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# Boreham Cave

[SD 926 726]

## Highlights

Boreham Cave represents a classic example of a phreatic system which has experienced rejuvenation and reversal of flow direction. It contains superb examples of phreatic tubes, which in places contain straw stalactites in a profusion unparalleled in Britain.

## Introduction

Boreham Cave lies in the north-east side of Littondale, 1 km up the valley from Arncliffe (Figure 2.1). The cave entrance is at valley floor level, with the passages extending to the east and north under Old Cote Moor. The slopes and floor of Littondale are cut into Great Scar Limestone, dipping very gently to the north-east. Boreham Cave represents the longest cave system yet explored on the northern side of the dale, with active and abandoned phreatic passages extending for a total length of 3100 m. The cave passages are described by Brook *et al.* (1988) and Yeadon (1975), and the latter includes discussion of the local karst hydrology.

## Description

From the entrance more than 500 m of low-level passage extends north-east, before swinging round to the north for a further 1000 m (Figure 2.43). Most of this passage consists of a phreatic tube about 2 m in diameter. It is developed largely at one stratigraphical level, and long sections are permanently flooded, with water flowing slowly to the north, then down a shaft to a lower flooded passage. One half-flooded chamber in the low-level tunnel provides access to 1500 m of high-level caves extending mainly to the east. The main passage is a relict phreatic tube up to 4 m in diameter, which is joined by several small inlet passages, both active and abandoned. Some sections of the high-levels contain thousands of closely packed calcite straws each up to 3 m long, with the finest display in the China Shop (Figure 2.44). There are thick sediment banks in some of the passages, all of which terminate in boulder chokes.

## Interpretation

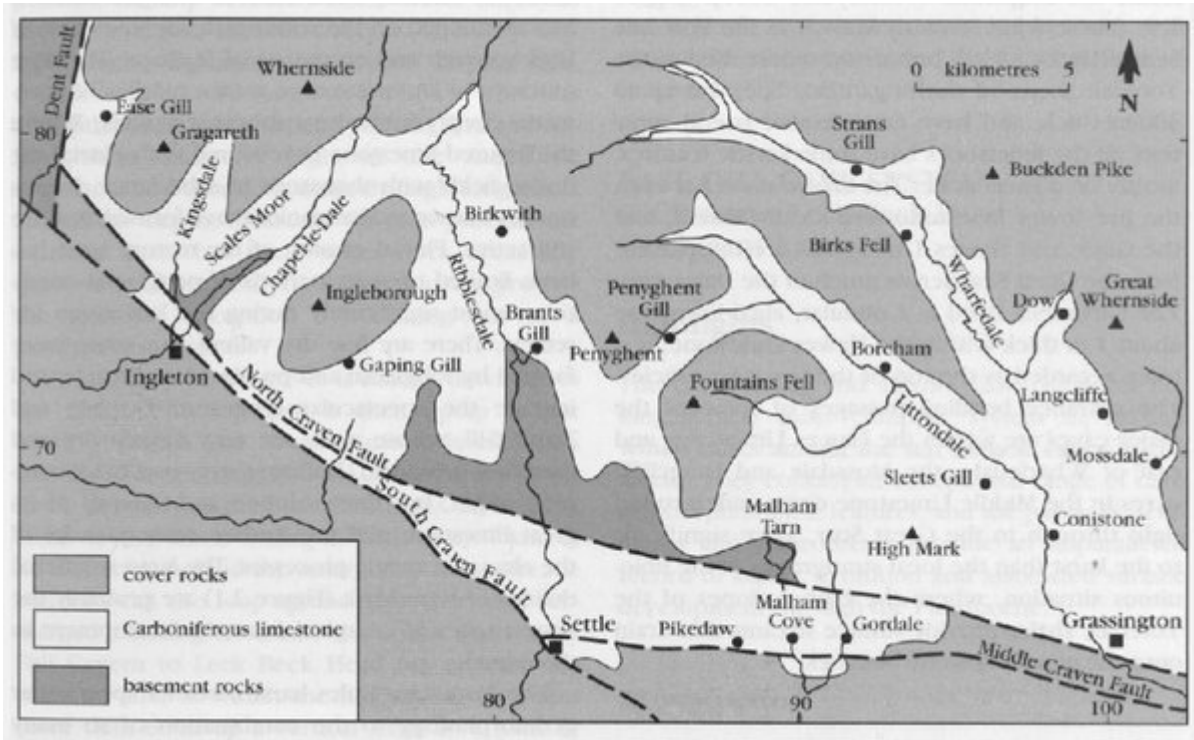
The upper and lower series of passages in Boreham Cave show a clear sequence of abandonment and partial rejuvenation of old phreatic conduits, with an associated reversal of flow direction. In the first phase of Boreham Cave, the large phreatic tubes of the high-level series formed the main conduit taking water southwards, via the Tinkle Tubes, towards a resurgence, now choked, in the valley side above the present entrance. Subsequently, the lower passage developed as a phreatic conduit which carried water south for part of its history, and the present entrance represents a truncated resurgence; the partially drained tunnel now carries water to the north. Both upper and lower series have since been invaded by vadose inlet streams and the percolation water responsible for the spectacular straw stalactites. Invading waters in the upper level have cut a vadose trench in part of the old phreatic passage, and have cut down to intercept the flooded lower passages.

