
Upper Lathkill Dale caves

[SK 171 659], [SK 161 646], [SK 144 674]

Highlights

The caves of Upper Lathkill Dale are features of abandoned or intermittently active karst drainage, which now lie isolated from any significant surface catchment. The high-level caves are relics of early Pleistocene landscapes, and contain examples of sediments no longer found on the surface here. The intermittently active caves demonstrate the nature of karst drainage fed entirely by percolation sources.

Introduction

The limestone basin at the head of Lathkill Dale contains isolated fragments of large phreatic cave passages at Lathkill Head, Water Icicle Close and Knotlow Mine (Figure 4.12). All the caves lie in the bedded, lagoonal facies of the Monsal Dale Limestones, and are far from any allogenic drainage sources; they are believed to be fed solely by autogenic input. The River Lathkill flows from one of the largest areas of riverless terrain in the Peak District karst, and it represents a classic example of a river flowing on or beneath the limestone valley floor depending upon the amount of preceding rainfall. After periods of wet weather, the river flows from Lathkill Head Cave, though at other times the dale may be dry as far down as Bubble Springs (Figure 4.12). This situation is no longer entirely natural, as the regional water table has been lowered by Hillcarr Sough to the south and also by Lathkill Dale Sough driven below the valley floor and Mandale Sough beneath its northern flank (Oakman, 1979). Whether the river flowed permanently on the surface before the construction of these drainage adits is uncertain. In historical times the river flowed from as far up as Moiiyash, and was restricted to flowing from Lathkill Head Cave only in times of drought (Bamber, 1951; Oakman, 1979).

The caves and karst of Upper Lathkill Dale have been discussed by Bamber (1948, 1951), Ford and Beck (1977) and Ford and Gunn (1992); the cave passages are described by Gill and Beck (1991).

Description

The large open entrance of Lathkill Head Cave discharges a powerful stream in winter, but dries out allowing access to the cave system in summer. The main passage is a bedding-guided phreatic tube, typically 1 m high and 5 m wide, which can be followed upstream to high, solution-enlarged joints, with a series of large chambers well decorated with speleothems. Further low passages have been followed north-west, and a series of small phreatic tubes pass beneath the dale floor to link with the lower levels of Ricklow Cave, with its entrance on the north side. A low, sediment-filled distributary extends downstream to within 150 m of Lower Calesdale Cave. Critchlow Cave lies directly opposite Lathkill Head, and has 800 m of low, partly sand-filled, phreatic passage, with several small chambers decorated with speleothems. Lower Cales Dale Cave is the third major cave in the immediate area; it has more than a kilometre of passage trending north-west through low phreatic tunnels and small chambers. Like Lathkill Head and Critchlow, it acts as a flood resurgence during prolonged periods of wet weather. Two other small cave fragments in Cales Dale have yielded late Palaeolithic remains (Jackson and Storrs Fox, 1913).

Water Icicle Close Cavern is entered only via a 32 m mine shaft which intersects the junction of three drained phreatic tubes, each up to 3 m in diameter. They have only very minor vadose entrenchment. All are blocked after short distances by collapse or fluvio-glacial deposits partly derived from the Millstone Grit, the nearest outcrops of which are now 7 km to the west. Stalagmite from these phreatic passages has been dated to earlier than 350 000 BP (Ford *et al.*, 1983).

The limestone north of Moiyash contains natural caverns which are accessible through the artificial shafts of Knotlow and Hillocks mines (Figure 4.12). Constricted phreatic tube complexes and some large, fracture-guided caverns have been partly modified by mining, but still retain their main morphological features. Large banks of fluvio-glacial sand are

present in the Hillocks chambers. The caves are largely relicts and lie at a height intermediate between those of Water Icicle Close and Lathkill Head. There has been some invasion of the passages by vadose water, which flows into sumps before reappearing at Lathkill Head.

Interpretation

The Upper Lathkill Dale caves encompass successive levels of partly drained and totally flooded phreatic caves situated beneath the central part of the Derbyshire karst plateau. The origin and destination of the water which formed Water Icicle Close Cavern is unknown; the passages clearly represent a dissected remnant of a former high-level, phreatic system which pre-dates the present cave drainage at Lathkill Head, and is probably older than the incision of Lathkill Dale. Speleothems dated by the uranium-series method can only indicate abandonment more than 350 000 years ago, and the cave is probably very much older than this. These old, high-level cave passages, in Water Icicle Close and Knotlow, appear to have been invaded and modified by glacial meltwater streams; these flowed from more extensive, contemporary outcrops of the impermeable cover, or from spreads of glacial till since removed. Either bedrock or till could have been the source of the Millstone Grit sand and gravel preserved in Water Icicle Close Cavern.

