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SHUTE SHELVE CAVERN EXPLORATION, HISTORY AND GEOMORPHOLOGY

by

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Length 262 m
Depth 56 m
NGR ST 42425536

ABSTRACT

Shute Shelve Cavern was discovered by members of the Axbridge Caving Group in March 1992. The cave was explored to a length of 262 m and a depth of 56 m. The first part of the cave had been entered by ochre miners during the early part of this century, and may be the 'Lost Cave of Axbridge' rumoured to exist somewhere on Axbridge Hill. The cave is a single section of a large fossil phreatic loop which probably drained water from a catchment area in the Lox Yeo valley to the north to an ancient resurgence somewhere near Axbridge. Uranium series dating indicates the speleothems in the cave are older than 350,000 years.

HISTORICAL BACKGROUND

The hill above the village of Axbridge, Somerset, (Figure 1) was extensively mined for ochre during the 1920s until just after the Second World War when mining ceased. According to the old miners legends, a large cave with a chamber ". . . as big as Axbridge Square" had reputedly been discovered somewhere beneath the hill (Barrington and Stanton, 1977, p. 106). In 1949, various members of the Axbridge Caving Group and Archaeological Society decided to try to find, re-open and explore the 'Lost Cave'. According to one of the original miners who was questioned regarding the locality of the cave, a dry stone wall had been built across the entrance when the mining finished, and the entrance shaft filled level to the surface. The entrance was said to lie at the end of the tramway leading from the mine workings down to the old railway station in Axbridge. Excavations began in several areas as indicated by the miner and several tunnels and shafts were dug at various points on the hill by members of the Axbridge Caving Group and Archaeological Society. One of these sites was Large Chamber Cave, where a trench was dug by the group in 1954, at the base of an ochre pit. The trench was cut through stony clay, infilling a wide phreatic passage (Barrington and Stanton, 1977, p. 106) eventually reaching a small chamber. Despite much digging, the 'Lost Cave of Axbridge' indicated by the miners was not discovered.

THE DISCOVERY

Early in 1992, members of the Axbridge Caving Group (ACG) extensively searched Shute Shelve Hill, which is adjacent to Axbridge Hill, for old mine

workings and cave entrances which were noted down for future exploration. In early February, one of these sites, a small entrance in the floor of an ochre pit, was entered by two of them and found to lead into a very small section of natural passage. The entrance, located 10 m south of the main workings (NGR ST 42425536), consisted of a steep body sized mined crawl which sloped down for 2 m before levelling off into a natural chamber 2 m by 3 m wide with a mud floor. Two possible ways on were present, one to the west and one to the east. The western passage was pushed to small chamber, lined with calcite crystals (Crystal Chamber). After a four week break, on 8th March, attention switched to the eastern passage, a low slot 1 m wide and 20 cm high through boulders from which a draught was flowing. This was dug and two hours later a tight squeeze was passed, entering a wide sloping chamber. A passage heading back up dip to the surface was pushed to a choke, and found to contain pit props and an ochre trial pit left by the miners. The next weekend the boulder collapse at the lower end of the chamber was explored and a small hole was located which corkscrewed down through the choke. This came out at the top of another chamber, larger than the previous one, linked by a 3 m climb into another, still larger chamber. Subsequently, various parts of the cave have been dug with limited success, the only significant find being in a side passage off the last chamber, from which 15 m of low, tight passage was entered on 21st June 1992.

