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MARKED HUMAN BONES FROM GOUGH'S CAVE, SOMERSET

by

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ABSTRACT

The loan by Cheddar Caves Museum of the hominid specimens found at Gough's Cave, Somerset, to the British Museum (Natural History) provided an opportunity to study a number of marks, including linear incisions, noted by previous authors and attributed to human activities. After documenting the distribution, orientation and macroscopic characteristics of the marks, their microscopic features were recorded using a binocular light microscope and scanning electron microscope. These examinations revealed generally random groups of various types of incisions as well as gouges and indentations. Comparison of these results with modern experimental and taphonomic data suggests that the marks observed are largely due to natural damage which occurred when the bones were at or near the surface of the deposits. Exceptionally, some equivocal evidence for deliberate human interference occurs on the adult mandible (Gough's Cave 6) and may be related to post mortem removal of the tongue.

INTRODUCTION

In his description of the hominid material from Gough's Cave, Somerset, Tratman (1975) noted the presence of linear incisions on some of the specimens. These marks were not reported in any detail but they were interpreted as 'cut-marks' inflicted by stone tools and said to indicate post mortem interference with the crania present, if not with entire cadavers (*ibid.*, p. 21). As recent studies (Andrews and Cook, 1985; Cook, 1986; Shipman, 1981) have shown that the microscopic characteristics of modifications on bone surfaces may be diagnostic of the natural and artificial processes which have effected them since death (Andrews and Cook, 1985, fig. 7), a particular study of the marks on the Gough's Cave material was initiated to augment and clarify Tratman's original observations. The study was facilitated by the loan from Cheddar of a number of specimens to the British Museum (Natural History), which enabled the author to document the distribution and macroscopic features of the modifications present and to examine them microscopically, following the techniques set out in Andrews and Cook (1985) and Cook (1986). As the specimens do not come from a single stratigraphic context and may differ in age and archaeological association, the results and interpretations of this work are presented for each piece, the numbering of which follows that of Stringer (1986) where the morphological characteristics of the material have been fully described. The anatomical nomenclature used here follows that of Spalteholz and Spanner (1961).