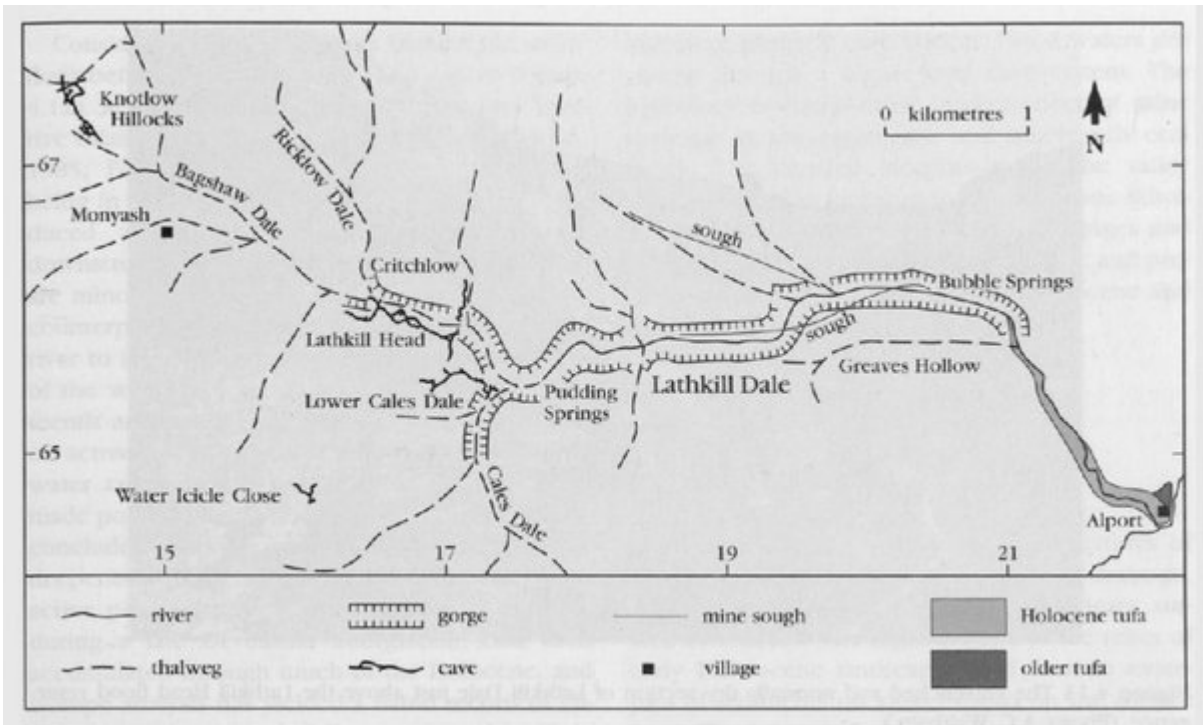
The active sections of Lathkill Head Cave, Critchlow Cave and Lower Cales Dale Cave are fed mostly by, and may have been formed partly by, percolation water; there has been little allogenic input other than seepage from the few small lava outcrops in the area. They represent fine examples of epiphreatic systems, formed within the zone of water table fluctuation, which have become accessible only in recent times through lowering of the water table by sough drainage.

The ancient and active drainage patterns within the caves therefore relate to the progressive incision of Lathkill Dale well back into the Pleistocene, when the impervious cover may have extended further across the limestone plateau. A tentative chronology by Ford *et al.* (1983) recognizes sporadic new cave development from the early Pleistocene through to the Holocene, but awaits confirmation by further dating of cave sediments. Data from Lathkill Dale may provide an evolutionary model for dry valleys in the Peak District karst where associated caves are not accessible. The sequences of clastic and speleothem deposits within the caves provide an important, if incomplete, record of Pleistocene events in the southern Pennines.

Conclusion

Lathkill Dale has an important series of isolated cave fragments preserved in the heart of the limestone plateau. These are significant as indications of the extent of karst drainage development remote from the present shale margin. The truncated relict caves, and the underlying active phreatic drainage, far from any impermeable catchments, make Lathkill Dale unique within Britain's karst.

References



(Figure 4.12) Outline map of Lathkill Dale, its tributary dry valleys and its associated cave systems.