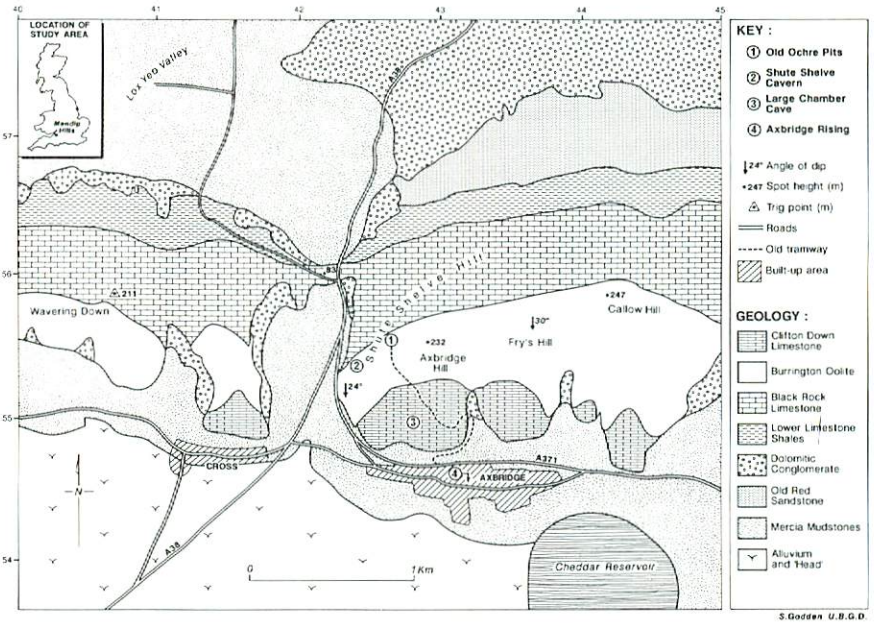

Figure 1. *The Geology of the Area around Shute Shelve Cavern*

DESCRIPTION OF THE CAVE

The survey of the cave is shown in Figure 2. The entrance is a descent of 3 m into the ochre pit which leads to the gate. Beyond the gate is a small chamber approximately 1.5 m in diameter and partially infilled with ocherous sediment. The way on lies to the left, and is a tight flat out dug squeeze down through boulders (the breakthrough point) which opens out at the head of the first chamber. The chamber was called Reynard Chamber after recent fox bones were found scattered on the floor. The chamber enlarges downslope, becoming approximately 10 m high and 15 m wide with stalagmite deposits in the southwest corner. To the left the chamber continues back up slope over boulders to a short crawl into Pitprop Passage. This is a narrow bouldery passage with much ocherous surface derived material and recent bones littering the floor and tree roots hanging from the roof. Several rotten pit-props and dug pits indicated that the miners had probably entered the cave in this area. The passage ends in a choke just below the surface.

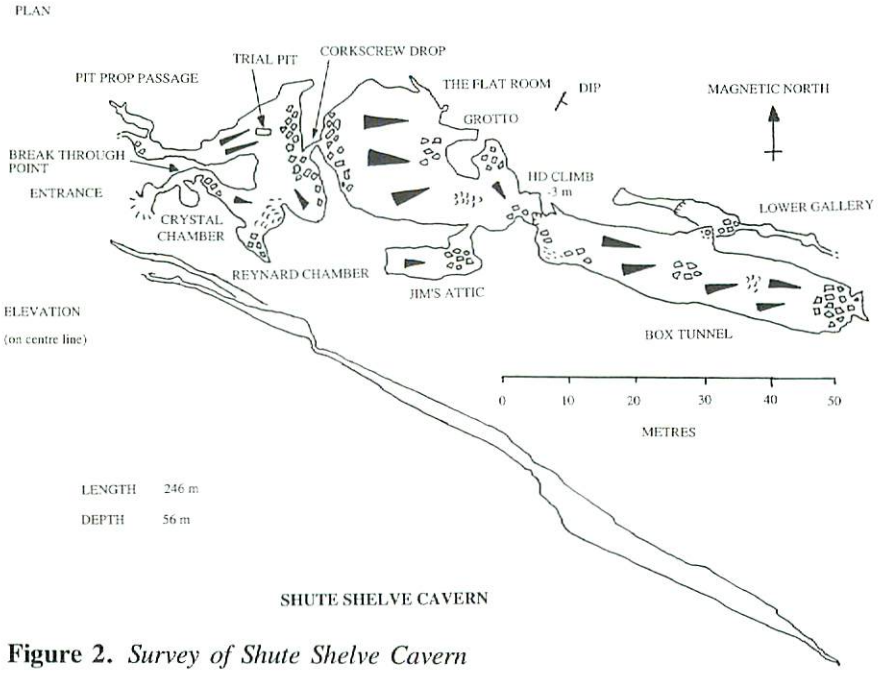

Figure 2. *Survey of Shute Shelve Cavern*

A corkscrew squeeze (Corkscrew Drop) dug through boulders at the base of Reynard Chamber leads into the head of the second chamber which extends for over 30 m downslope and is over 12 m wide and 5 m high. The roof is a wide flat bedding plane (hence the name 'The Flat Room') and the floor is littered with boulders. Jim's Attic is a small side passage to the south off the Flat Room which extends back up dip for 15 m. Lower down, the Flat Room contracts in size and a 3 m climb down (HD short for Hanging Death, due to the unstable nature of the boulder floor above the climb) gives access to the Box Tunnel, named for

its rectangular shape and not after the railway tunnel near Bath. Box Tunnel averages 10 m high and wide and continues down dip for 100 m before ending in a large boulder choke. Halfway down on the left side a 2.5 m diameter hole in the wall drops into a smaller parallel passage (Lower Gallery), which extends some 15 m down dip before becoming too tight. There is potential for extensions to both the lower passages and they are currently being dug.

