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THE MESOLITHIC HUMAN SKELETAL COLLECTION FROM AVELINE'S HOLE: A PRELIMINARY NOTE

by

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ABSTRACT

Aveline's Hole is an important Early Mesolithic (c. 9000 BP) cemetery site in the Mendip Hills, investigated many times since its discovery in 1797. The majority of the finds from the cave, together with the site documentation, were destroyed during a bombing raid on Bristol in World War II. Here, we summarise work in progress on the small amount of surviving human skeletal material from the site, highlighting the information that can still be gleaned from partial and fragmentary collections. At least 21 individuals are represented in the surviving collections, comprising adult men and women, and subadults including both children and infants. Preliminary information is presented on demography, pathology, bone modification, diet and levels of activity as seen in changes to muscle attachment sites on the bone. A full report on the reassessment of the human remains from the site will be forthcoming.

INTRODUCTION

The collection from Aveline's Hole on the Mendip Hills, North Somerset (Figure 1) comprises the largest known collection of Mesolithic human remains in the British Isles and one of the largest in Europe. Late eighteenth and early nineteenth century investigations report the presence of between 50 and 100 skeletons, apparently lying for the most part complete and articulated on the cave floor. The great majority of this material was lost long before it could be properly analysed. The most recent excavations were carried out by the University of Bristol Spelæological Society between 1914 and 1933, during which the scattered and fragmentary remains of some 20 individuals were reportedly encountered. Unfortunately, the collection was largely lost, together with all the notes on the excavations, during raids on Bristol in 1940 in which the Society's museum was burned. This hapless sequence of events has led to the site perhaps not receiving the attention it would otherwise be due. However, a certain part of the human skeletal collection did survive the Bristol bombing. This material is highly fragmented and incomplete, but it can nevertheless yield a great deal of information. Here we report some of our preliminary findings from an ongoing reassessment of the collection.

SITE BACKGROUND

Aveline's Hole was first discovered accidentally in 1797. The presence of ancient human remains was almost immediately apparent, indicating that they must have lain more or less directly on the floor of the cave. The state of the entrance upon discovery and the absence of any evidence for post-Mesolithic activity strongly suggests that the entrance to the cave was sealed not long after its use for burial, possibly intentionally. A series of informal investigations and, for the time, more considered excavations followed, both resulting in the removal of large quantities of material from the site. The original account describes the skeletons as laying 'promiscuously' on the cave floor (*Sporting Magazine*, 1797, cited in Davies, 1921 p61-62), while in 1805, explorations at the cave reportedly yielded 'near 50 perfect skeletons lying