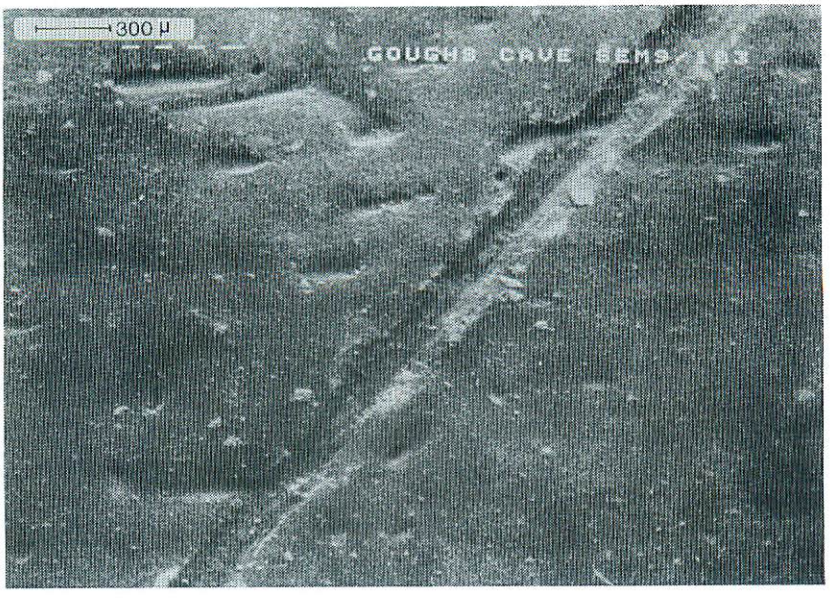


PLATE 1 — GOUGH'S CAVE 3: V-SHAPED INCISION ON THE PARIETAL

PLATE 2 — GOUGH'S CAVE 3: ASYMMETRICAL GROOVE EXHIBITING DISPLACED BONE ON ONE SIDE

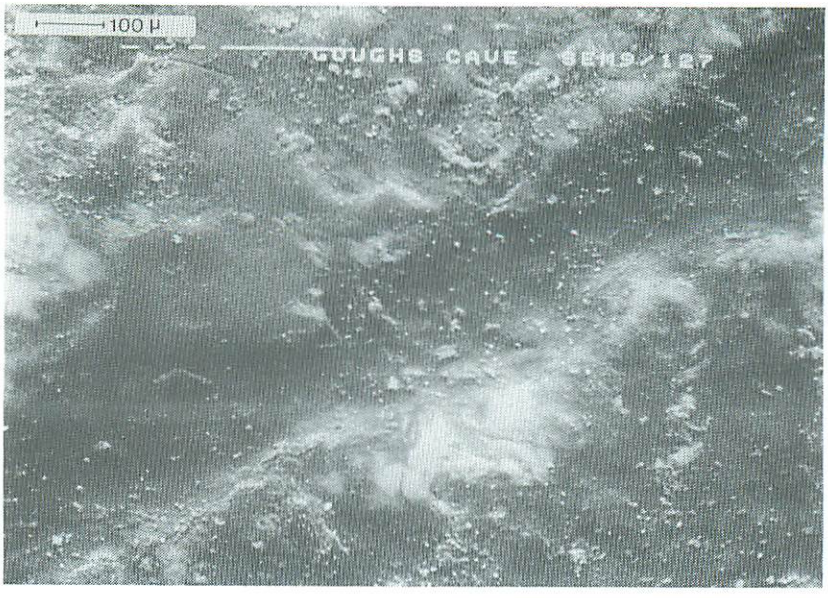


PLATE 3 — GOUGH'S CAVE 3: GROOVE OBSCURED BY RESIN

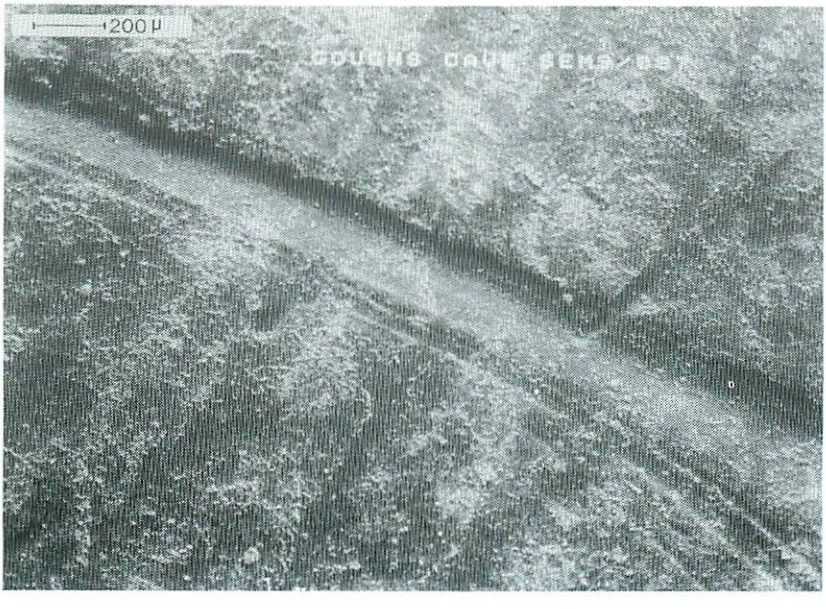


PLATE 4 — GOUGH'S CAVE 7: U-SHAPED GROOVE

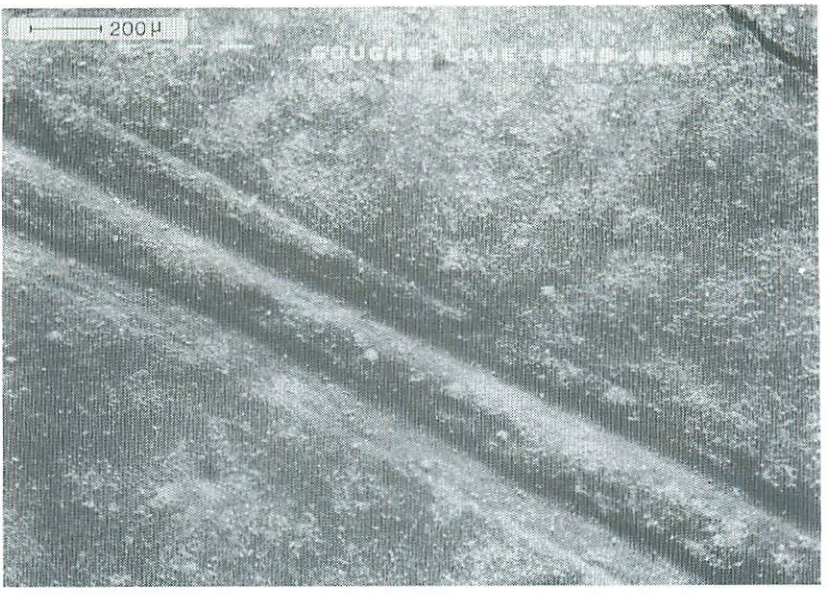


PLATE 5 — GOUGH'S CAVE 7: W-SHAPED GROOVE

PLATE 6 — GOUGH'S CAVE SCAPULA '7': CURVED AND INTERSECTING GROOVES

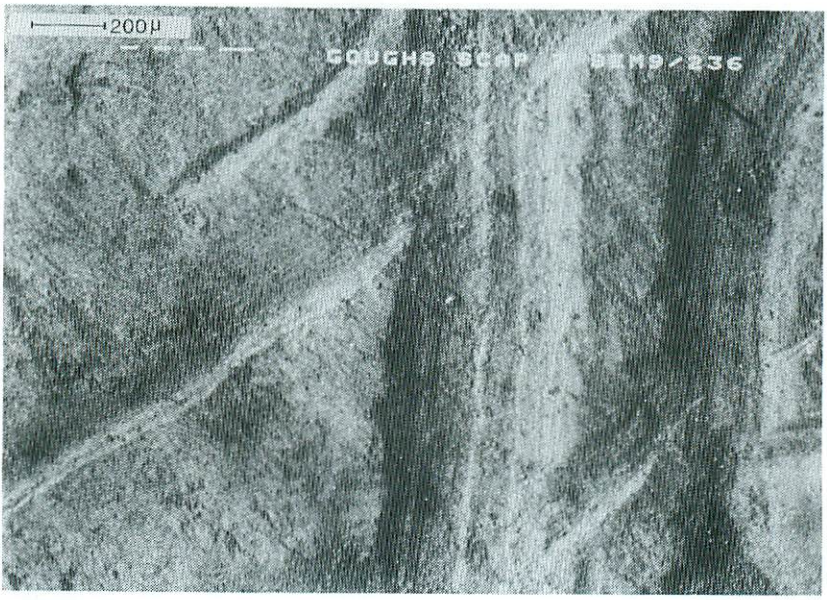


PLATE 7 — GOUGH'S CAVE SCAPULA '7': GROOVES EXHIBITING MULTIPLE STRIATIONS

GOUGH'S CAVE 1

This is a skeleton mounted on permanent display in Cheddar Caves Museum, and it has not been possible to include it in the present study. However, in view of the evidence for traumatic death, of 'cut marks' on the skull and 'lesions' on the postcrania cited by Tratman (1975), it is important that this skeleton should be studied at some future date.

GOUGH'S CAVE 2

The only marks on this cranial vault (Stringer, 1986, plate 1) occur above the left orbit. Two of these are fine incisions, 10 to 20 mm long, while other grooves in this area appear to be vascular channels. The incisions are superficial and when examined using a binocular light microscope, do not show any diagnostic features. They are probably the result of mild abrasion at some stage during deposition.

