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THE SWALLOW HOLE ON FORTY ACRE FARM, ALVESTON, AVON

by

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ABSTRACT

A swallet depression at Alveston, Avon, to the north of Bristol has been excavated. A natural shaft, roomy at first and completely filled with sediments, was cleared back to its solid rock walls to 6 m depth, where it became much more constricted. A narrow 6 m long passage was forced horizontally away from the foot of the shaft along the intersection of a joint and a bedding plane. In the course of excavating the mud and rocks which lay beneath the uppermost (very recent) soil infill, a small but unusual group of bones, including human bones, was recovered. Archaeologically the assemblage is uncommon in several respects, and it is suggested that the bones were thrown into the swallet, then an open pit, during the mediaeval or post-mediaeval period.

THE GEOLOGICAL SETTING

Close by the footpath which passes eastwards across the fields from St. Helen's Church, Alveston, a tiny stream, often absent in summer and little more than a field edge drainage ditch, terminates abruptly against a water-worn face where the Clifton Down limestone is exposed. This has a southerly, regional dip of about twenty degrees. This location (FIG. 1) is indicated on the six inch Geological Survey sheet ST 68 NW as 'Dark clay on limestone' at an altitude of approximately 95 m. There are also 'solutional hollows' along the junction between the blue clay and the limestone. Two such depressions in the adjacent field were filled and levelled in September 1979.

The stream gathers its water from level pasture land established on the overlying Rhaetic and White Lias clays which extend eastwards and southwards towards the M5 motorway. These beds may be up to 12 m thick, but they were deposited unconformably on an irregular limestone surface, and may well be thinner in places, as evidenced by shallow depressions and occasional small solutional collapses. To the west of the swallow hole, the secondary cover is absent. Grazing is less restricted here because the soil structure is less easily damaged, whereas on the heavy blue and yellow clays just to the east cattle have to be over-wintered indoors.

Unlike the situation in the Mendips the geological sequence is complicated by the presence of the Cromhall Sandstone (subordinate beds of sandstone and grit) which could have promoted a high or perched water table which hindered solutional development and thus the chances of cave formation. In this district the present limestone-clay junction may also be too recent for extensive solutional activity to have occurred.

THE HISTORIC SETTING

The following account, taken from *Alveston, our village within living memory* (1959), gives a colourful impression of the ground conditions once to be found in the area:

To the right of the church path as one passes 'The Lawns' on the left, is one of several 'whirly holes' in the parish, now dry but some years ago still with water that swirled round with the force of the springs feeding it. Others may be found, usually concealed by brambles, in a field below Wolfridge on its south west side, midway between the new church and Shellards Lane, and in the field to the east of the Black and White Garage. They are not now very deep, although about five years ago a farmer had great difficulty, even with the help of a tractor, in extricating a cow from one. Their sides have crumbled and filled them in so that they no longer merit the description of 'frightful chasms' given them by the Alveston Naturalist more than a hundred years ago. He wrote: 'In a direction nearly east and west, in a line pointing to the Severn a number of sinkings and pits are observable, like abandoned shafts, or the commencement of mines. They are called by the country people 'whirly pits.' In some instances the bottoms are not visible, owing to the tortuous irregularity of the passages; in other cases they are only deep hollows covered with turf. These sinkings are evidently occasioned by the lowering of the surface in consequence of the removal of the support beneath. . . . These removals have been occasioned probably by a stream of water running far beneath, and washing away the support. . . . and in part by the superfluous water from the ditches and watercourses above draining away into the fissures of the rock. . . . Some of them present dark and frightful chasms. . . . Many a fox when hard pressed has been known to make for these 'whirly pits' as his last resource. . . . I once saw one of these animals dead at the bottom.'

