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# Fairy Holes

[NY 943 368]

## Highlights

The long, almost horizontal cave passage in Fairy Holes carries a small stream and has few tributaries. It is the finest and longest of the linear caves with the simple underground drainage patterns which are common in the thin Yoredale limestones exposed in the hillsides of the northern Pennines.

## Introduction

Fairy Hole lies under the southern flanks of upper Weardale, between Eastgate and Westgate (Figure 3.1). It is the prime example of cave development in the Yoredale limestones of the northern Pennine dales, where one or very few sinks feed a rising via a single passage with few tributaries. The single cave stream passage has been explored from the rising for most of the 3.5 km to the main sinks, in Blaeberry Burn (Figure 3.25). It is developed in the Carboniferous Great Limestone, which is locally about 18 m thick. Mixed sequences of shales, sandstones and thin limestones lie both above and below the Great Limestone, which forms the lowest unit in the Namurian.

The passages are described by Jones (1957) and Brook *et al.* (1988), but lack of access to the cave has precluded any scientific studies.

## Description

The original cave entrance above the resurgence survives in a remnant of limestone, encircled by a quarry which has completely removed about 600 m of stream passage immediately upstream. South of the quarry face, the truncated cave still has 3200 m of passages, nearly all forming the one streamway (Figure 3.25). Most of this is a clean vadose canyon over a metre wide, but most sections are aligned on joints which were initially opened by phreatic solution. An abandoned upper level of the cave survives partly as a series of loops where it is offset from the active cave, and partly as roof sections of the streamway. There are sections modified by blockfall and wall collapse, with some chambers up to 30 m long and 6 m wide, mainly formed where the active streamway intersects and undercuts wider parts of the abandoned roof passage. Some of the passage walls have protruding fossil rugose corals etched out of the Frosterley Band. The streamway collects small flows from sinks in the Killie Holes along the limestone bench, but inlet passages are small and not fully explored.