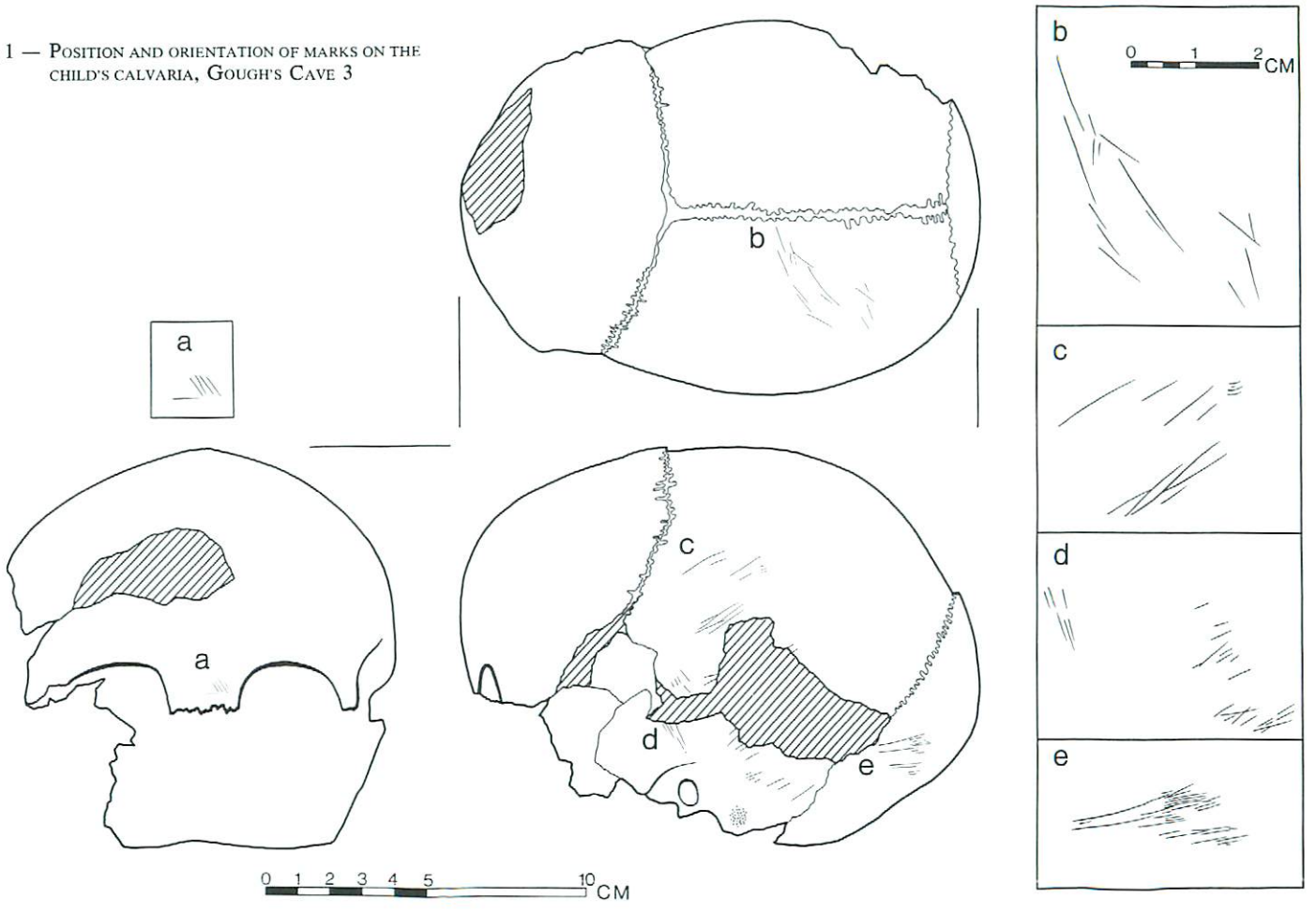
GOUGH'S CAVE 3

This calvaria of a child (*ibid.*, plate 2) shows a number of marks on the frontal, left parietal, left temporal and occipital bones. The frontal exhibits a series of short (10 to 12 mm) obliquely orientated, parallel indentations on the glabella region (Fig. 1a). These are partially covered with cave sediment and occur in association with cracking just above an ancient break. The left side of the calvaria is damaged in the area of the squamous suture. The damage is ancient and interrupts some of the linear incisions on both the temporal and parietal. On the temporal, there are three groups of between three and seven fine, obliquely orientated incisions which are 10 to 30 mm long (Fig. 1d). One group has an anterior to posterior trend whereas the other two have the reverse orientation and lie at the same angle as the incisions on the inferior temporal line of the parietal and those of the occipital. On the sagittal area of the parietal there are occasional, randomly orientated linear incisions, as well as some gouges and indentations (Figs. 1b and 1c). On the occipital thirteen fine incisions, 10 to 30 mm long, occur in a fan-like array just below the lambdoid suture (Fig. 1e) and seven random incisions are present in the area of the nuchal plane. No marks occur on the right parietal, and the right temporal is missing.

Microscopic Examination

Before the parts of the skull were rejoined by the conservation department of the British Museum (Natural History), the marks described above were observed and recorded using a binocular light microscope (BLM) and a scanning electron microscope (SEM).

FIG. 1 — POSITION AND ORIENTATION OF MARKS ON THE CHILD'S CALVARIA, GOUGH'S CAVE 3



Examination in the SEM revealed that the marks on the sagittal area of the parietal and the majority of those in the area of the squamous suture and on the occipital are either incisions with symmetrical cross-sections (PLATE 1) or flat-bottomed troughs from which a stripe of bone has been removed. Some marks in the area of the squamous suture and on the occipital exhibit asymmetry of cross-section associated with a curl of displaced bone along the deeper side (PLATE 2). However, these characteristics do not persist along the entire length of the incisions, and internal features such as striations and 'faults' (Brommage, 1984; Cook, 1986; Shipman, 1981; Shipman and Rose, 1983) are not apparent, although in some cases they may have been masked by resin applied following excavation as a preservative (PLATE 3). Gouges and indentations have also been recorded on the sagittal area of the parietal. The marks on the glabella region of the frontal were examined using a BLM and this revealed that the bone has not been penetrated by incisions but depressed into grooves with smooth U-shaped cross-sections.

Interpretation

When compared with marks produced by a variety of known causes (Andrews and Cook, 1985; Cook, 1986), the incisions with V-shaped cross-sections, the flat-bottomed troughs, gouges and indentations most closely resemble those caused by natural agencies during the disarticulation, deposition and burial of skeletal elements (Andrews and Cook, 1985). On the left parietal, temporal and occipital, some of the marks also exhibit features such as asymmetry and displacement of bone which are characteristic of incisions made by stone tools (Brommage, 1984; Cook, 1986; Shipman, 1981). However, such characteristics have also been recorded on bones altered by trampling and movement during deposition (Andrews and Cook, 1985; Oliver, 1984) and modification of the bone by such natural agencies can be suggested as most probable in this case because of the limited extent of the 'cut mark' traits noted and the apparent absence of other internal features. The microscopic data therefore seem to indicate natural modification of this skull. However, as these data could be regarded as equivocal (White, 1985) and some marks and features have been obscured by preservative, it is important to review both the macroscopic and microscopic evidence in the light of alternative interpretations.