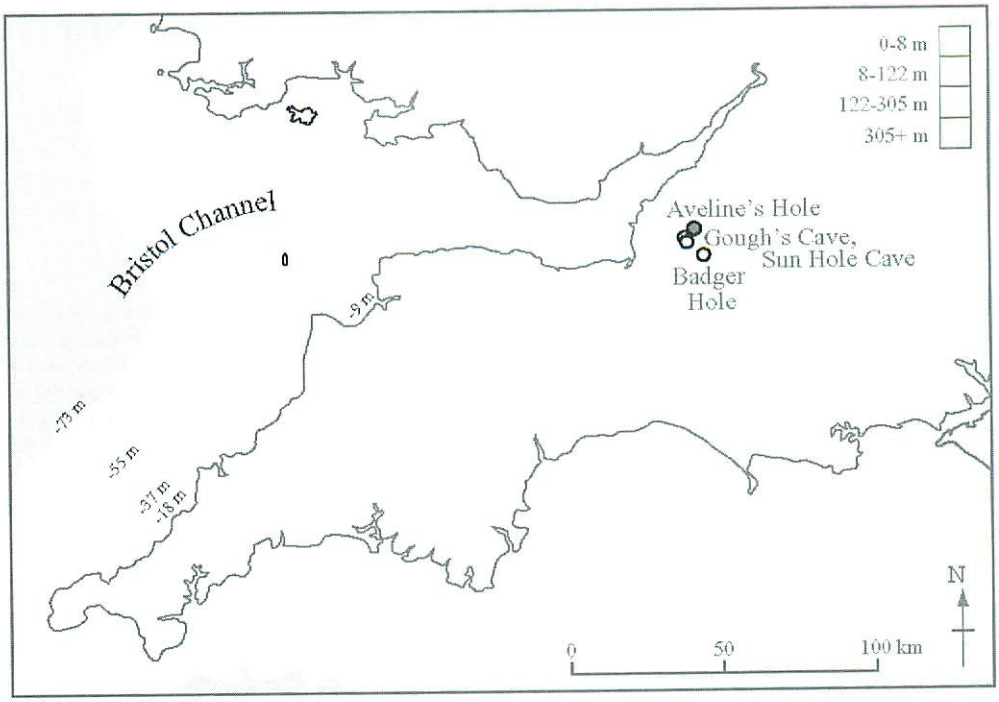

Figure 1. *Map of southwest Britain showing locations of Aveline's Hole and nearby sites on the Mendip Hills. The 9,000 BP sea-level lay near the -37 m OD contour shown here.*
Drawn by Libby Mulqueeny.

parallel to each other' (Anon, 1805 cited in Jacobi, 1987). It is estimated that in total the cave held more than 70 skeletons. Given the early date, this estimate must be viewed with extreme caution, yet there seems little doubt that a significant number of skeletons were present. Indeed, reexamination of human skeletal remains from British long barrows excavated in the nineteenth century often show that the number of individuals present was just as likely to be underrepresented as to be exaggerated in the reports of the period (M. Wysocki, *pers. obs.*).

After the initial flurry of interest, it seems that little work of further note was initiated until the early twentieth century, when the University of Bristol Spelæological Society (UBSS) undertook a series of excavations, first in 1914, and then from 1919 to 1933 (Buxton, 1925; Davies, 1921, 1922, 1923, 1925; Fawcett, 1920, 1922, 1925; Tratman, 1922, 1923, 1975a, 1977). This resulted in the collection of the fragmentary remains of some 20 individuals. There is no impression from the brief preliminary reports that these were ever complete skeletons when found. Rather, it seems likely that they represent elements missed from those removed in the earlier explorations. This is supported by the fact that the majority are recorded as coming from the north side of the cave, which is where the earlier skeletons were also located.

In addition to scattered and fragmentary human remains, what was described as a 'ceremonial burial' was found, with a skeleton apparently placed in a disused hearth, together with red ochre, abundant animal teeth, some of which were perforated, and a set of fossil ammonites (Davies, 1925). The latter show no traces of being modified but were all roughly semicircular with smoothed ends, suggesting that they were intentionally selected. More

tellingly, the fossil ammonites apparently could not have come from Aveline's Hole itself, as the nearest source is over 20 km distant (Donovan, 1968).

One of the more intriguing, and puzzling, aspects of Aveline's Hole lies in its surprisingly early date. Five conventional ^{14}C and AMS estimates have been previously obtained on human bone from Aveline's Hole, with the results ranging between 9115 and 8740 BP (Table 1). The presence of such a large cemetery, it is certainly appropriate to use this formal term, at this time flies in the face of much of the accepted wisdom concerning the supposed emergence of large, formal cemeteries only later in the Mesolithic, and then close to productive marine or aquatic resources (for example, Rowley-Conwy, 1998; Smith, 1992; Zvelebil, 1989). In the early Holocene, the Mendip Hills were far from the sea (about 80-100 km) (Kidson and Heyworth, 1982) and there are no particularly large rivers or lakes nearby. Yet the area seems to have been a focus for Early Mesolithic burial, with human remains dating to the same period also known from Badger Hole and Gough's Cave (Table 1) although it is not clear that Badger Hole represents an intentional burial. For its concentration of burials, there is nothing with which to compare Aveline's Hole for the next four millennia in Britain *i.e.*, until the beginning of the Neolithic. The degree to which the Aveline's Hole human remains cluster at c. 9000 BP, as they seem to do on present evidence, is a question worthy of further investigation.

Figure 2. *Aveline's Hole, selection of proximal left ulnae.*

THE SKELETAL COLLECTION

The aims of the ongoing reassessment are: 1) to check the identifications of those specimens listed in the UBSS catalogue, and to provide identifications for the many fragments that are not listed; 2) to record any useful osteometric data; 3) to calculate the minimum number of individuals represented, together with any age and sex data; 4) to record any pathologies, post-mortem modification or other unusual features present; and 5) to investigate aspects of the lifestyle of this population through an examination of degenerative changes, musculo-skeletal stress markers, stable isotope analysis and dental macro- and micro-wear (some preliminary work on dental microwear was undertaken by Haile, 1996).