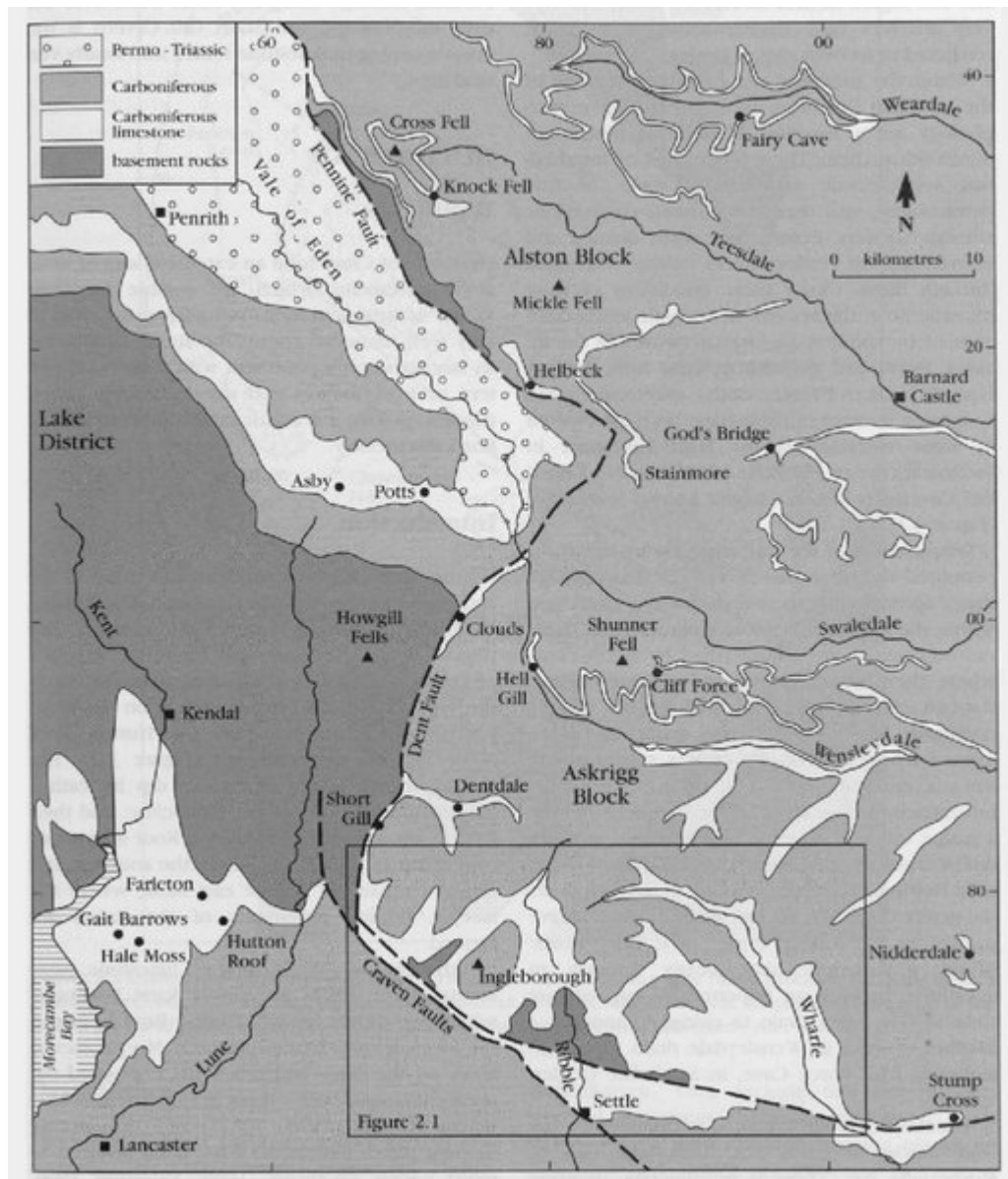
## Interpretation

The thin Yoredale limestones offer limited scope for the development of complex multi-level cave systems, and most underground drainage in them is simple and direct. Fairy Holes is typical in that it has a single, youthful, vadose streamway between sinks and a rising on the edges of the modern outcrop. The cave stream has invaded, linked and modified an earlier generation of phreatic rifts. These are widespread in the Yoredale limestones, and were formed by solution in a confined aquifer before it was drained by incision of the adjacent valley, probably in the late Pleistocene. The vadose stream drains downdip through the fissured limestone, which carries it from the sinks parallel to the Westernhope Burn. This accounts for the large distance to the downdip rising within a very narrow limestone outcrop. Aggressive percolation water sinking into the exposed limestone along its hillside bench enhances cave excavation by solution in the rock immediately below; the Fairy Holes stream cave, just behind the outcrop bench, is therefore larger and more accessible than is normal in these limestones.

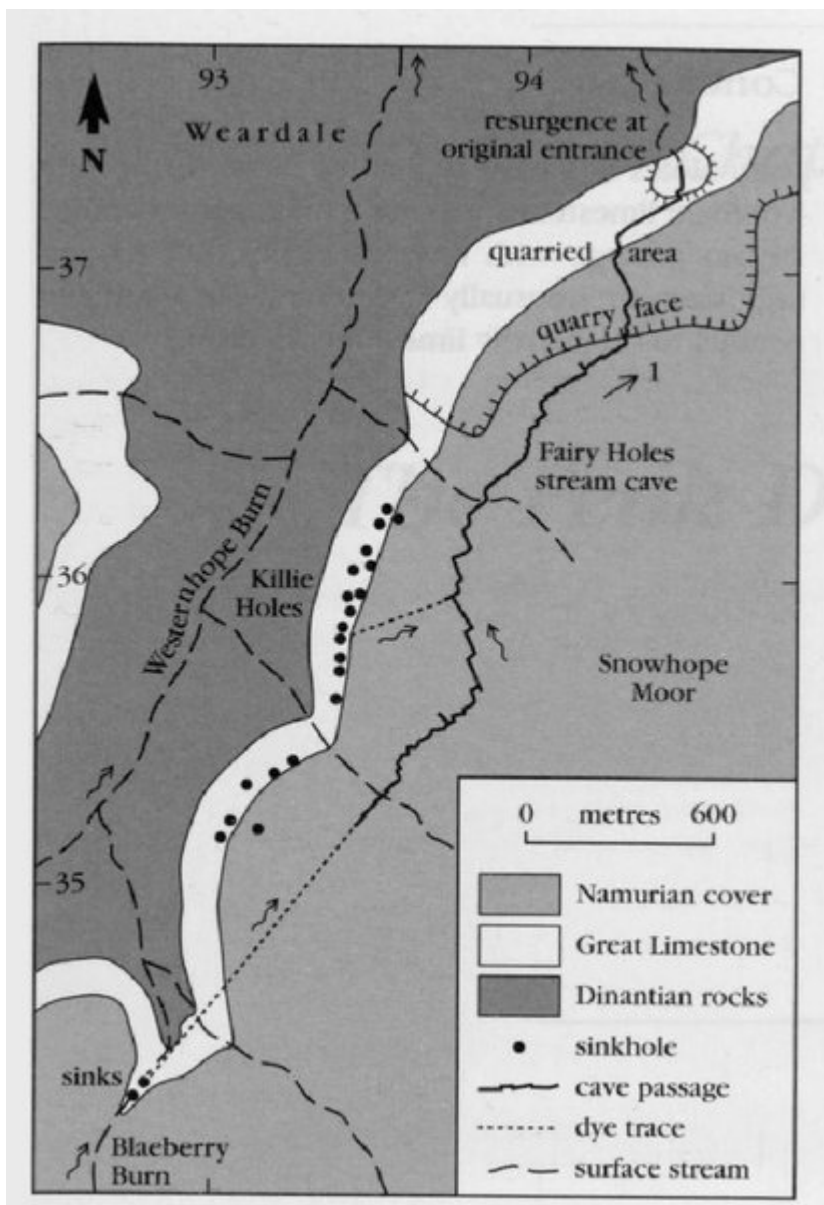
## Conclusion

Fairy Holes is a cave typical of those in the thin Yoredale limestones, having a long, gently graded stream passage with few tributaries, but its passage sizes are unusually large due to its alignment parallel to the narrow limestone outcrop.

## References



(Figure 3.1) Outline map of the karst regions in the northern Pennines, with locations referred to in the text. The other Carboniferous rocks are the non-carbonates of the Orton Group and Yoredale facies of the Dinantian, and the Namurian, but they include thin bands of limestone with lesser karst features not shown on this map. The Carboniferous limestone includes the Dinantian Great Scar Limestone, the Yoredale limestones with significant karst, and the Main or Great Limestone of Namurian age. The basement rocks are Lower Palaeozoic non-carbonates. Details and locations in the southern Dales are shown in (Figure 2.1).



(Figure 3.25) Outline map of Fairy Holes and the limestone bench which it drains. The cave and outcrops are shown in their original form, previous to development of the quarry; the limestone has been largely removed from its outcrop southwards to the quarry face, which has also cut into part of the non-carbonate cover. Except for a tiny fragment behind the original resurgence entrance, all the cave passage north of the quarry face has been destroyed (from cave survey by University of Leeds Speleological Association).