
Hathersage Moor

Highlights

Hathersage Moor shows the Chatsworth Grit Formation in its fullest development, together with a shale containing an upper Marsdenian fossil fauna.

Introduction

Exposures along and near Burbage Brook [SK 255 820], [SK 260 815], [SK 262 815], [SK 267 812] 12 km SW of Sheffield, South Yorkshire, are in one of the classic areas for the Millstone Grit of northern England, famous for its rock climbing as well as the geology. These particular exposures show part of the Chatsworth Grit Formation and underlying shales. The geology is described by Eden *et al.* (1957) and Mayhew (1967a, 1967b).

Description

Lithostratigraphy

The full thickness of the succession here is difficult to determine from direct observation because of the discontinuous exposure, but is probably about 100 m. The lower strata are medium to dark grey, marine or brackish shales, with thin ribs of ferruginous siltstones and some ferruginous nodules. These are poorly exposed, but elsewhere in the vicinity lower strata are about 10 m thick (Mayhew, 1967a).

The shales are overlain by the Chatsworth Grit Formation (known locally as the Rivelin Grit). The formation consists of two arenaceous members, the lower one 15 m thick and the upper one 60 m thick, separated by a thick shale unit. The lower member consists of flaggy, fine-grained sandstones with thin shale interbeds. The upper member is also flaggy and fine grained at the base, but the rest of it consists mainly of coarse sandstones and sandy conglomerates, with large-scale cross-bedding.

Biostratigraphy

Shales near the base of the sequence have yielded marine fossils, including the ammonoid *Verneuilites sigma* (Wright) and the bivalve *Posidonia cf. insignis* (Jackson). It clearly belongs to the *D. sigma* Subzone, indicating the topmost Marsdenian.

Interpretation

This is an important exposure of the Chatsworth Grit Formation. The formation represents one of the best known examples of the type of sheet delta deposit, that characterizes the upper Millstone Grit of northern England. Based on the general model described by Collinson (1988), the lower member and basal part of the upper member probably represent mouth bar deposits, and the rest of the upper member the remains of distributary channel deposits.

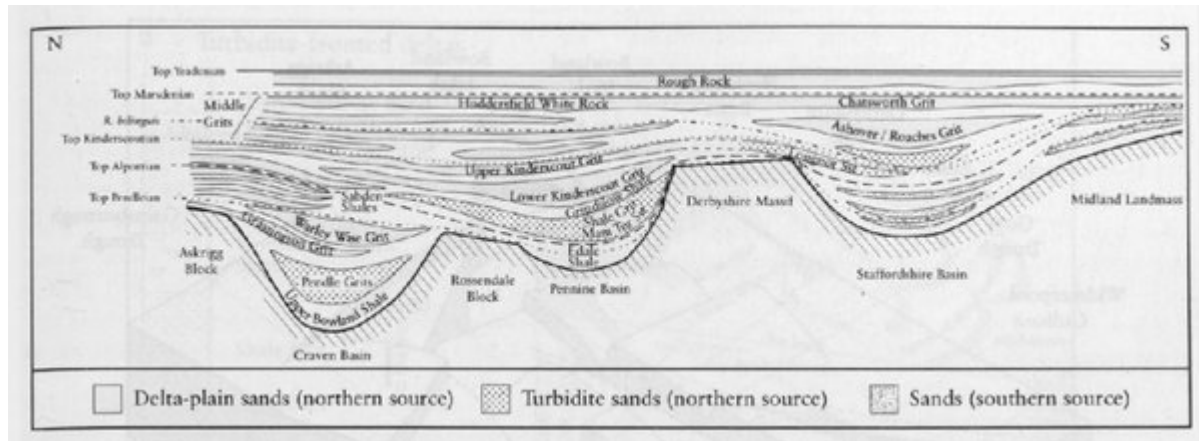
The distribution of the Chatsworth Grit is discussed by Mayhew (1967a, 1967b), Ramsbottom *et al.* (1978) and Collinson (1988). It occurs throughout the Central Province, except on the southern margins near the Wales–Brabant Barrier, and seems to be the lowest part of the Millstone Grit in the province not to have been strongly influenced by the Dinantian palaeobathymetry (Figure 9.2). Mayhew (1967a, fig. 13.2) shows that the formation is most fully developed in this part of South Yorkshire. In particular, the lower member is only developed along a 15 km stretch of its outcrop, between Stanage Edge and Chatsworth. There are numerous exposures within this belt, but Hathersage Moor is one of the best, and the only one where it can be directly related at surface to a biostratigraphically diagnostic marine band.

In South Wales, strata of the same age are mainly basal shales or littoral deposits of the Bishopston Formation (e.g. Tenby–Saundersfoot Coast) or Middle Shales Formation (e.g. Vale of Neath). Large-scale deltaic deposition is not seen until the upper Yeadonian to lower Langsetian, with the development of the Farewell Rock Formation.

Conclusions

Hathersage Moor is the best available exposure of sandstones from the upper Millstone Grit, known as the Chatsworth Grit Formation. It also includes a band of shales containing fossils, which indicate a late Marsdenian age, just over 310 million years old.

References



(Figure 9.2) The distribution of major sandstone bodies in the Millstone Grit of the Central Province. Based on Collinson (1988, fig. 9.5).