The preliminary results presented here must be seen as subject to revision in the final report. The extant collection comprises some 800 specimens including complete and fragmented bones and teeth. Just how incomplete the collection is becomes apparent when it is realised that a single adult human skeleton contains about 206 bones (there is some variation) and between 28 and 34 teeth. Even very few individual bones are complete, aside from some metapodials and phalanges. From the UBSS catalogue, it is clear that a number of additional specimens have gone missing since 1940. Some of these have been sent for destructive analysis, such as conventional radiocarbon dating. In addition, a small number of teeth are reported as having been sectioned, and their present location is unknown. Of other specimens noted in the catalogue there is simply no sign, nor any record of their whereabouts. In total something less than 100 elements reported as present in the catalogue have not as yet been found (not included in the above total of *c.* 800).

The highly fragmentary nature of the collection severely limits what can be said. Previous efforts have gone into reconstruction, particularly of the crania. We have, in addition, during the course of the present reassessment identified some conjoining fragments. Some of these are of particular interest as they join specimens recorded (by lettering on the bones themselves) as coming from separate contexts. Unfortunately, given the destruction of the site records, it is not clear what most of these contexts were and which were horizontally and/or vertically adjacent. Further scrutiny of the existing documentation, such as it is, may provide some clarification.

Demography: MNI, sex and age

In terms of the minimum number of individuals represented, there are at least 15 but more probably 16 adult or adolescent proximal left ulnae, a selection of which are shown in Figure 2. This is reasonably close to the total of 20 individuals indicated for the 1919-1933 UBSS excavations. In the absence of even a single complete longbone, it is not possible to give a realistic impression of the sex ratio represented by the remains. However, morphological and size differences between a number of adult elements, together with limited application of univariate discriminant functions, are sufficient to clearly indicate the presence of both males and females. There is no indication that either sex notably predominates, although again this is very hard to assess. This finding is contrary to earlier reports, which implied that the great majority of adult individuals were female (Fawcett, 1922; Tratman, 1922). It is also difficult to provide a stature estimate for any single individual, but the overall impression is that the population was of relatively short stature even by early prehistoric standards. For example, an estimate from a probable female distal humerus segment, using the Steele and Bramblett (1988) formulae for fragmentary remains, indicates a stature within the range 143-159 cm (c. 4' 8" to

5' 1"). It is likely the relatively small size of this population that led to their mistaken identification as predominantly female.

The distribution of adult age ranges can be roughly assessed through an examination of dental wear, particularly of the molars. This examination is in progress, but for the moment it can be noted that few molars show the extreme wear usually associated with elderly individuals. Of course, assigning any absolute age depends very much on the rates of dental wear for the population, determined by diet and methods of food preparation (Walker *et al.* 1991). In general, hunter-gatherer groups tend to show very high rates of tooth wear, so that the paucity of highly worn molars in the Aveline's Hole group may reflect the actual rarity of individuals reaching the fifth decade of life or beyond.

In addition to the adolescents and adults, there are a number of younger subadults present at Aveline's Hole (Figure 3). We feel that these are unlikely to have been recognised in the UBSS total, as the elements do not seem to have been previously identified, *i.e.*, they have not been catalogued, nor has any mention of the presence of infants and young children at the site been made in any of the previous publications. Indeed, this is one of the more interesting early findings of the present reassessment, since it could be concluded from the available literature and from the catalogue that only older children and adults were buried in the cave. The subadults are represented by very few elements, but they suffice to demonstrate the presence of three young children (ages 2.5-4.5, 3.5-6.5, and 5-7 years), an infant of 6-18 months and an infant at or near term (*i.e.*, neonatal or perinatal). This brings the total number of individuals identified at Aveline's Hole to 21. This number may increase by one or two as the study proceeds, but it is likely to be broadly correct.