The distribution of the marks and the presence of linear incisions led Tratman (1975) to suggest that there had been some post-mortem interference with the skull. In support of this hypothesis, it could be said that the marks on the left parietal and temporal occur roughly in the area of attachment of the temporal muscle which might have been cut through to disarticulate the mandible. However, the absence of marks on the right parietal and the occurrence of marks with similar characteristics and orientation on the occipital detract from this view. Equally, it seems unlikely that the marks are related to post-mortem detachment of the scalp. According to the literature, scalping may be either total or partial and need not follow or cause death (Hamperl and Laughlin, 1959;

Nadeau, 1941; Neumann, 1940; Ortner and Putschar, 1981). However, if scalping occurs prior to death the bone of the skull develops a granular pathology (Hamperl and Laughlin, 1959; Ortner and Putschar, 1981) which is absent from the Gough's Cave specimen. Total scalping in historic times seems to have been achieved either by pulling off the skin and hair from the neck upwards following decapitation (Nadeau, 1941; Reese, 1940) or by cutting the skin on the forehead and pulling backwards. The former technique would leave no marks on the skull, except possibly on the foramen magnum, and is improbable in the case of the Gough's Cave specimen. The latter method could cause marks on the bone as described in the following historical example from Central Illinois:

> most of the cuts ... are on the frontal bone and extend in a rough circle around the crown. After the front end of the scalp had been cut loose ... it had been pulled backward and cut free without making more than two cuts on the occipital. (Neumann, 1940, p. 287).

The absence of clearly defined cut-marks on the frontal of the Gough's Cave calvaria and the distribution of incisions in multiple clusters at different levels on the left side and occipital do not accord well with this or other descriptions of total scalping (Hamperl and Laughlin, 1959; Nadeau, 1941; Ortner and Putschar, 1959; Owlsey, Berryman and Bass, 1977) or cannabalistic defleshing of the skull (White, 1985). Equally, partial scalping achieved 'by grasping the hair on the crown of the head, and passing a knife around it through the skin' (Catlin, 1857, vol. 1, p. 60) can be ruled out on the basis of the disposition of the marks.

From this review, it is evident that if the incisions are interpreted as cut marks made by stone tools, then their distribution and purpose are difficult to interpret both on anatomical grounds and in the light of ethnographic information. In contrast, several lines of evidence seem to converge in support of the hypothesis that the skull has been modified by natural processes. Movement of sediment over or against the partially embedded skull would account for the distribution and microscopic characteristics of the marks on the left side and occipital and the absence of incisions from the right side and frontal. Corrosion of the bone on the mastoid process of the left temporal supports the view that this area was temporarily exposed, perhaps under damp conditions. The damage in the region of the left squamous suture could also have occurred while this area was exposed. The indentations on the frontal resemble depressed grooves observed on modern bones which have suffered contact under slight pressure with subangular and rounded limestone clasts (Andrews and Cook, 1985) and may have the same origin. The distortion of the skull noted by Stringer (1986) offers additional evidence that it suffered stress within the deposits. It is also evident that the skull was buried quite quickly because it does not exhibit the plethora of scratches, gouges and corroded areas which accrue when the bone has moved around at or near the surface (Andrews and Cook, 1985). Taking all these macroscopic and microscopic data into account, it seems most probable that the alteration of this calvaria occurred naturally rather than by deliberate human action.

GOUGH'S CAVE 6

Marks occur on both the buccal and lingual aspects of this partial adult mandible (Stringer, 1986, plates 3 and 4) which exhibits a cracked surface condition reminiscent of specimens which have been exposed to subaerial alteration in caves (Cook, 1986). On the buccal aspect some short scoring occurs on the right mandibular body anterior to the break on the angle of the mandible. On examination using the BLM, these marks appear to be impressed rather than incised and could be pressure features related to the break. Marks are more frequent on the lingual aspect where they occur on the left ramus just above the angle of the mandible (FIG. 2a), on the inferior border of the left mandibular body up to the diagastric fossa, on the right mandibular body below the surviving second molar, and on either side of the mental spine (FIG. 2b). The shape of the mandible prevented it from being examined in the SEM, and casting (Cook, 1986) was ruled out because the marks have been at least partially filled with preservative. Consequently observation of these marks could only be achieved using the BLM.

