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FLEET STREET, MANOR FARM SWALLET, CHARTERHOUSE ON MENDIP, ST 498.556

by

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ABSTRACT

Fleet Street, an inlet passage in Manor Farm Swallet discovered in 1980, is described. The source of severe pollution of the stream is discussed. A silt in the new passage appears to be among the oldest sediments in the cave. The normal magnetization of the silt suggests deposition during the past 700,000 years. By implication, the cave is unlikely to be much older than this.

INTRODUCTION

Manor Farm Swallet was first explored in 1973 (Smart and Stanton, 1974). At that time the 7m aven, which brings a tributary to join the main stream at Stream Junction, was climbed and the passage at the top explored. The explorers halted at a stalagmite barrier which seemed to seal the passage, the small stream passing through a constricted hole at floor level. In 1980 the authors revisited the passage at the top of the aven and passed the constriction to discover a further 133m of inlet passages which throw some light on the age of formation of the cave. This article describes the new passages and discusses their significance.

EXPLORATION AND PASSAGE DESCRIPTION

The 7m aven ('The Aven, Figs. 20 and 21) was climbed using artificial aids in two trips in September 1980. The stalagmite barrier 40m from the top of the pitch has a small hole at the base. The stream has become badly polluted since 1974 and the floor of the hole is a noxious pool of liquid mud capped by sewage fungus. After a good deal of mutual encouragement the hole was passed by a flat out wallow, face down in the mud, and we could stand up in open passage on the far side. A rift passage continued ahead to boulders. On one wall were a few tell-tale smears of mud which suggested that we were not the very first explorers. A climb up through the boulders led to a large chamber with water dripping from a ledge 10m above its far end. The ledge is guarded by an overhanging boulder and is totally inaccessible from below. A climb was tried on the shaly rock of the right hand wall, but it is rotten and eroded by drips of water entering from the roof. Eventually a way was found by climbing a slope of boulders and stalagmite above our point of entry to the chamber. From the point where the slope meets the roof a ledge follows the left hand wall of the chamber, about 1m below the roof. The ledge is floored by mud first, then by extremely loose boulders but is easily traversed by crawling. At the far end we were 3m directly above the overhanging ledge which was our objective, and could see two open

