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# Alport Castles

## Highlights

Alport Castles is the best exposure of Shale Grits, as developed in the southern part of the Pennine Basin.

## Introduction

A landslip scar [SK 142 914] on the south-west side of Birchenlee Pasture, 12 km ESE of Glossop, Derbyshire provides a large exposure of the Shale Grit Formation of the southern Pennines Basin (Figure 9.10). The geology has been described by Walker (1966a).

## Description

About 120 m of strata are exposed here, 115 m of which belong to the Shale Grit. The latter formation consists in essence of numerous mudstone/ siltstone–sandstone couplets. The mudstone/siltstone components are typical of the basinal facies of this part of the Millstone Grit, and can be compared with similar deposits such as at Mam Tor (see above), except that there are no fossils.

The sandstones are of two types, which Walker (1966a) referred to as Facies A and Facies C. The main difference is bed thickness, the former being 60 cm thick, the latter anything from 60 cm to 3m thick. Also, Facies C can sometimes be in the form of large channels, although small-scale channelling also occurs in Facies A. Alport Castles is particularly good for showing sedimentary structures in these sandstones units, including sole structures, graded bedding and parallel lamination. Ripple lamination is also sometimes visible, confined to the top part of a sandstone bed. Both sandstone types have been interpreted as turbidites, Facies A being the distal deposits and Facies C the proximal deposits (Walker, 1966a).

The Facies A sandstones dominate the lower half of the Shale Grit, and Facies C the upper half (compare Blackden Brook). In fact, Facies C is totally absent from the lower beds at Alport Castles and would thus be difficult to separate from the underlying Mam Tor Formation.

An unusual lithology present in the upper Shale Grit here are beds of pebbly mudstones, found adjacent to channels. Walker (1966a) believed these to have resulted from gravels falling on to and sinking into soft mud.

The top 15 m seen at Alport Castles are mudstones and a broad sandstone-filled channel, belonging to the Grindslow Shales. They compare closely with the more complete sequence visible at Blackden Brook.

## Interpretation

This is by far the best exposure of Shale Grit, as developed in the southern part of the Pennine Basin. Another section through much of the formation occurs at Blackden Brook, but the sedimentology is not so well shown there. In particular, the sedimentary structures within the sandstones are well seen at Alport Castles. This is important, as the combination of erosive bases with sole structures, graded bedding, parallel-lamination through most of the bed, but ripple-cross lamination at the top, all fit into the classic Bouma Model for turbiditic deposits (Bouma, 1962; see also Walker, 1986). As well as being important for understanding the geological history of this part of Britain during the mid-Namurian, as part of the progradation of the Kinderscoutian delta over the area, this site documents one of the best examples of Late Palaeozoic turbidite deposits in north-western Europe.

## Conclusions

Alport Castles is one of the most important exposures of rocks of the Shale Grits, which are about 315 million years old. The site has particularly well developed structures in the rocks that show that they were formed by turbidity currents. These currents were generated when seismic movement disturbed sediment in a shallow marine setting (in this case on the front of a river delta), which then rolled down along the sea-bottom into deeper water where the sediment was re-deposited. Alport Castles is one of the best Late Palaeozoic (250–410 million years old) examples of such deposits in north-western Europe.

### References



*(Figure 9.10) Alport Castles GCR site. Exposures of Millstone Grit. (Photo: R.A. Cottle.)*