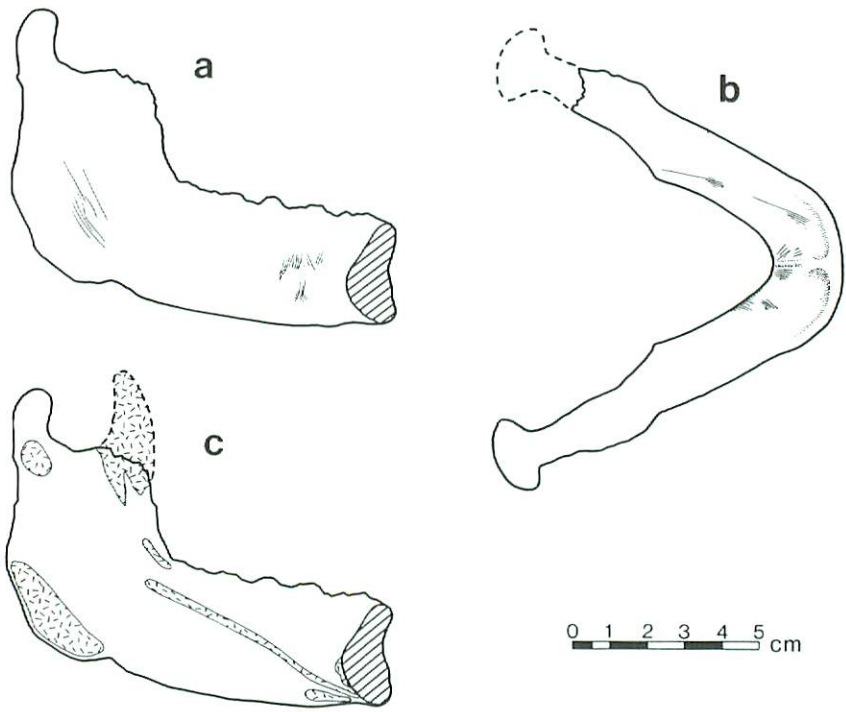


FIG. 2 — POSITION AND ORIENTATION OF MARKS ON THE ADULT MANDIBLE, GOUGH'S CAVE 6; AND DIAGRAM (C) TO SHOW THE FORMER AREAS OF MUSCLE ATTACHMENT

On the ramus about six parallel marks, 30 to 35 mm long, occur on the medial surface following the trend of the mylohyoid groove and the cracking in the bone surface. They occur away from the areas of attachment of the pterygoid, temporal and mylohyoid muscles (FIG. 2a and c). Microscopically these marks lack any traits reminiscent of cut marks made by stone tools (Brommage, 1984; Cook, 1986; Shipman, 1981) but exhibit a stepped appearance as if the bone had been impressed and pushed upwards or downwards at an angle. Such marks are probably the result of post-depositional alteration caused by pressure and slight movement within the deposits. On the mandibular body, the linear marks below the second molar and along the inferior border are fine, horizontal incisions. They occur away from areas of muscle attachment (FIG. 2c) and on the inferior border are directed anteriorly below and between the submandibular and diagastric fossae (FIG. 2b). On examination, they were noted as having symmetrical V-shaped cross-sections which apparently lack the diagnostic features of cut marks made by stone tools, although the internal features are obscured by resin. However, they do resemble some of the fine incisions found on specimens marked naturally during and after deposition (Andrews and Cook, 1985). Some small (less than 10 mm) but sinuous U-shaped channels characteristic of root or possibly moss growth, have also been recorded on the mandibular body. Finally, on each side of the mental spine there is a cluster of vertical incisions between 10 and 20 mm long (FIG. 2b). These marks occur in the area of attachment of the tongue muscles. Macroscopically they are bolder than the fine incisions described above but, due to the preservative, no diagnostic features could be observed through the microscope. In this case, the position, orientation and macroscopic character of the incisions may justify their interpretation as cut marks. As such they would have been inflicted by tipping the head backwards and making incisions behind the chin using a stone tool to cut through the muscles attaching the tongue. However, it should be noted that there are no marks on the surviving condyle to suggest that cutting or violence were used to detach the mandible from the skull.

Taking into account the condition of the specimen and the character of the marks on it, some speculations on its depositional history may be put forward. First of all, the marks in the area of the mental spine suggest the possible removal of the tongue at the time of death. However, the evidence for this should be regarded as circumstantial and equivocal because it has not been possible to confirm the character of the marks by microscopic examination. The condition of the bone suggests that it was not buried straight away but was exposed to some subaerial alteration, possibly within the cave. The marks on the buccal surface and inferior border may also have accrued at this stage. The presence of root or moss marks indicate that burial was gradual and probably natural. During deposition the mandible was damaged and marked on the surviving ramus, possibly by movement and pressure. However, these could only have been slight because thin, fragile areas of bone around the alveoli margins are not damaged very much and the overall density of marks on the mandible is not as great as on trampled examples.