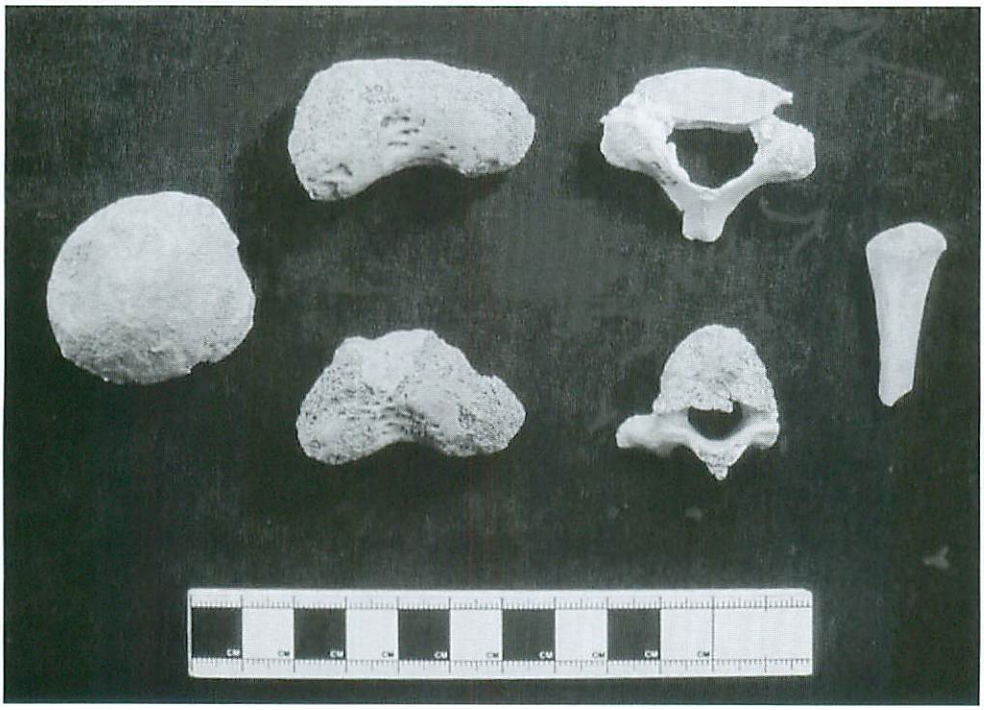

Figure 3. *Aveline's Hole, selection of subadult postcranial remains.*

Pathology

Few of the extant elements show indications of pathology. Two adult individuals exhibit moderate cribra orbitalia (Figure 4), usually interpreted as evidence of iron deficiency anaemia, which can be brought about by a variety of causes, such as inadequate diet or high parasite load (Stuart-Macadam, 1992). Two elements, a clavicle and the shaft of a right humerus, show the active woven bone characteristic of periostitis, a non-specific inflammation affecting only the outermost 'skin' of the bone. This could reflect bruising or ulceration of the overlying soft tissue, or may be a reaction to infection elsewhere in the body. Degenerative changes would be expected to be relatively common in a hunter-gatherer population, given the high levels of activity and mobility usually associated with this way of life. However, the elements most frequently affected by this condition are poorly represented in the surviving Aveline's Hole assemblage. There are very few vertebrae and many long bones are represented only by shaft fragments. Where the articular surfaces are present, they are often fragmentary or eroded, precluding an assessment of the state of the joint. A left proximal ulna does show moderate eburnation of its semi-lunar notch (Figure 5), indicating bone-on-bone contact at the elbow and may be the earliest recorded example of osteoarthritis in Britain.

