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## Dow Cave

[SD 984 744]

### Highlights

Dow Cave contains a remarkably linear joint-controlled inlet passage draining from sink to rising beneath a surface interfluvium. The main passage intersects a massive choke of debris in a large interglacial shaft.

### Introduction

Dow Cave lies under the western slopes of Great Whemside, north-east of Kettlewell, in Wharfedale (Figure 2.1). It is a resurgence cave with about 3000 m of mapped passage, dominated by the straight and narrow Dowbergill Passage, which feeds in from Providence Pot in the next valley to the south. This provides a small flow, but the main drainage enters from choked sinks in Caseker Gill, above the much shorter main passage.

The cave was initially described by Brindle (1954, 1955) and Powell (1954). Its geomorphology is briefly discussed by Long (1974), and the passages are described by Brook *et al.* (1988).

### Description

The resurgence entrance to Dow Cave is over a large debris pile where roof collapse has retreated from its exposure in the flank of Caseker Gill. Behind the fallen blocks, the stream flows in a fine keyhole passage up to 4 m wide and 8 m high. Upstream the vadose slot diminishes and the phreatic tube emerges from a wide bedding-controlled cave. This can be followed for only a short distance beyond a large chamber 400 m from the entrance to a major collapse feature, the boulder choke of Hobson's Choice. Above are higher chambers roofed with ill-sorted limestone and sandstone blocks in a matrix of mud. A smaller upstream passage has several waterfalls in rifts up to 25 m high, before a final boulder choke from which the main stream emerges. Some of the old roof channels in this part of the cave are well decorated with speleothems.

The Dowbergill Passage inlet enters Dow Cave low in the south wall a short distance downstream of the Hobson's Choice choke. From its junction with Dow Cave it extends SSE in a remarkably straight line for more than 1300 m to an upstream sump. A series of small, muddy rifts and fragments of larger passages in Providence Pot, are entered through an excavated shaft in the streambed of Dowber Gill, and link into Dowbergill Passage 90 m downstream of the sump. Through much of its length, Dowbergill Passage is a vertical rift, 10–25 m high but rarely more than a metre wide (Figure 2.47). Wedged blocks create sections of false floor, high above the gently graded stream. There are very few roof inlets or speleothems, since the passage lies beneath the Yoredale shale outcrop.

### Interpretation

The large main passages of Dow Cave represent part of a major, old, phreatic conduit, since modified by vadose entrenchment and truncated by valley downcutting. The mix of very large limestone and sandstone blocks in the Hobson's Choice choke suggests that it is a fill of both collapsed and inwashed material in a large pothole, extending to the surface and formed prior to the Devensian glaciation. This fill has since been partly removed from below by the Dow Cave stream.

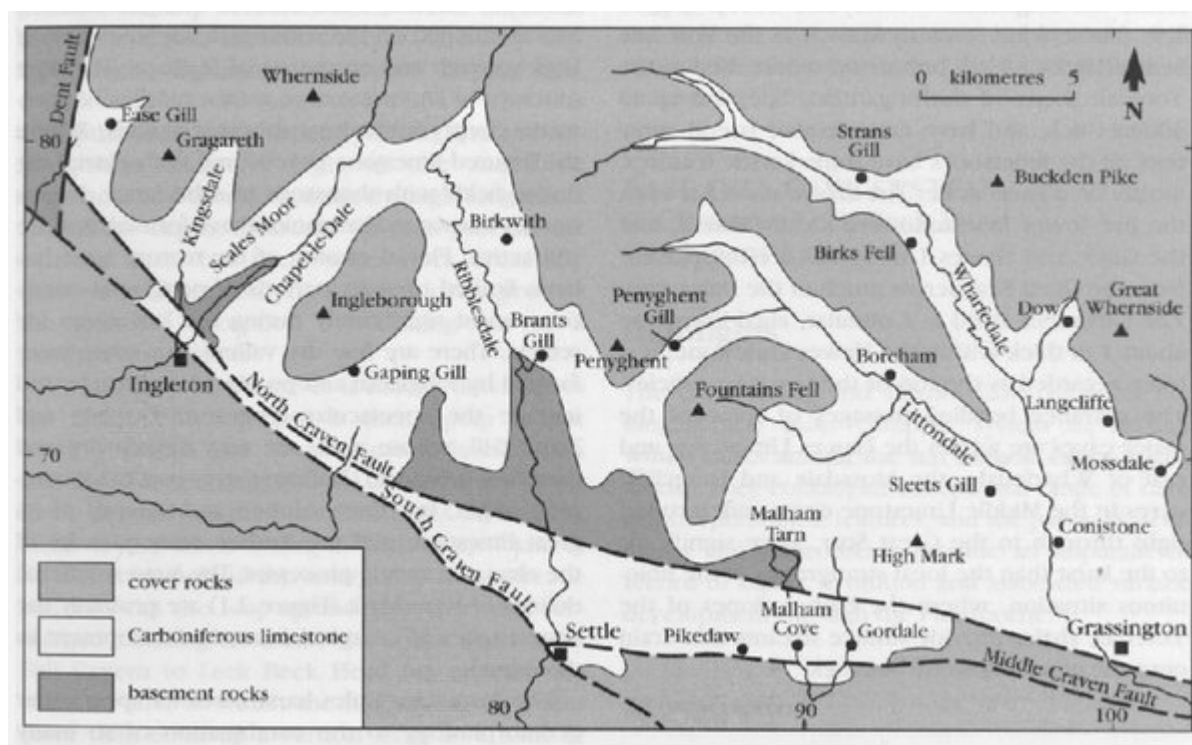
The Dowbergill Passage inlet is almost dead straight, and is formed along a single major joint. It is a spectacular example of both control by a tectonic joint (Halliwell, 1979b), and a drainage route passing beneath a surface interfluvium. Cave passages this straight over such a great distance are generally formed on faults, but Dowbergill Passage appears to be on a simple joint, with no visible sign of fault displacement. The phreatic origins of the rift cave are no longer discernible.

