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THE LATEGLACIAL MAMMAL FAUNA OF GOUGH'S CAVE, CHEDDAR, SOMERSET

by

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ABSTRACT

Reappraisal of a Late Devensian mammal fauna from the cave earth and breccia unit of Gough's Cave, Cheddar, Somerset, ST 4670 5391, has shown it to be a human predation assemblage dominated by horse *Equus ferus*, red deer *Cervus elaphus* and arctic hare *Lepus timidus*. New carbon 14 age determinations place the bulk of the faunal remains at around 12,000 years bp corresponding to a period within the Lateglacial Interstadial. The first directly dated British material referable to saiga antelope *Saiga tatarica* belongs to this period. An existing date of c. 10,000 years bp on reindeer *Rangifer tarandus* from higher in the same unit provides tentative evidence for a later phase of faunal input. Surviving information relating to the stratigraphic occurrence of faunal remains is examined in detail.

INTRODUCTION

The purpose of this paper is to critically review the available information relating to the Gough's Cave mammal remains, to update and amend previously recorded faunal lists, and to discuss the environmental and biostratigraphic significance of the assemblage. Associated avian remains are similarly reviewed by Harrison (this volume). This is essentially a salvage operation, the scope of which is severely limited by the lack of excavation records and the sad fate of much of the material that was found.

Late Devensian animal remains recovered from a wedge of cave earth and breccia that once all but filled the entrance to Gough's Cave, Cheddar, are largely attributable to the activities of man. There are few Pleistocene sites in the British Isles for which this can be so clearly shown. Of the fourteen species of mammal recorded in the Pleistocene assemblage (Table II), remains of four – horse, red deer, aurochs and arctic hare – show direct evidence of human activity in the form of systematic butchery marks (Parkin *et al.,* this volume). The cut bones were found in intimate association with abundant humanly worked flint flakes and blades (Davies, 1929; Jacobi, in preparation).

A new series of absolute age determinations on bones from the Gough's Cave assemblage (Table IV) places the main part of the accumulation at or a little before 12,000 years bp (Burleigh *et al.,* 1985; Burleigh, this volume), correlating with the later part of the Lateglacial Interstadial of N.W. Europe. There is some evidence for faunal change in the upper part of the Pleistocene sequence, provisionally correlated with the Younger Dryas Stadial.

PREVIOUS WORK AND SPECIMEN HISTORY

Bones were first recorded from the cave by Sollas (1881), but without details of their identification or exact provenance.

When Richard Gough opened up the site as a show cave in the late nineteenth century, deposits partly blocking the entrance were trenched through to improve public access, in which process terminal Pleistocene flint artefacts and numerous bones were found (Irwin, 1986). These were displayed in a small site museum where, in the course of time, they became thoroughly mixed with finds from other sites in Cheddar Gorge. The faunal list given by Garrod (1926), which includes such animals as spotted hyaena, cave lion and woolly rhinoceros, must be ignored: many of the specimens on which her account was based are now believed to have come from a fissure in the Sugarloaf Rock dug out by Gough in 1881-2 (Parry, 1931, p. 49). One suspects that the confusion in the museum at Cheddar may not have been altogether accidental, given the commercial advantage that could be derived from the implication that Gough's Cave was the last resting place of savage or extinct animals.

The site first received serious scientific attention in 1903 when 'Cheddar Man' was discovered in the Cheddar Man Fissure, recently cleared and considerably enlarged by the cave management. The circumstances of this find are reported by Davies (1904) and later, somewhat vicariously, by Seligman and Parsons (1914). Animal remains do not figure large in either account. Davies notes horse remains being found at the same time as the Cheddar Man skeleton, but the quantity of sediment removed at this time was quite large and the nature of the association between the human and the animal bones is unrecorded.

Seligman had submitted a small collection of mammal material to the British Museum (Natural History) for determination. These were eventually reported on by Miss Dorothea Bate in a letter to Seligman dated 7th Nov. 1924 (B.M.(N.H.) archive) where she identifies '*Cervus ?giganteus*, *Equus* sp. and *Ursus* sp.' amongst the specimens returned to him at the School of Economics (London). This material has not been traced.

From 1927 to 1931, a major part of the remaining fossiliferous sediment in the entrance and vestibule of the cave was excavated by Richard Parry. He dug the deposits in six-inch (15 cm) spits, following the longitudinal trend of the bedding visible in the sides of Gough's original entrance trench, but without taking into account the possibility of lateral variations in stratigraphy or structure within the width of the cave passage, the unfortunate consequences of which will be examined later.

The post-excavation history of the 1927 to 1931 collection is of considerable importance in helping to understand its limitations. After each season's work the non-human bones were sent for identification to Dorothea Bate at the B.M.(N.H.). Her notes and correspondence are the most important surviving archive relating to this period of investigation, Parry's detailed excavation records having been lost or destroyed (B.M.(N.H.) Palaeontology Department letter files: manuscripts and notes held by the Fossil Mammal Section). By agreement with the

Marquess of Bath, the B.M.(N.H.) was given control over the disposal of the greater part of the faunal collection, with a selection of representative items being returned to Cheddar for public display.