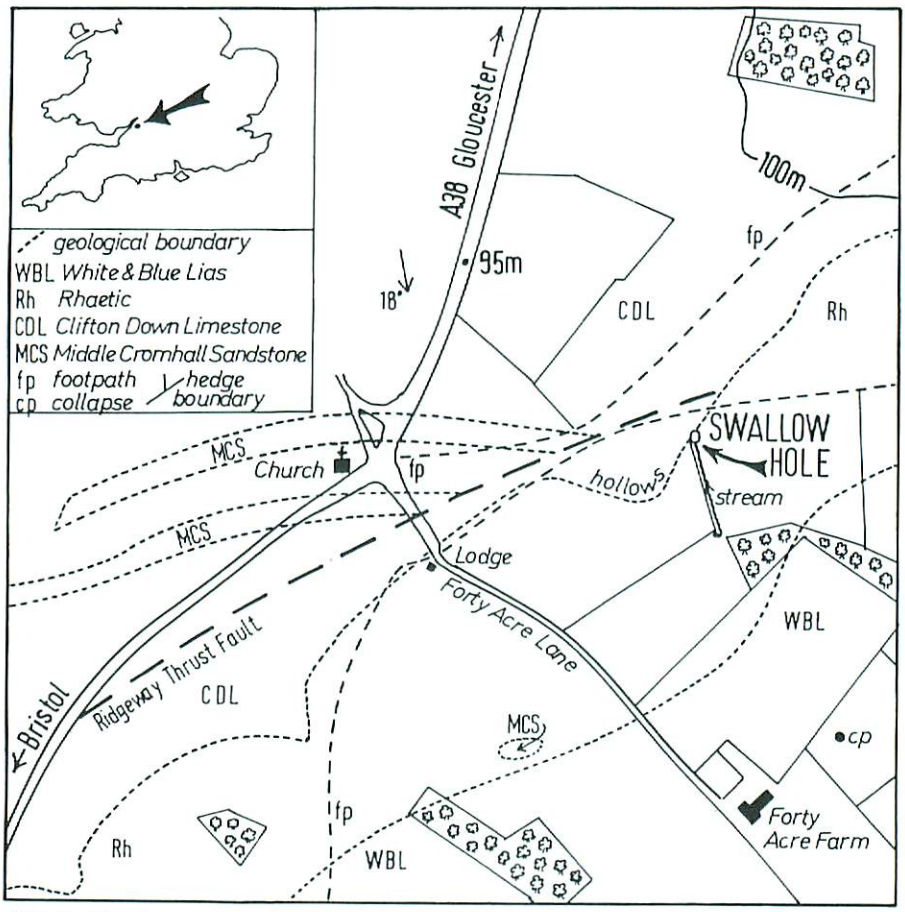

FIG. 1—THE ALVESTON SITE AND ITS GEOLOGY, KM SQUARE ST6387. SOME HEDGE BOUNDARIES BETWEEN THE CHURCH AND THE SWALLOW HOLE HAVE BEEN OMITTED FOR CLARITY

The swallow hole on Forty Acre Farm is the one referred to as 'midway between the new church and Shellards Lane'. The 'Alveston Naturalist' was John Leonard Knapp, born 1767, who lived in Alveston 1815–1845. It is probable that many of the pits would have been caused by the gradual 'crowning' of the clay cover over a solutional hollow or fissure in the underlying Carboniferous Limestone or even White Lias limestone beds, until the loss of support caused the 'bridge' to collapse. One of the writers (AC) was shown such a collapse near Forty Acre Farm, which occurred during the wet Christmas of 1985, and was told of another that occurred at the lodge on Forty Acres Lane in 1978. The 1959 booklet refers to now infilled areas of gruffy ground in the district. Although these trials for galena are unlikely to have been taken through the Rhaetic Clay cover, their presence may have added to the number of occurrences cited.

These level meadows extending eastwards from the A38 do not remind one of 'cave country', and the subsequent excavations at the swallow hole did not contradict this impression. The ridge of Carboniferous Limestone which borders the Severn plain north of Bristol is not altogether bereft of speleological interest, however, for example Pen Park Hole ST 58487920, and Alveston Bone Fissure ST 61448503.

THE EXCAVATIONS

The excavation began, in the autumn of 1977, against the rock face where the water was sinking, this being the only location where digging was possible (FIG. 2). This involved the removal of sediments mixed with plant matter so that the inflowing streams, the main one from the south and a small one from the north, could be redirected leaving a relatively dry place to work.