GEOLOGY

Shute Shelve Cavern is developed in the lower part of the Lower Carboniferous Burrington Oolite which dips at 25° to 30° to the south-southeast (Figure 1). The massive well bedded limestone has been extensively dolomitised. The limestone is cut by a large number of thin haematite and calcite veins which stand proud of the rock due to differential solution, forming a pronounced 'boxwork' effect. In the area below the HD climb, large blocks of haematite litter the passage floor where a larger haematite vein has been intersected. Well developed calcite lined geodes which have been truncated by the cave and thus predate its development can be seen at various points in the cave.

The ochre deposits which were sought by the miners infill the entrance passage and the top of Reynard Chamber and occur sporadically throughout the lower part of the cave. It appears that the ochre was formed by surface weathering of exposed haematite veins, and later transported into the cave under the influence of gravity from the hillslope above the entrance. The cave has therefore acted as a trap for the ochre deposits which were protected from further erosion and preserved in the cave.

CAVE GEOMORPHOLOGY

The cave is a truncated fragment of a large irregular phreatic passage developed along a major bedding plane and extending down the dip, now partly modified by breakdown. Large, well developed phreatic scallops indicate slow flow down dip to the southeast. The passage is controlled primarily by a major bedding plane, joint control being only evident in part of Reynard Chamber, where the passage is developed along a north-south joint. The cave roof is a bed of dolomite which can be well seen in the roof of the second chamber where dissolution has penetrated upward into the overlying limestone beds. The boulder chokes between the chambers occur where the passage roof drops a bed and the extensive breakdown on the floor becomes lodged against the step in roof level.

Very little evidence of any original river borne sediments remains in the cave. A few pockets of red clays with well developed surge marks (Bull, 1978) are preserved in wall alcoves and may reflect either falling water levels during phreatic abandonment, or later ponding after sealing by sediments. On the south side of the Box Tunnel, horizontally bedded sands with interbedded silts and red clay occur. There is no evidence of any vadose modification anywhere in the cave.

The position of this phreatic passage high on the side of Shute Shelve Hill suggests the cave is very old. Certainly, it is completely unrelated to the modern hydrology, containing only a few small percolation inlets. The passage is comparable in size to the main phreatic conduit in Gough's Cave, Cheddar (Farrant, 1991), which has a catchment area of approximately 54 km^2. The dimensions of the passage indicate the cave must have drained an area of similar size, much larger than that afforded by Axbridge Hill and therefore the catchment must have once extended further to the north, east and west.

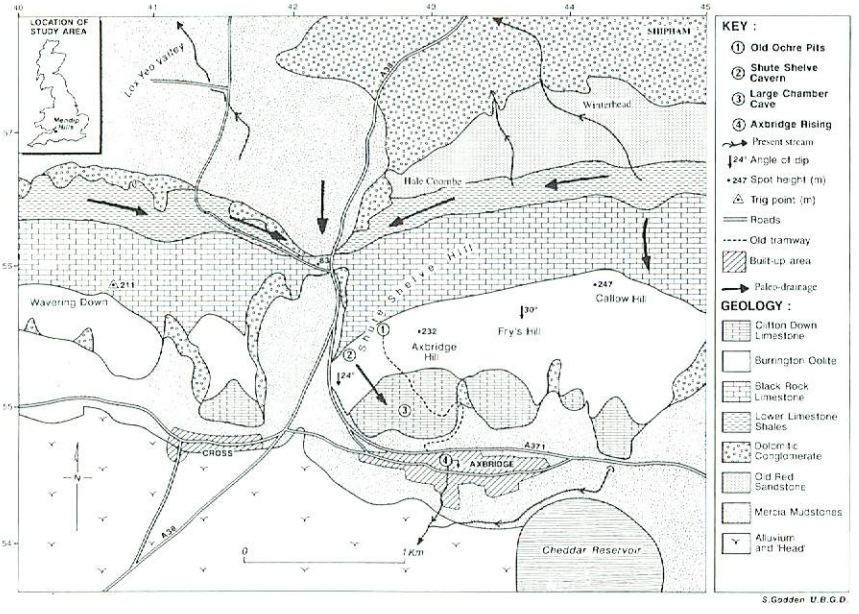

Figure 3. *The area around Shute Shelve hill showing Present and Paleo-Drainage.*

The western boundary of the catchment may have extended as far as Crook Peak, 3 km to the west and as far east as Tynings Farm, to the north of Cheddar. The main catchment was probably allogenic and extended into the area now occupied by the Lox Yeo valley, presumably prior to the removal of the Triassic and Lower Jurassic rocks which once filled the valley. Surface drainage almost certainly would have developed on the impermeable Mercia Mudstones overlying the Dolomitic Conglomerate (and also on any Lower Lias rocks which may have existed prior to erosion) in the Winscombe-Shipham area, and may have flowed onto the limestone in the Shute Shelve area, where the Mercia Mudstones overlap onto the Black Rock Limestone at the lowest point on the southern flank of Mendip, east of Loxton (Figure 3). Any water flowing through Shute Shelve would have sunk at the contact with the limestone, and drained down dip towards Axbridge via Shute Shelve Cavern.