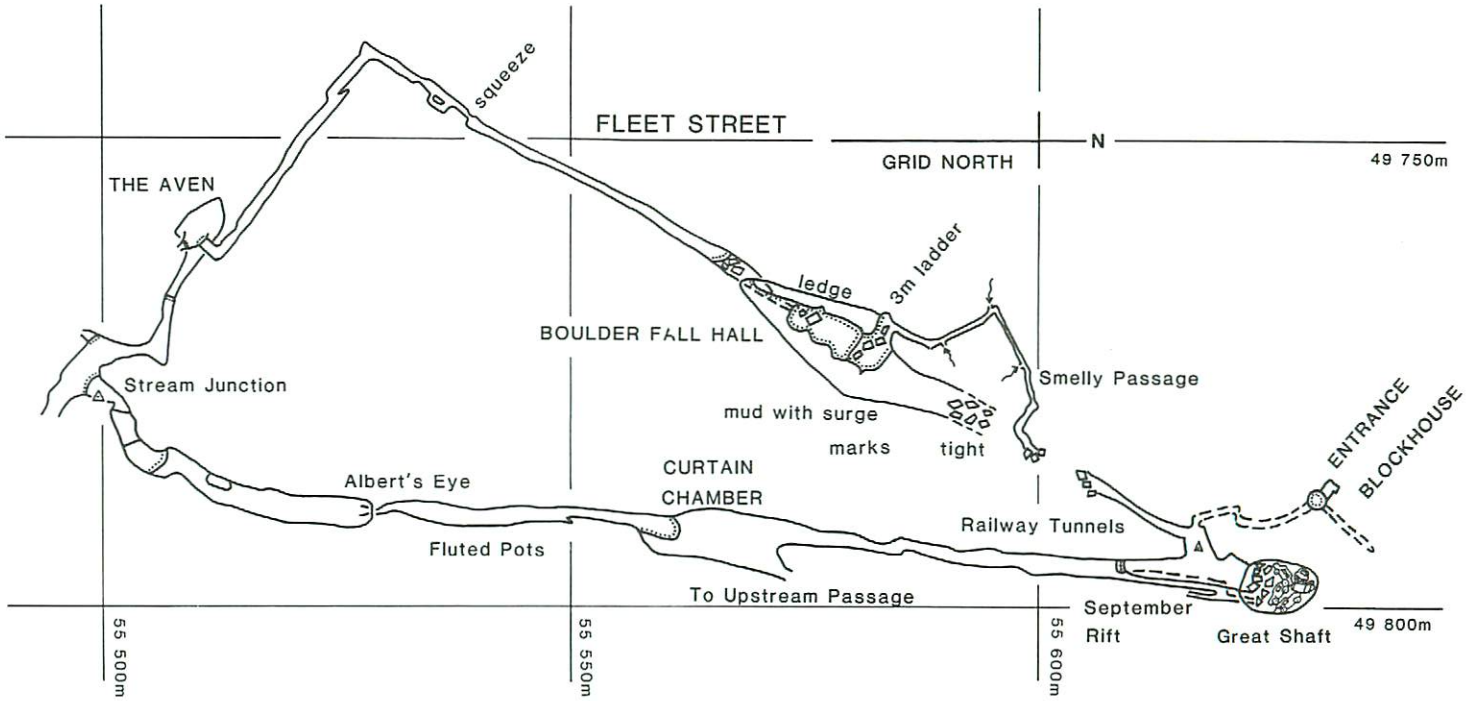

Fig. 20. Plan of Fleet Street and the upper part of Manor Farm Swallet.