Passages in the lower series are still largely flooded, and water in the first section, from the entrance to the junction with the high-level series, is virtually static, being largely ponded percolation water. North of the junction, water draining in from the high-level series flows very slowly to the north, into a vadose canyon which ends at a waterfall shaft down to a lower flooded level; this probably drains to the Litton Risings, 850 m to the south-west. The flooded passages represent a perched phreas in progress of being drained as the downstream vadose canyon cuts back into them. The two levels of passages, both close to the floor of Littondale, contain in their morphology, their fluvioglacial sediment and their calcite speleothem contents an important, but as yet unstudied, record of the Devensian glaciation of the eastern Dales.

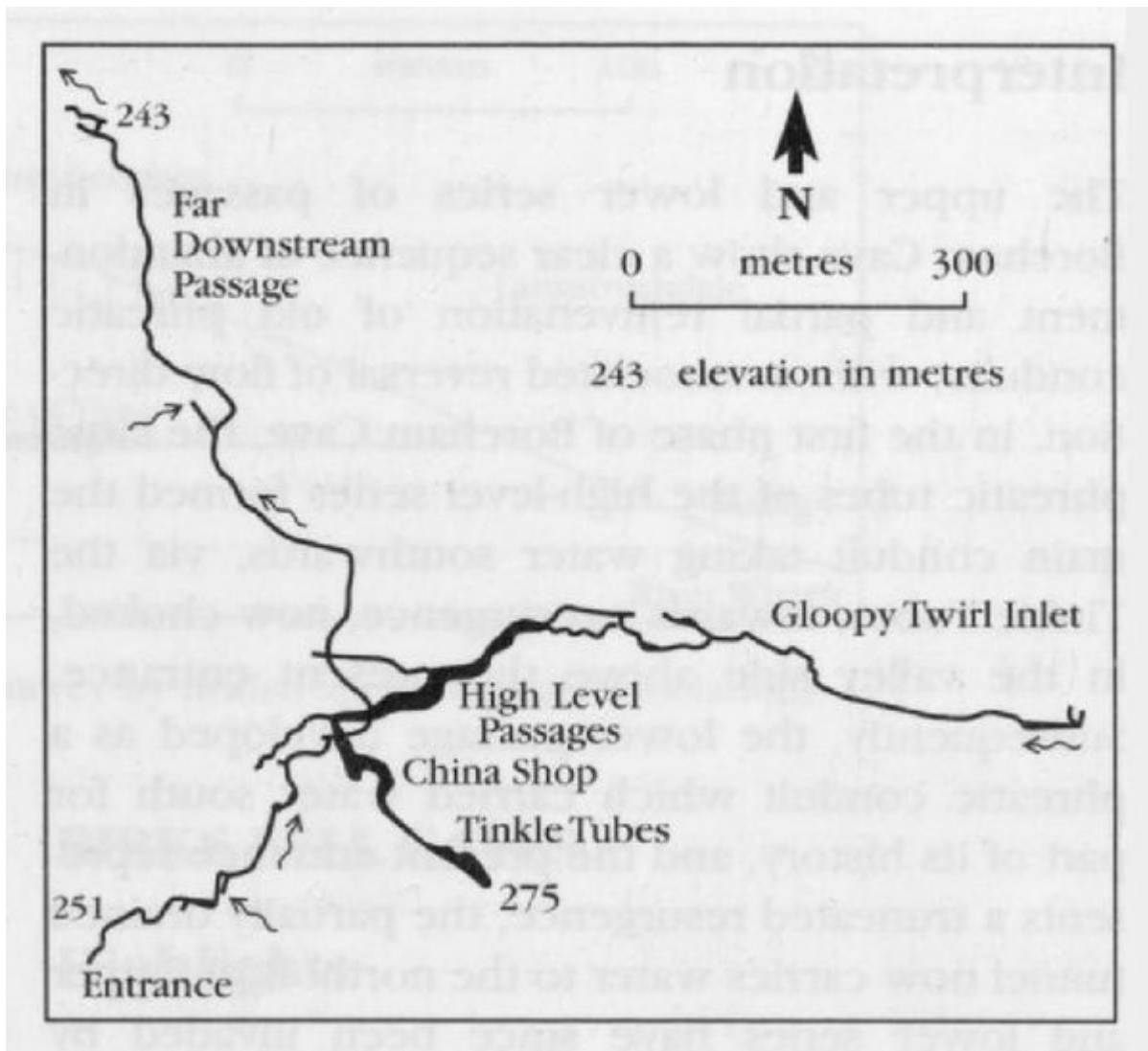
## Conclusion

Boreham Cave is notable for its phreatic tubes, both active and relict, which follow the bedding at two levels in the limestone close to the level of the modern valley floor. The abandoned high-level passages contain the most beautiful assemblages of straw stalactites found in a British cave; their preservation from accidental damage will be ensured by the natural access restrictions imposed by the flooded passages in the lower series.

## 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 2.43) Outline map of Boreham Cave (from survey by Cave Diving Group).



*(Figure 2.44) Delicate straw stalactites hang down into standing water in the old phreatic tube of the China Shop in Boreham Cave. (Photo: T.G. Yeadon.)*