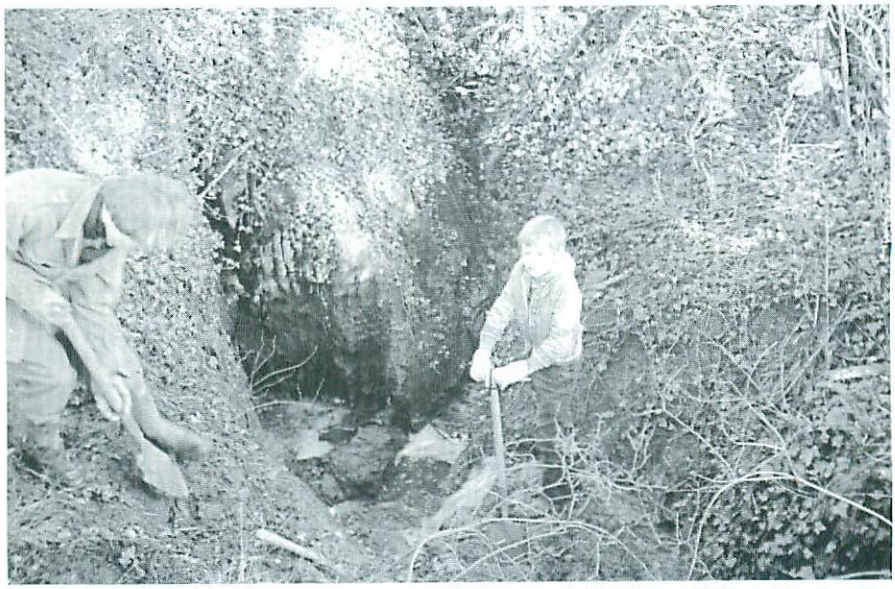

FIG. 2—THE SWALLOW HOLE AT THE START OF EXCAVATION IN NOVEMBER 1977, LOOKING NORTH
Phot.: A. G. Clarke

The southerly stream came to sink more or less permanently on the southern edge of the swallet, and a 'catch-pit' was formed by building a low block wall here. This catch-pit had to be frequently cleared of stream-borne debris to maintain drainage away from the excavation. Water sinking at the catch pit never returned to the shaft (see below). The much smaller inflow on the north side, really a piped field drain, was much less persistent.

By the spring of 1978 it was clear that the excavation was at the eroded intersection of two vertical joints meeting at about sixty degrees. This had resulted in a prominent 'nose' of very sound limestone dominating the shaft on the north side (FIG. 3). This was later undercut by the excavation and formed a considerable overhang in the shaft (FIG. 4). The underside of this pierced rock is the level to which the shaft was originally filled with clay, and is taken as the zero datum for any depths given.

FIG. 3—THE 'NOSE' FORMED BY INTERSECTING JOINTS
Phot.: A. G. Clarke

By June 1978 a very sticky blue-grey clay, greatly contaminated with rotted leaves and sticks in the upper part, had been removed to a fairly uniform depth of 1.5 m (FIG. 5). A few more open and less clayey parts were present where the clay had been washed away from between jammed stones. The shaft had been cleared right back to the rock walls for safety of access and convenience, and had yielded occasional finds of bone. This uniform, muddy sediment was succeeded, in a rather ill-defined way, by 0.3 m of small rocks, where a looser, voided structure was the result of water erosion of the muddy matrix. It was at this level that the association of many bones with the looser texture and easier digging became evident. As the excavation was taken back to the rock walls, many of the larger bones were recovered from voids close to the face, and were frequently 'cemented' to it.

FIG. 4—VIEW SKYWARDS AFTER REMOVAL OF INFILL. NORTH IS TO THE RIGHT-HAND SIDE, SOUTH TO THE LEFT-HAND SIDE
Phot.: A. G. Clarke

FIG. 5—SHAFT PROTECTION AND HAULAGE
Phot.: A. G. Clarke

At 1.8 m depth, and right across the base of the excavation, there followed a zone of broken rock, largely washed clean, and containing many bones which could readily be recovered. The 1.5 × 1.5 m shaft was rapidly tapering, and below lay a loose boulder choke between narrowing vertical walls, later made 0.6 m wide to a depth of 2.5 m. On one day in July 1978 a bucketful of bones was removed, mainly from mud at the south end. It was possible to see into 1.2 m of a narrowing cleft, and the neck of a bottle typical of the period 1670–1710 was retrieved, again from mud deep in the south end. It was assumed that this had been carried in with mud mobilized by water. Several other fragments of bottles had been found at the south end, but at a higher level. In one instance three pieces of dark green glass, retrieved quite separately from the mud, were found to match and formed a complete base, 12 cm in diameter.