Since then, preferential erosion of the softer Mercia Mudstones against the harder Dolomitic Conglomerate and Old Red Sandstone has radically altered the

drainage pattern in favour of the present Lox Yeo River. At first, drainage was to the south, through the limestone at Shute Shelve and Shipham Gorge. Then as the erosion of the softer Triassic Mercia Mudstones proceeded, harder Old Red Sandstone was exposed from under the Triassic cover and drainage reverted to the exhumed pre-Triassic Lox Yeo valley. This had the effect of reversing the surface drainage in the Hale Coombe-Winterhead area, cutting deep valleys to the north, through the sandstone, north of Axbridge Hill and causing the abandonment of Shute Shelve Cavern. This beheading of the catchment may explain the lack of vadose modification in the cave.

Other sites on Axbridge Hill, such as Large Chamber Cave may be choked downstream fragments of the same conduit system. Today, only autogenic percolation water draining Axbridge Hill feeds the rising in Axbridge Square.

THE AGE OF THE CAVE

A sample of clean speleothem was taken from the flowstone cascade in Reynard Chamber for uranium series dating. The uranium and thorium isotopes were chemically separated using standard techniques (Ivanovich and Harmon, 1992), electroplated onto stainless steel planchettes and counted by alpha spectrometry. The results are shown below.

Sample No	U234/ U238	Th 230/ Th232	Th 230/ U238	Th 230/ U234	Age (ka)
6855 (Upper)	1.22± 0.01	106± 16.1	1.05± 0.02	0.86± 0.02	191 ± 80
6862 (Lower)	1.13± 0.01	47.5± 1.85	1.16± 0.02	1.02± 0.01	>350

The sample yielded ages of 191 ka (126-270 ka, 2 sigma errors) for the upper portion and in excess of 350 ka for the lower portion of the stalagmite. These dates indicate that the cave had been abandoned by 350 ka and probably much earlier as the stalagmite flow lies on breakdown rather than the original bed-rock floor. This implies the Lox Yeo valley was functional by at least 350 ka. Further samples of speleothem and sediment have been taken for dating using mass spectrometric (Edwards *et al.*, 1987) and palaeomagnetic techniques (Tarling, 1983) respectively. This should give a more precise age for the cave and enable a proper chronology to be deduced.

DISCUSSION

It is possible that the 'Lost Cave of Axbridge' has now been discovered. The miners certainly entered Reynard Chamber, as they erected pit props and dug

trial pits. The amount of haematite and ochre still present on the floor of the lower chambers and the lack of miners artifacts suggest that they did not penetrate further than Reynard Chamber. Reynard Chamber is not as large as Axbridge square, although the miners almost certainly would have over-estimated and exaggerated the size of the chamber, especially with the poor lighting available to them. Shute Shelve Cavern does not lie at the end of the tramway, as intimated by the miners, but it is possible that when the Axbridge Caving Group members were first taken by the old miner to the end of the tramway, which over the years has become indistinct, the point they reached may not have been the original end. There are some fragments of a possible tramway downslope from the entrance. According to the miners, the 'Lost Cave' was walled off and backfilled. There is no evidence for this in Shute Shelve Cavern, although the miners point of entry is badly affected by collapse. Although initially Shute Shelve Cavern was thought to be the 'Lost Cave', the evidence in favour of it being so is far from conclusive.

Higher up the hill, more old ochre workings are present, marked as Quarry (dis) on the O.S 1:25,000 sheet ST 45/55, one of which follows a natural rift 6 m wide and in excess of 10 m deep. The end of the rift is masked by collapse and appears to have been partially backfilled with spoil. Large, well developed phreatic scallops are present on the walls, along with remnants of ochre. The evidence suggests the rift was once infilled with ochre and cleaned out by the miners who later partially backfilled it. Furthermore, this site does lie at the termination of a tramway. Digging at this site may reveal another potential candidate for the title 'Lost Cave of Axbridge'.

ACCESS

The land on which the cave is located is owned by the National Trust and after negotiations with them and the Somerset Bat Group, the cave was gated. Access is restricted to the summer months (May to October) under a leadership scheme administered by the ACG as the site is a winter bat roost. At the time of writing, the key can be obtained by writing to Cliff Dockerell, 7 The Mead, Shipham, Somerset, BS24 1TP, giving a few days notice.

ACKNOWLEDGEMENTS

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NOTES ON THE SURVEY

The survey was carried out by members of the ACG (Ewan Black, Cliff Dockerell, Alan Gray, Robin Williams, Andy Tyler and Geoff Yeates) using Suunto instruments. The survey was drawn up by Alan Gray and Andy Farrant and is to BCRA grade 5.

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