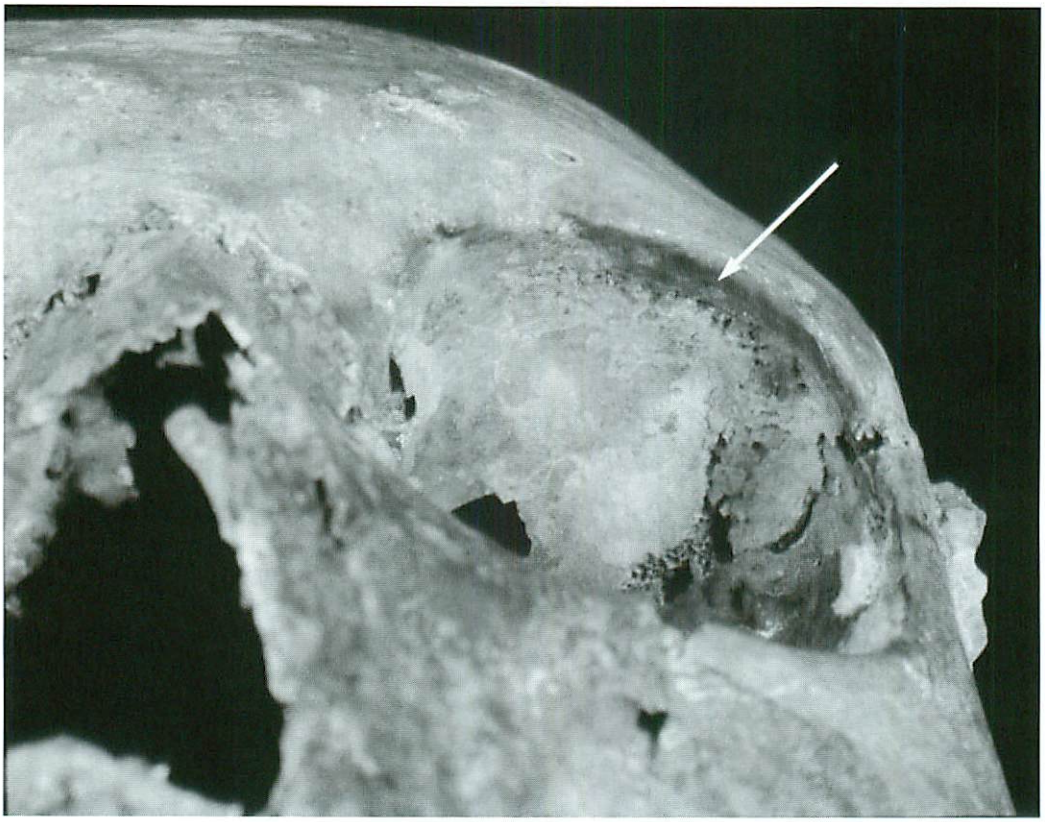

Figure 4. *Aveline's Hole, left orbit exhibiting cribra orbitalia.*

A number of teeth were previously identified by Tratman as carious and are marked as such in the catalogue entries (Tratman, 1922). However, Tratman himself subsequently came to realise that in many cases he had been misled by post-depositional erosion, particularly at the cementum-enamel junction. In any case, none of the loose teeth in the extant collection can be clearly scored as exhibiting caries (total of 61 posterior teeth). A cranium labeled AH 9 in the Wells Museum does have a caries on its maxillary dentition, and three definite caries are present on a mandible that probably belongs to the same individual. However, the history of AH 9 is complex, and it is not certain that it belongs with the Mesolithic assemblage from Aveline's Hole (Meiklejohn, *pers. comm.*). In the absence of more than a few small mandible and maxilla fragments, it is not possible to comment on the incidence of dental abscessing, although at least one abscess is present. A number of tooth roots appear reactive, reflecting some trauma to the tooth, whether through infection caused by exposure of the root canal, a physical blow, or by extreme mechanical loading of the jaws. A number of adult anterior teeth show series of up to three marked hypoplastic lines, indicating repeated periods of stress in childhood, most probably nutritional in origin (Figure 6). The timing of these will be further investigated. Although not strictly a pathology, a number of molar teeth show what have been called 'tooth pick grooves' (Larsen 1997) interproximally, on either their mesial or distal aspects (Figure 7).