By autumn 1978, work was confined to a vertical slot on the west side of the shaft (Fig. 6), with a deep, narrow, vertical joint visible below and trending southwards and inwards, back under the stream bed. Whilst widening this joint, many bones were found amongst loosely packed stones. At 5.9 m depth, further vertical progress became impossible (Fig. 7). The excavation then proceeded horizontally, southwards and down-dip, away from the base of the shaft, following the aforementioned eroded joint and also the bedding plane above it.

During the winter of 1979–80 water accumulating in the floor had hindered progress, and the view ahead closed to a 5 cm gap. Wherever clay had been excavated to deepen the floor and make working space, this became a long pool which persisted for several months at a time during wet periods, halting all work. Leaf matter caught in the roof, and empty plastic bottles perched on the side of the shaft suggested backing-up during floods, and it became obvious that heavy water input could only find its way out of the shaft by several very narrow routes. A solitary scapula, wedged in a cleft, had been the only bone find in this part of the excavation.

It was at this juncture, during the summer of 1980, that the shaft was completely divided into a northerly and a southerly section by the construction of a mortared, vertical wall of 150 mm concrete cubes, 36 courses high, and varying in width from 0.6 m at the bottom to 1.3–1.5 m at the top. This was intended to provide dumping space on the north side, and to keep the excavation clear of debris. The narrow south side of the wall then became an easy 6 m ladder climb.

The way on became increasingly cramped as a firm yellow clay was dug from a constructed vertical joint in the floor. Attempts were also made to make more headroom in the roof. In April 1980, the excavation 'holed through' on the left hand side to connect with a separate rift which took the water from the 'catch pit' above. The compact yellow clay was an older deposit and quite distinct from the soft organic clay described above.

The final session of excavation took place in the summer of 1981, when a wide pit was formed by removing mud to a depth of 1.2 m, exposing honeycombed, rotten rock, but finding no more bones. Fragments of Cromhall Sandstone were picked out of this mud as it weathered on the surface. The excavation had reached a point only 6 m away from the foot of the shaft, and 2 m away from a point vertically beneath the ancient oak tree on the bank above.

The pool persisted between September 1981 and April 1982, but had subsided by May, leaving a residue of knee-deep, soft, water-logged mud. The pool had reformed by September 1982, and seems to constitute a soakaway amongst mud-filled narrow crevices. On 30th November 1986 only

FIG. 6—VIEW NORTH AT 3–4 M DEPTH
Phot.: A. G. Clarke

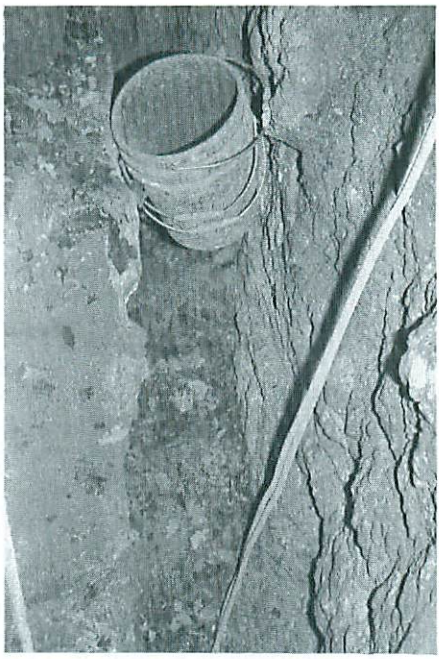

FIG. 7—VIEW SOUTH IN NARROW VERTICAL JOINT
Phot.: A. G. Clarke

a tiny stream was sinking in a small, much reduced, muddy pool. In March 1982 a dye tracing experiment was made under conditions of low water flow (approximately 1 gal/min). This proved negative to Thornbury Sports Centre (ST 63508930), Washingpool Hill (ST 61658655) and Tytherington (ST 67008825).