GOUGH'S CAVE 7

A group of mainly vertical incisions occurs in the central area of this complete adult right parietal (Stringer, 1986, plate 5) just above the lower temporal line (FIG. 3). The linear incisions are associated with gouges and pressure features. On examination in the SEM, the incisions were found to have U-shaped cross-sections (PLATE 4) which occasionally diverge to produce a W-form (PLATE 5). Such microscopic features have not been recorded from cut marks made by stone tools and their number, position and orientation preclude scalping and cutting of the temporal muscle to detach the mandible as possible causes. Indeed, the association of the incisions with gouges and indentations suggests that damage occurred naturally while the bone was in the deposits.

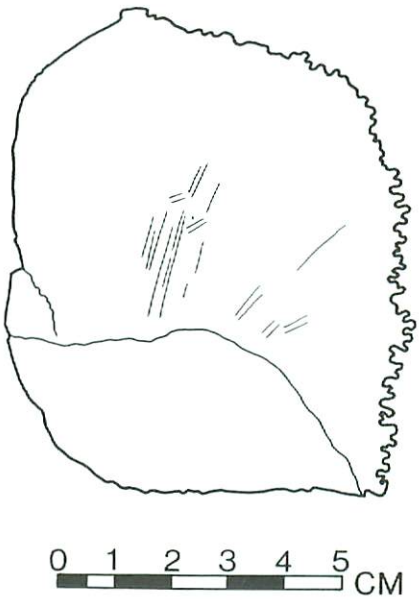


FIG. 3 — MARKS ON THE ADULT PARIETAL, GOUGH'S CAVE 7

LEFT SCAPULA, 1.1/38

This proximal end fragment of an adult left scapula (Stringer, 1986, plate 6) exhibits several small gouges and linear incisions less than 10 mm long. They occur close to the lateral margin and on the acromion. The length and random distribution of the incisions are not suggestive of butchery marks and examination in the SEM failed to reveal any of the traits usually observed when stone tool cut marks are observed. The presence of short incisions showing V-shaped cross-sections associated with gouges is much more suggestive of natural damage caused by contact with sedimentary particles during and after burial.

LEFT SCAPULA, '7'

The ventral surface of this proximal end fragment of a probable adult left scapula (Stringer, 1986, plate 6) is covered by a number of marks (FIG. 4). These marks predate the breakage of the scapula blade. Their number and the manner in which they cross, intersect and curve are not reminiscent of the macroscopic patterning produced by butchery marks on animal scapulae and the absence of microscopic criteria for the identification of stone tool cut marks confirms this impression. The marks

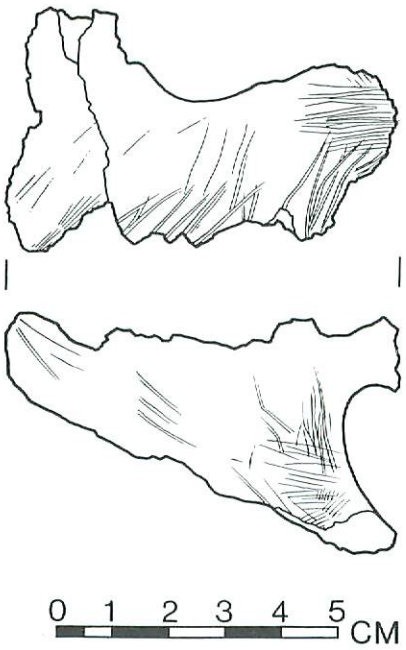


FIG. 4 — MARKS ON GOUGH'S CAVE SCAPULA '7'

observed in the SEM include incisions with symmetric, V-shaped cross-sections, multiple striations within U-shaped grooves and some scrapes (PLATES 6 and 7). The characteristics of these marks compare well with those recorded from bones marked by trampling and movement (Andrews and Cook, 1985; Cook, 1986) and further, their patterning may be explained by the observation that scapulae tend to move by rotating about the proximal end rather than sliding parallel to the long axis (Andrews, personal communication). If the acromion or coracoid process became imbedded, movement from side to side in contact with sedimentary particles could produce the intersecting and curved marks, as observed on the ventral surface of this scapula. These observations suggest that the alteration of this specimen most probably occurred naturally during burial.

RIGHT SCAPULA, M23 1/2

Unfortunately, this specimen (Stringer, 1986, plate 6) is heavily coated in preservative and it has been difficult to study the numerous marks on its dorsal and axillary border satisfactorily. However, like the marks on the other scapulae, their distribution and orientation are random and not reminiscent of butchery traces. Examined with the BLM, the grooves on the neck of the coracoid process and the fine incisions of varying lengths and orientations on the infraspinous fossa appear to lack any cut mark traits. On the neck of the scapula, there are three U-shaped troughs from which stripes of periosteum have been removed. The condition of the specimen does not allow confidence in the interpretation of these data but the features noted might suggest a natural origin for the alteration.