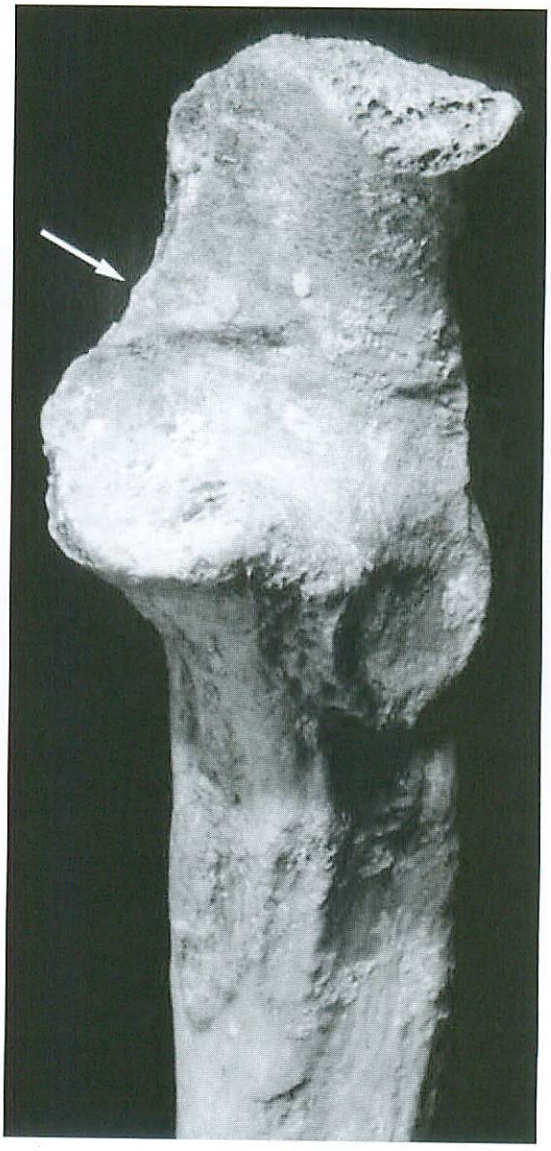

Figure 5. *Aveline's Hole, left proximal ulna exhibiting eburnation.*

Post-mortem modification

Although no mention of the fact has been made in any of the publications on the site, the UBSS catalogue mentions a number of specimens claimed to exhibit cut-marks. In most cases it is not known by whom this assessment was made. Some of the relevant specimens can no

longer be found, but of those that have been located and examined, none show anything like a convincing cut-mark. Further efforts are being made to locate the remaining specimens and/or photographs in order to assess these claims, but on current evidence they are highly dubious. Nevertheless, what makes such claims worth serious consideration is the fact that a series of definite stone tool cut-marks have been identified on the skeletons of at least two of the three adults and both of the children at Gough's Cave (Cook, 1986, 1991; Currant, *et al.* 1989; Tratman, 1975b). This locality, best known for 'Cheddar Man', is also located on the Mendip Hills, quite near Aveline's Hole. However, while 'Cheddar Man' is approximately contemporary with the dated humans from Aveline's Hole, the cut-marked human bones from Gough's Cave fall within the Late Glacial period ca. 12,000 BP (Table 1).

Figure 6. *Aveline's Hole, selection of anterior teeth showing severe enamel hypoplasia.*

A relatively small number of elements show rodent gnawing, indicating that the remains were accessible for at least some period of time after death. A more significant form of post-depositional modification is seen in the many elements highly eroded by geochemical processes. In a number of cases this erosion is so extreme that many morphological features of the bone are obscured. In the light of recent studies of bone diagenesis in cave environments, these modifications are also strongly indicative that the burials were either exposed directly on the cave floor or lay relatively close to the surface (Karkanas, *et al.* 2000; Stiner, *et al.* 2001). The intensity of geochemical modifications on the surviving material also gives legitimate grounds to question just how representative of the original mortuary deposits the excavated assemblages really are (Karkanas, *et al.* 2000). Immature bones in particular might be underrepresented.

Site & material	species	Lab. No.	Date BP	±	$\delta^{13}C$	$\delta^{15}N$
Aveline's Hole						
shed antler	*R. tarandus*	OxA-1122	12,480	130		
2nd phalanx	*C. elaphus*	OxA-1121	12,380	130		
unshed antler	*C. elaphus*	OxA-801	12,100	180		
shed antler	*R. tarandus*	OxA-802	9,670	110		
femur	*H. sapiens*	BM-471	9,115	110		
right humerus	*H. sapiens*	OxA-799	9,100	100	-19.3	7.5
post-cranial frags.	*H. sapiens*	Q-1458	9,090	110		
right humerus	*H. sapiens*	OxA-800	8,860	100	-19.5	8.0
right humerus	*H. sapiens*	OxA-1070	8,740	100	-18.7	8.7
A.H. 1, Skull 'O'	stalagmite	GrN-5393	8,100	50		
Badger Hole						
Badger Hole 2 mandible	*H. sapiens*	OxA-1459	9,360	100		
Badger Hole 1 cranial fragments	*H. sapiens*	OxA-679	9,060	130		
Gough's Cave[1]						
GC87/190	*H. sapiens*	OxA-2796	12,380	110	-18.5	7.1
M23.1/2	*H. sapiens*	OxA-2237	12,300	100	-18.6	6.5
GC3 calvarium	*H. sapiens*	OxA-2235	11,990	90	-19.7	
GC2 calotte	*H. sapiens*	OxA-2795	11,820	120	-18.9	7.1
GC6 mandible	*H. sapiens*	OxA-2236	11,700	100	-19.1	5.4
talus (Cheddar Man)	*H. sapiens*	OxA-814	9,100	100		
tibia (Cheddar Man)	*H. sapiens*	BM-525	9,080	150		
Sun Hole						
UBSS M5.13/24	*H. sapiens*	OxA-535	12,210	160	-19.8	7.2