THE VERTEBRATE REMAINS

Introduction

The excavations of this active swallet at the Rhaetic/Clifton Down limestone interface led to the recovery of a small assemblage of bones as described above. These were found mainly in the upper layers, in a heavy, clayey sediment in which it was difficult to discover and to extract the bones. No sieving was undertaken and, bearing in mind the sediment, it is likely that some smaller bones will have been missed. Additionally, at lower levels many of the bones were recovered from voids in the sediment, often with heavy concretions and adhering to the swallet walls. They appeared to occupy a single 'horizon'—though no actual stratigraphy was observed—below the most recent sediments at the top of the sequence but above the yellow mud and other more recent infill in the lower, horizontal passage. There were no finds other than the bones, so that no dating (other than ^{14}C) is possible. Most of the bones are from large mammals, and many are relatively complete; it is unlikely, therefore, that a significant proportion of these were not recovered.

The bones remain in the possession of Alan Clarke.

The bone assemblage

Bones from five species were identified, and only 14 bones were not identified to species: ten small fragments of unidentified mammal, three fragments of rib from a sheep-sized animal (possibly fallow deer, this being the only species of comparable size identified), and a complete left femur which appears to be of cattle, but is very small (8.5 cm long), even though unfused. It is possible that this is from a perinatal individual, but the diaphysis appears to be too well formed to be so young.

The identified species are cattle (*Bos taurus*), horse (*Equus caballus*), fallow deer (*Dama dama*), rabbit (*Oryctolagus cuniculus*) and human (*Homo sapiens*). These are summarized in TABLE I.

The commonest species is fallow deer (50%). The bones of this species are predominated by antlers (21%) and femora (15%), and long bones generally are common (TABLE I). Eight of the antlers were not shed and two had been shed. There is a lack of any other cranial material, other than two mandibles with permanent dentition, but the unshed antler must indicate killing of the animals rather than simple collection of the shed antlers. The minimum number of individuals (MNI) represented by the antlers is eight, and this corresponds with the MNI obtained from the post cranial material (tibiae). Two of the latter are from infants, three from juvenile/sub-adults and three from sub-adults and older (one of which is definitely adult). The antlers, however, do not appear to come from infants so that the MNI would appear to be ten, at least. There is no evidence of any butchery on the fallow deer remains. A few of the bones were measured, and a selection of the measurements is given in TABLE II.

TABLE I—*Summary of bones from Alveston swallow hole*

Species	*Anatomy*	*Number*	*Percentage*
Cattle	horncore	1	
	mandible	5	
	teeth	2	
	vertebrae	6	
	rib	6	
	humerus	3	
	radius	1	
	pelvis	6	
	femur	4	
	fem. epiph.	3	
	tibia	8	
	metatarsal	3	
	total	48	29.1
Horse	tooth	1	
	metacarpal	2	
	pelvis	2	
	femur	2	
	tibia	3	
	metatarsal	1	
	total	11	6.7
Rabbit	humerus	1	
	tibia	3	
	metatarsal	1	
	total	5	3.0
Fallow Deer	antler	17	
	mandible	2	
	vertebrae	4	
	scapula	4	
	humerus	6	
	radius	8	
	ulna	1	
	metacarpal	6	
	pelvis	3	
	femur	12	
	tibia	9	
	calcaneum	1	
	metatarsal	8	
	1st plalanx	1	
	total	82	49.7
Human	femur	2	
	tibia	2	
	fibula	1	
	total	5	3.0
unidentified	rib	3	
	femur	1	
	indet.	10	
	total	14	8.5

