

---

# Gib Tor

## Highlights

Gib Tor is the best exposure of the upper Millstone Grit in the Staffordshire area, and demonstrates that this area had become integrated into the main depositional basin of the Central Province. It also provides fine examples of shales showing contorted bedding, possibly the result of penecontemporaneous slumping (Figure 9.7).

## Introduction

Exposures along Black Brook [SK 012 643]–[SK 021 648], on Goldsitch Moss, about 9 km NNE of Leek, Staffordshire, show the upper part of the Millstone Grit Group in the north Staffordshire area. The only paper describing aspects of the geology of the site is by Cope (1946), although Higgins (1975) makes a passing mention of conodonts found in some of the shales.

## Description

### Lithostratigraphy

There is no measured log available for this section, but it is probably about 250 m thick. Three major sandstone units can be seen, in ascending order the Roaches Grit, Chatsworth Grit and Rough Rock formations. They are coarse, feldspathic grits, with well developed trough-cross bedding and an erosive base. Palaeocurrent evidence suggests a northerly origin for the sediment. They are thus in the typical facies of the Millstone Grit deltaic sandstones, found throughout the rest of the Central Province.

Each of these arenaceous units is overlain by an interval of more argillaceous strata. Immediately overlying the sandstone are black marine shales. These coarsen upwards into siltstones, and are eventually overlain by the next unit of deltaic sandstone. A characteristic feature of the shales immediately above the marine band is that they are often contorted (Cope, 1946).

### Biostratigraphy

There has been no published palaeontological work on this site, other than a mention by Higgins (1975) that conodonts occur in the marine bands (no species were listed). However, the lowest of the marine bands is known to yield *Bilinguites superbilinguis* Bisat, whilst the top one contains *Gastrioceras subcrenatum* (Frech). The middle band is thought to be the Cancellatum Marine Band. The sequence thus ranges from the upper Marsdenian to the lower Langsettian.

## Interpretation

This is the best available section through the uppermost Millstone Grit in the Staffordshire area. The sequence exposed at Orchard Farm only shows that part of the succession immediately adjacent to the Cancellatum Marine Band, although it has yielded a greater diversity of fossils from that band.

The upper Millstone Grit of Staffordshire, which is so well seen here, does not differ, significantly from coeval strata elsewhere in the Central Province (e.g. at Yeadon Brickworks); the northerly derived feldspathic grits of the Rough Rock and Chatsworth Grit formations (the latter sometimes alternatively known as the Huddersfield White Rock Formation) occur as fairly uniform units throughout northern England. This is significant, since it indicates that the Staffordshire Basin had ceased to be a separate entity by the Yeadonian, and possibly even the late Marsdenian. This contrasts with the position in the early and middle Namurian, such as seen at Pot Bank Quarry, where there is evidence of a quite discrete Staffordshire Basin, being filled by quartzitic sediment from the Wales–Brabant Barrier.

The contorted shales overlying the marine beds can be seen in a number of other localities in Staffordshire (Cope, 1946), but Gib Tor is by far the best. The origin of these structures is still far from clear and they have not been studied in recent years. Cope regarded them as due to tectonic deformation, quoting a variety of lines of evidence such as listric surfaces, bedding plane slickensides, and the absence of erosional truncation. Perhaps most significant, however, was his discovery that the fold axes of the contortions were parallel to the structural axes of the regional folding. In the Langsettian of Pembrokeshire (e.g. at Tenby–Saundersfoot see Chapter 4) there are similar contorted beds just above a marine band, which are now thought to be the result of penecontemporaneous, seismically-triggered slumping of the sediment down a palaeoslope. If the regional structural axes were already controlling the palaeoslope directions in the late Namurian in the Staffordshire Basin, a seismic origin for these contorted beds would seem highly likely.

## Conclusions

Gib Tor is the best exposure of rocks in the upper part of the Millstone Grit in the Staffordshire area. These rocks, which are just over 310 million years old, include three major sandstones (the Roaches Grit, Chatsworth Grit and Rough Rock) which have been identified over large areas of the northern Midlands and north England, and are the remains of river sands that had been brought down from the Caledonian Highlands in present-day northern Scotland. They differ from the lower part of the Millstone Grit in Staffordshire, which was formed by rivers flowing from the south, and thus reflects a major switch in drainage pattern in the area. Gib Tor also has some fine examples of shales showing contorted bedding, possibly the result of seismic movements shortly after the rocks were deposited.

## References



*(Figure 9.7) Gib Tor. Reproduced by permission of the Director, British Geological Survey: NERC copyright reserved (L1241).*