Table 1. *Human and animal bone dates from Aveline's Hole and other Mendip sites.*

Sources: Barker *et al.* 1971; Burleigh 1986; Gowlett *et al.* 1986; Hedges *et al.* 1991; Jacobi 1987; Richards *et al.* 2000; Vogel and Walterbolk 1972; Aveline's Hole stable isotope date from Schulting and Richards 2000

[1] In addition to the human dates from Gough's Cave, there are a series of faunal dates, many on bones showing cut-marks, between 12800-12200 BP.

Diet and activity markers

The stable carbon and nitrogen isotope data available for three of the directly dated humeri from Aveline's Hole appear to demonstrate an absence of marine protein in the diet (Schulting and Richards 2000). This is despite initial appearances: the three stable carbon isotope ($\delta^{13}C$) values, averaging -19.2‰, are actually slightly elevated for a typical terrestrial diet (for which the $\delta^{13}C$ values would be c. -20 to -21‰) and so might be thought to indicate some small contribution of marine protein. However, there is significant temporal variation in

$\delta^{13}C$ values, and throughout much of the Pleistocene and into the Early Holocene values seem to have been slightly elevated, so that terrestrial fauna often measure around -19‰ (Richards, 1998). A similar set of results can be seen for Late Glacial human remains at Gough's Cave and Sun Hole Cave (Richards, *et al.* 2000). As noted above, the lack of a marine component to the diet is not surprising in light of the site's distance from the sea; on the other hand, hunter-gatherer groups in north-temperate zones are known ethnographically to be very mobile, often traveling over large distances seasonally. Perhaps more surprising is the seeming lack of any significant use of aquatic resources, including salmon, from lakes and rivers. Indeed, the relatively low values for stable nitrogen (averaging 8.1‰) appear to suggest a greater input of protein from plant foods than seen in the Early Neolithic. But again, local faunal values need to be measured before this inference can be taken as anything more than speculative. Additional stable isotopic analysis on both humans and associated fauna will form part of the present project.

Figure 7. *Aveline's Hole, selection of molar teeth showing 'tooth pick' grooves.*

Skeletal markers of strong, repeated muscle actions (musculo-skeletal stress markers) will also be examined for what they can contribute to an understanding of the lifestyle of this inland Early Mesolithic population. For example, hypertrophy of the supinator crest has been noted in one proximal ulna fragment. This feature has been associated with repeated activities involving supination and hyperextension of the arm, such as spear throwing or pitching a baseball (the latter admittedly an improbable activity in the British Mesolithic) (Kennedy, 1983).

CONCLUSIONS

The intention of this report has been to introduce the aims of the ongoing reassessment of the human skeletal remains from Aveline's Hole. The results presented here, although very brief and preliminary, give an indication of the kinds of information that will be forthcoming. Additional analyses are planned, including a programme of AMS dating and stable isotope analysis. In addition to a reconstruction of palaeodiet, it is hoped that it will be possible to investigate the geographic origins of individuals buried in the cave through the use of lead and strontium isotope analysis, reflecting the groundwater where an individual grew up. This may go some way towards understanding the nature of the site and its apparently anomalous position as a large cemetery at such an early date. A limited amount of soil and pollen analysis on matrix adhering to bones will also be attempted on an exploratory basis.

Aveline's Hole is one of the most important Early Mesolithic burial sites in Europe. Certainly it is by far the largest known Mesolithic cemetery in Britain. While the amount and state of the surviving material and accompanying documentation leaves much to be desired, the present reassessment will provide sufficient new information to enable the site to more fully take its place in discussions of mortuary practices and society in the Early Holocene of Western Europe.

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