TABLE II—*Selected measurements of bones, Alveston swallow hole*

Species	*Anatomy*	*Dimension*	*Measurement* mm
Cattle	humerus	DB	66.5
	femur	DB	78.2
		PB	38.1
Horse	metacarpal	PB	40.6
		DB	56.4, 43.5
		GL	235.0
	tibia	PB	84.0
		DB	70.0, 67.6, 69.5
		GL	346.9
	metatarsal	PB	43.5
Fallow Deer	humerus	DB	35.0, 35.5, 37.5
	radius	PB	37.0
	metacarpal	PB	25.2
	femur	PB	25.4
		DB	44.0, 45.0, 46.5
		GL	211.5
	tibia	PB	45.0
		DB	31.3, 32.3
		GL	251.2
	metatarsal	DB	28.1, 28.0
		GL	207.3, 209.0

key—GL: greatest length DB: distal breadth
PB: proximal breadth

Next most common are cattle (29%) and, though tibiae are the most common element (17%), pelves (12%) and mandibles (10%) are also prominent, TABLE I. As with the fallow deer, cranial elements (excepting mandibles and horncores, in parallel with the deer) are absent, and it is the limb bones which form the bulk of the material. A minimum of six individuals are represented, two of which are infant, two juvenile, one sub-adult and one sub-adult or older. There is no evidence of butchery.

There are eleven bones of horse (7%), most of which are long bones. Three of the four individuals represented are adult, the other being juvenile/sub-adult. Measurements, summarized in TABLE II, indicate that horses of about 1.5 m (14.4 hands) in withers height are represented.

The five bones of rabbit are modern in appearance in comparison with the heavily stained and often eroded bones of the other species, and are likely to represent modern intrusions.

Finally, there are five bones (3%) of human: a pair of femora and tibiae, and a fibula, all from the same individual. The bones are fragments of diaphysis only, but appear to be fully formed (and thus fused), representing an adult, aged about 20 or more (Brothwell, 1972, Fig. 25).

Discussion

This is an odd assemblage because it is not a natural death assemblage—had it been so one would have expected complete skeletons in the case of 'pit-fall' deaths. Archaeologically, too, the frequencies of species, range of species and anatomical representation are unusual. The absence of sheep and pig, for instance, is noteworthy—an archaeological deposit of general domestic refuse would normally comprise sheep and pig as well as cattle. If it is

assumed that all the bones of the large mammals were recovered (and this seems reasonable), then the conclusion must be that these bones were deliberately thrown away in the swallet, perhaps as rubbish (though surely not including the human remains). The anatomical representation, however, is rather at odds with this idea, especially the remains of the deer and the fact that there is no evidence of any butchery. The presence of fallow deer argues for a date later than Norman (Corbet and Southern, 1977, p. 433). At present they are still found in Gloucestershire and Avon (Corbet and Southern, 1977, Fig. 174), but do not now occur in the immediate locality of the site. There is no suitable dating evidence available, but one may speculate that the deposit relates to a time when open forest was more extensive in the area, perhaps mediaeval or post-mediaeval. They may represent remains from hunting or even poaching activities, but the odd anatomical representation and lack of butchery belie this to some extent.

The human bones also represent a puzzle. Clearly one individual is represented, but this can hardly be seen to represent an inhumation. The fate of the rest of the bones, or the reason for the presence of those here must remain a mystery. The fact that all the bones were part of a single 'horizon' may mean that they were all deposited on a single occasion, and this raises the possibility that they were moved from a primary deposit elsewhere, but this is speculative.

This deposit cannot, therefore, be seen as a straightforward rubbish dump since the species represented are very restricted (with no sheep or pig present), and comprise unusual elements (the human bones). A reconstruction of the manner in which the bones were deposited is, perhaps, more simple. At some time in the past, possibly during the mediaeval period, the site would have been an open pit with a rocky floor. Bones were brought or thrown in—the number of deposition events is uncertain—possibly over a relatively long period of time. Eventually field drainage ditches were put in and the pit became a mini-swallet. Over a number of centuries the pit was filled with organic muds which covered the bones. Periodic flooding mobilized the sediments, redistributing and jumbling the bones.

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REFERENCES

ALVESTON WOMEN'S INSTITUTE. 1959. *Alveston, our village within living memory.*

BROTHWELL, D. 1972. *Digging up bones.* London, British Museum (Natural History).

CORBET, G. B., and SOUTHERN, H. N. 1977. *The handbook of British mammals.* Oxford, Blackwell.

[KNAPP, J. L.] 1928. *The journal of a naturalist.* London, Murray (4th edn. 1938).

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