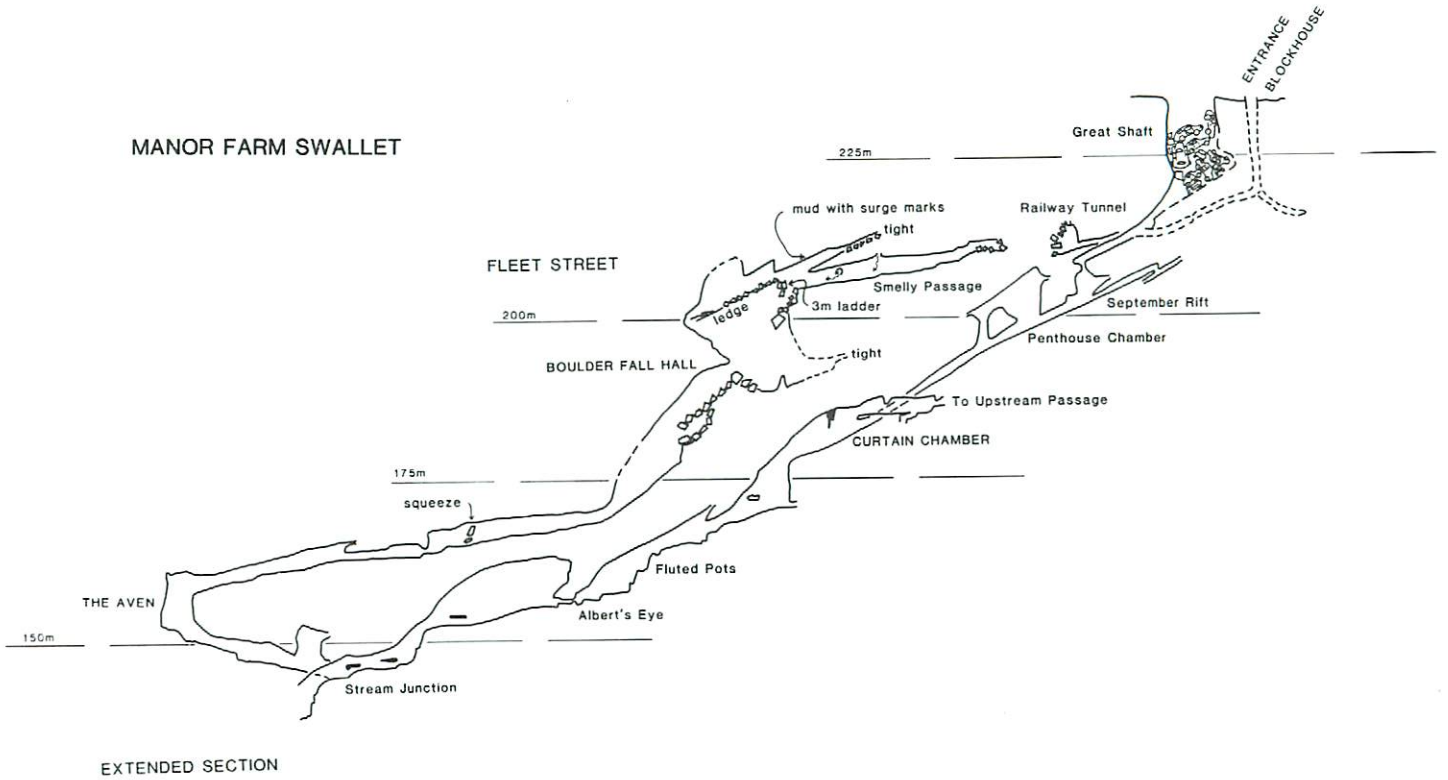

Fig. 21. Section of Fleet Street and the upper part of Manor Farm Swallet. Altitude lines in metres A.O.D.

passages continuing. The loose boulders made the climb down look less than safe, so exploration was delayed until a return visit could be made with a short ladder and pitons to belay in the crumbling shale of the wall.

On returning, we found that the left-hand passage (Smelly Passage, Figs. 20 and 21) was a tight, sharp rift with three inlets of polluted water from narrow fissures in the walls. The second is particularly noxious and has formed a dome of sewage fungus over a stalagmite boss, almost blocking the passage. Beyond, a tight wriggle with caver's debris including shreds of neoprene, wire and a pencil, ends where a boulder blocks the passage. This point is very close to the boulder choke in the western (U.B.S.S.) dig at the Railway Tunnels, at the foot of the Great Shaft.

The right hand passage, reached by a short scramble, is a low bedding plane, blocked after 12m by boulders extending almost to the roof. Where it has escaped erosion by invading drip waters from the roof, the boulders are covered by a layer of silt with dendritic surge marks. Both boulders and silt have been undermined and tilted from their original positions by erosion. In one place the boulders appear to rest upon a layer of fractured flowstone, which itself has a scalloped surface.

The new extension was named Fleet Street, because of the association between the polluted trickles flowing through it and the Fleet Drain in London. It appeared subsequently that the previous explorers, who had left the mud smears on one wall, were a group from the London area who had maypoled The Aven a few weeks before our own climb. Boulder Fall Hall was named from the shower of rocks which descended spontaneously from the ledge traverse in the Hall onto station 13 during the survey. The ledge is extremely loose and unstable.

All of the climbing equipment was removed from The Aven and the climb into Smelly Passage once the survey had been made. Future parties will have to devise their own method of reaching this noxious little collector's piece.

DISCUSSION

The whole of Fleet Street appears to have formed as an early vadose inlet to the cave from a swallet at the Great Shaft. This inlet was abandoned by the stream in favour first of September Rift and Penthouse Chamber and, later, of the Upstream Series (both of which are lower), with the swallet migrating up the valley to approximately its present position. The water which now enters the roof of Boulder Fall Hall appears to come from seepage into the dry valley floor overhead. The sewage polluted trickles in Smelly Passage must derive from the yard at Manor Farm. The pollution has become much worse in recent years, and this may indicate recent cracking of a drain or concrete surface in the yard.

The section of deposits in the right hand passage above Boulder Fall Hall consists of silt (5-20cm) with surge marks, overlying break-

down blocks and, apparently, scalloped flowstone. The silt is not seen resting directly upon the flowstone, but covers fallen blocks which a few feet away rest upon flowstone. It is inferred that the silt once covered the whole floor but has been partly eroded away by trickles of water which now enter from the roof nearby. The section appears to indicate the following sequence of events.

1. Excavation of the cave passage.
2. Deposition of flowstone on a floor abandoned by the stream.
3. Return of streamflow to produce scalloping.
4. Collapse of roof.
5. Flooding, with silt deposition. Fluctuating water levels indicated by dendritic surge marks.
6. Drainage, followed by partial erosion of the deposits by recent invasion water.

During the flooding episode indicated by the silt the water level must have been close to the site of the deposits, as dendritic surge marks are believed to form in areas of fluctuating water level (Bull, 1976). The deposits are now high in the roof of the cave and are quite unlike the gravels seen on the floor of the main stream passages. Therefore, they are probably of great age, and may have been laid down only shortly after the earliest stages of the cave's development. Any method of estimating the age of the deposits provides a clue to the antiquity of the cave. A sample of the flowstone layer has been collected for uranium-thorium dating but results are not available yet.