LEFT CLAVICLE

About six indentations less than 5 mm long occur on the shaft of this specimen (Stringer, 1986, plate 7). The bone is not disrupted but depressed suggesting that the marks may be pressure features incurred during burial.

CONCLUSION

Although the specimens from Gough's Cave cannot be regarded as a stratigraphically or archaeologically discrete sample, some generally applicable comments do stem from the specific studies of each piece. With the possible exception of the adult mandible Gough's Cave 6, none of the specimens exhibit marks with a distribution and orientation pattern which might be expected if the cadavers had been dismembered by humans. In contrast, such predictable patterning does seem to be present on animal bones from the site (Parkin, Rowley-Conwy and Serjeantson, this volume, pp. 311-330). Further, microscopic examination of the marks failed to reveal criteria for the identification of cut marks made by stone tools. This evidence could be regarded as equivocal on the basis that marks caused by different agencies are sometimes difficult to distinguish (Andrews and Cook, 1985; Oliver, 1984; Shipman and Rose, 1983), particularly if the diagnostic features are simply a reflection of the mechanical interaction of stone and bone (White, 1985), and because some of the marks are masked by preservative. However, observation and documentation of more than 50% of the marks present on each specimen has revealed that the majority are gouges, indentations, U- or W-shaped troughs or fine, internally featureless V-shaped incisions. In the experience of the author, such suites of marks are peculiar to bones known to have been modified by natural causes such as trampling and movement at or near the surface and do not occur when damage has been inflicted by butchery alone. No carnivore or rodent toothmarks have been found on this material. Coupled with the lack of macroscopic patterning, these data suggest that the Gough's Cave hominid remains may have

suffered natural damage at or near the surface of the deposits and that apart from the tantalizing but slight evidence for the deliberate removal of the tongue from mandible number 6, there is no reason to postulate post-mortem human interference with the cadavers.

ACKNOWLEDGEMENTS

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REFERENCES

ANDREWS, P. and COOK, J. 1985. Natural modifications to bones in a temperate setting. *Man*, **20**, 675-691.

BROMMAGE, T. G. 1984. Microscopic criteria for the determination of directionality of cutmarks on bone. *Am. J. Phys. Anthropol.*, **65**, 359-366.

CATLIN, G. 1857. *Letters and notes on the manners, customs, and condition of the North American Indians.* Philadelphia.

COOK, J. 1986. The application of scanning electron microscopy to taphonomic and archaeological problems. pp. 143-163 in *Studies in the Upper Palaeolithic of Britain and northwest Europe.* ed. D. A. ROE. Oxford, British Archaeological Reports.

HAMPERL, H. and LAUGHLIN, W. S. 1959. Osteological consequences of scalping. *Human Biology*, **31**, 80-89.

NADEAU, G. 1941. Indian scalping technique in different tribes. *Bull. Hist. Med.*, **10**, 178-194.

NEUMANN, G. K. 1940. Evidence for the antiquity of scalping from Central Illinois. *Am. Antiq.*, **5**, 287-289.

OLIVER, J. S. 1984. Bone damage morphologies from Shield Trap Cave, Montana. *Abstracts of the First International Conference on Bone Modification, Carson City, Nevada*, p. 27.

ORTNER, D. J. and PUTSCHAR, W. G. J. 1981. *Identification of pathological conditions in human skeletal remains.* Washington, Smithsonian Institution Press.

OWLSEY, D. W., BERRYMAN, H. E. and BASS, W. M. 1977. Demographic and osteological evidence for warfare at the Larson Site, South Dakota. *Plains Anthropologist*, memoir **13** (2), 119-131.

REESE, H. H. 1940. The history of scalping and its clinical aspects. *The 1940 yearbook of neurology, psychiatry and endocrinology*, 3-16.

SHIPMAN, P. 1981. Applications of scanning electron microscopy to taphonomic problems. *Ann. N.Y. Acad. Sci.*, **376**, 357-386.

SHIPMAN, P. and ROSE, J. 1983. Early hominid hunting, butchering and carcass-processing behaviors: approaches to the fossil record. *J. Anthropol. Archaeol.*, **2**, 57-98.

SPALTEHOLZ, W. and SPANNER, R. 1961. *Atlas of human anatomy.* London, Butterworth.

STRINGER, C. B. 1986. The hominid remains from Gough's Cave. *Proc. Univ. Bristol Spelaeol. Soc.*, **17** (2) for 1985, 145-152.

TRATMAN, E. K. 1975. Problems of "The Cheddar Man", Gough's Cave, Somerset. *Proc. Univ. Bristol Spelaeol. Soc.*, **14** (1), 7-23.

WHITE, T. D. 1985. Acheulian Man in Ethiopia's Middle Awash Valley: the implications of cutmarks on the Bodo Cranium. *Eighth Kroon Lecture, Netherlands Museum for Anthropology and Prehistory, Amsterdam.*

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