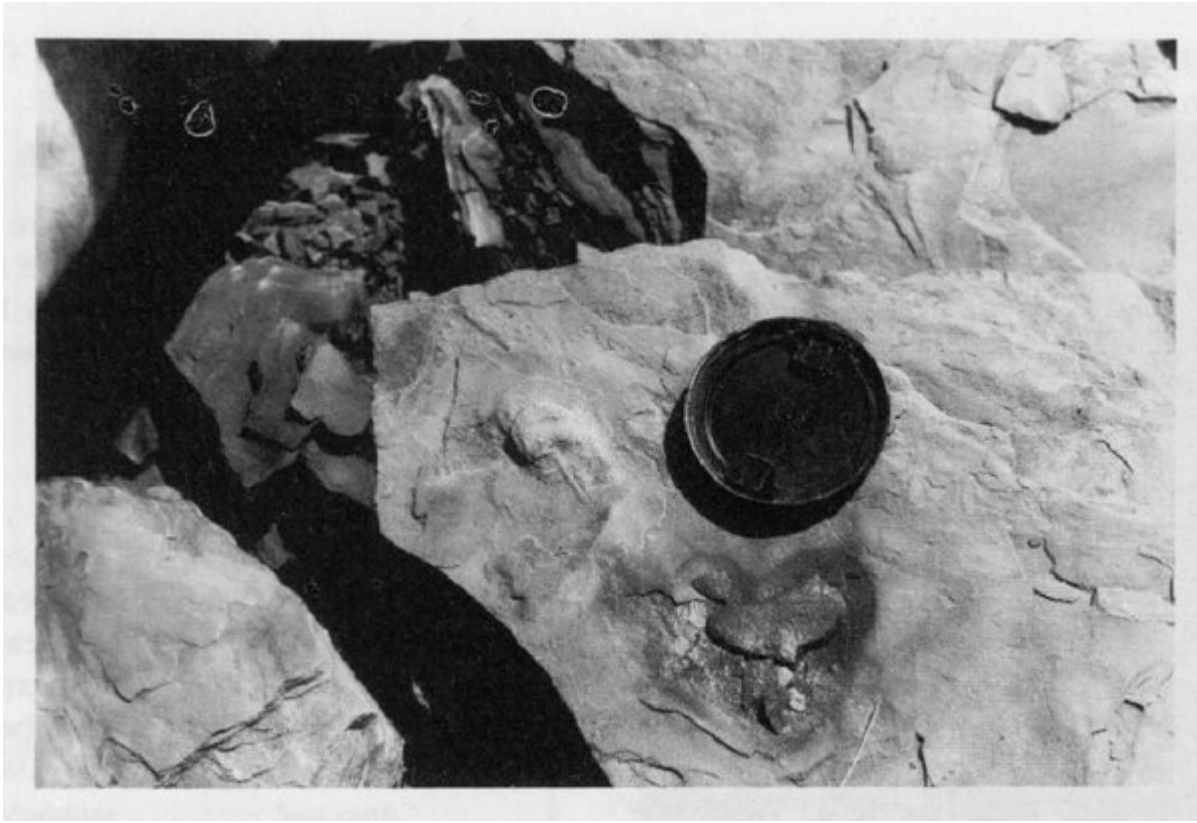
### References



*(Figure 10.9) Langsettian exposures at Neepsend Brickworks. (Photo: C.J. Cleal.)*



*(Figure 10.10) Main exposed face at Neepsend Brickworks. Based on Davies (1967, fig. 18.2).*



*(Figure 10.11) Neepsend Brickworks GCR site. Xiphosurid trace fossil. (Photo: C.J. Cleal.)*