A compass-oriented core of sediment was taken from an undisturbed part of the silt layer and transported out of the cave with the minimum of disturbance. The sediment surface at the site of the core was inclined at 30° south on a strike of 90° magnetic. In the laboratory the core was sliced longitudinally and inspected for signs of disturbance. Three oriented cylindrical sub-samples 2.5cm long and 2.5cm in diameter were taken from undisturbed laminae at the centre of the core. Their remanent magnetic properties were measured using a spin magnetometer. Results were as follows:

Intensity (10^{-6} gauss)	Declination (deg.)	Inclination (deg.)
4.78	350	-4.3
4.23	350	18.5
5.89	13	16.0

The inclinations on all three sub-samples are much less than the main component of the earth's magnetic field in Britain (67°; Tarling, 1971, pp. 94, 98). A possible reason for this is rotation of the silt particles during or since deposition. The declination results are consistent in indicating a poleward direction close to the present one. Conceivably, this might result from remagnetization of wet sediment since deposition, but recent studies have shown that remanent magnetization is quite stable in even very wet silts provided that they are not physically disturbed (Verosub *et al.* 1979). Our data may be interpreted as indicating that the earth's magnetic field had the same polarity at the time of silt deposition as it has today.

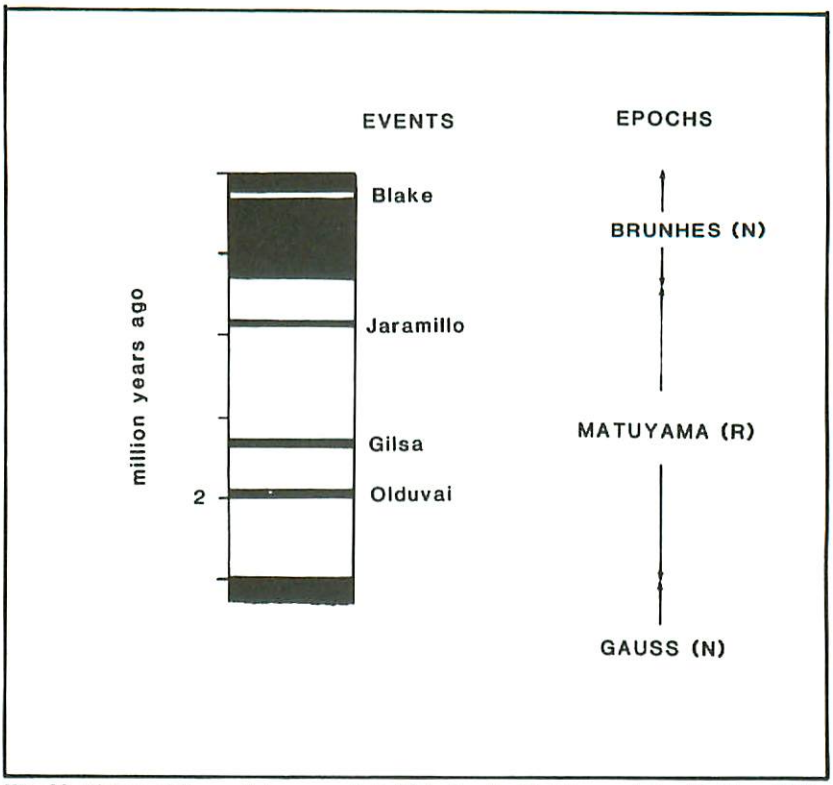

Fig. 22. History of the earth's magnetic field during the Pleistocene (after Tarling, 1971). Shaded and N = normal; unshaded and R = reversed polarity.

Study of the magnetic field in the past, based upon the magnetization of dated lava flows, has shown that the main field has reversed direction several times in the last few million years (Tarling, 1971; Fig. 22). The last reversal, called the Matuyama magnetic epoch, lasted from c.2.5 million years B.P. to about 700,000 y B.P. It seems very unlikely that the silt is as old as 2.5 my, which it would have to be if its normal magnetic polarity were due to deposition in the Gauss epoch of normal polarity. It is also unlikely that it was deposited during one of the three short periods of normal magnetic field which punctuate the Matuyama. The most likely explanation is that the silt was laid down sometime during the present Brunhes epoch, less than 700,000 years ago. By implication, these uppermost passages in the cave could well have been formed by this date.

SURVEY

Fleet Street was surveyed to B.C.R.A. Grade 5 in November 1980 by the two authors. Other passages are redrawn from the survey by W. I. Stanton in Smart and Stanton (1974).

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