Similarly, there is now no evidence of the extent of tectonic opening on the fissure, prior to its solutional enlargement; the site of the joint, parallel to the hillside, would have favoured opening by de-stressing, probably after a glacial retreat. Vadose incision along the fissure was probably very rapid, and has now produced a smoothed profile graded to the level of the Dow Cave streamway. This has been aided by capture of the drainage in Dowber Gill, where Providence Pot appears to be an old sink; this is now active only in flood, as most of the water joins Dowbergill Passage from sinks further up the gill.

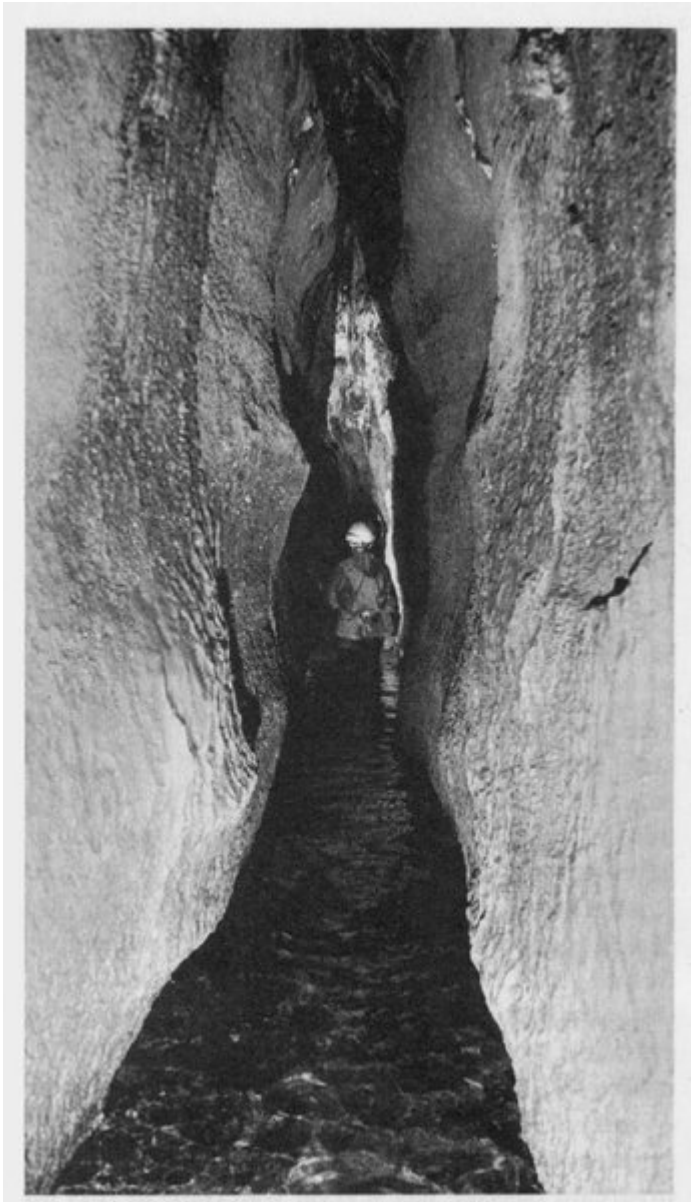
## Conclusion

The main passage of Dow Cave demonstrates the progressive destruction of a phreatic cave, by drainage, vadose entrenchment, truncation, collapse and choking by debris. It also provides unusually easy access to the base of a large, choked, interglacial sinkhole. Dowbergill Passage is a rift passage of unusual straightness and length, formed along a joint and capturing the drainage from an adjacent valley.

## References



(Figure 2.1) Outline map of the Yorkshire Dales karst, with locations referred to in the text. The Carboniferous limestone shown includes all the Great Scar Limestone (Kilnsey, Cove and Gordale Formations) and also the lower Yoredale limestones (of the Wensleydale Group) where they are hydrologically linked to the Great Scar and are therefore part of the same karst unit. Higher limestones within the Yoredale Series are not marked. Basement rocks are Palaeozoic slates and greywackes. Cover rocks are the Yoredale facies of the middle and late Brigantian Wensleydale Formation and various Upper Carboniferous and Permian clastic formations.



*(Figure 2.47) The tall, narrow rift of Dowber Gill Passage in Dow Cave (Photo: M.H. Long.)*