Miss Bate produced a short note on the 1927/8 finds which was incorporated verbatim into Parry's report to the Somersetshire Archaeological and Natural History Society (Parry, 1929, pp. 104-105). Thereafter, she wrote to Parry giving details of new records and answering his specific enquiries (Parry, 1931), but no further reports on the fauna were prepared or intended.

Surviving material from the 1927 to 1931 excavations bears all the hallmarks of fairly drastic selection, with a strong bias towards easily identifiable specimens, particularly teeth and foot bones. It is clear from correspondence between Bate and Parry that neither party considered it desirable to retain the large quantity of fragmented bone that had been recovered from Gough's Cave. Their agreement sealed the fate of what would now have been a very valuable taphonomic collection had it survived intact. Large scale disposal of material also explains why a number of spit records of particular species mentioned by Bate can no longer be traced (TABLE I).

From 1948 to 1953 further excavations were carried out under the direction of the head guide, Victor Painter, removing nearly all of the remaining fossiliferous deposits (Donovan, 1955). A small collection of mammals recovered at this time, now in the Cheddar Caves Museum and the B.M.(N.H.), are marked with spit numbers corresponding with those of Parry. While finds from this period do not significantly augment our knowledge of the mammal fauna, these excavations are the source of nearly all of the material from which the recently presented environmental and sedimentological data are derived (Collcutt, 1986; Leroi-Gourhan, 1986). Unsorted bone scraps from the 1949, 1950 and 1951 seasons, originally sent to the British Museum and now in the B.M.(N.H.), are of considerable value in helping to reconstruct the true nature of the bone assemblage, even though it is from the inner, less productive parts of the accumulation (Parkin *et al.,* this volume).

That a sizeable quantity of Gough's Cave material was periodically thrown out of the museum at Cheddar is apparent from the discovery of bones and teeth bearing characteristic spit numbers in the cave's car park in 1952. Fortunately someone recognized the value of these specimens and took them to Taunton where they are now preserved in the County Museum. This collection has only been seen recently and has not been studied in detail, but good specimens with well preserved butchery marks are certainly present (Roger Jacobi, personal communication).

There have been numerous subsequent diggings in Gough's Cave, not all of which have been recorded. Significant finds have been made from time to time, most notably the decorated rib fragment reported on by Hawkes and Tratman (1970), but the volume of unexcavated sediment is now very limited. Today only small pockets of the bone-bearing cave earth and breccia still survive on the cave walls and perhaps in places beneath the modern concrete floor, a very precious and precarious resource for future detailed study.

RELATIONSHIP OF FAUNA TO STRATIGRAPHY

The stratigraphy and lithology of the Gough's Cave entrance deposits are reported on by Donovan (1955) and Collcutt (1986).

We have several sources of information relating to the stratigraphic position of faunal remains from Gough's Cave but none of them are direct. At no stage in the history of exploration has material been recovered and recorded with specific and unequivocal reference to lithostratigraphy, with the qualified exception of 'Cheddar Man' (Davies, 1904).

It is very clear that Parry's six-inch excavation spits did not invariably coincide with the bedding of the cave deposits. For the present discussion we can concentrate on the two major lithological divisions within the sediments of the outer part of the cave, the cave earth and breccia unit, source of the bones and artefacts, and the underlying conglomerate unit. The reported occurrence of fauna and cultural objects in sediments underlying the cave earth and breccia can be shown to be no more than an artefact of Parry's recording system, which was largely based on the erroneous assumption that the deposits were regular and continuous in transverse section at any particular distance into the cave.

As can be seen from TABLE I, Lateglacial mammal remains extend well below spit 16, the base of the cave earth and breccia as specified by Parry (1929). Down the middle of the cave, beneath Richard Gough's access path, finds were definitely restricted to the cave earth and breccia (Donovan, 1955, p. 90), but towards the cave walls, bones and flints were found in spits lower than the normal base of this unit. The cause of this 'cave wall effect' is clearly demonstrated in Donovan's figure 13, where the cave earth and breccia is shown filling a 1 m deep trench-like feature developed between sediments of the conglomerate unit and the cave wall. A similar section was seen by the author on the western edge of the Cheddar Man Fissure early in 1985, showing a narrow wedge of cave earth and breccia containing mammalian rib fragments penetrating down between the conglomerate and the cave wall to a considerable depth below the usual junction between the two sediment bodies.

While Parry does not appear to have seen this feature directly, possibly due to the lack of good transverse sections in his excavations, he did make the observation concerning flints found in spits below the those normal for the cave earth and breccia that he was 'strongly under the impression that these had been carried down below their original level by the retreating waters after flooding, *as they were all found at the sides of the cave, often against the cave walls and usually in sandy patches'* (Parry, 1931, p. 47, new italics).

The same observation undoubtedly extends to the decorated rib fragment described by Hawkes and Tratman (1970), ascribed by them to the conglomerate on account of its adhering sandy matrix and the report that it was found 'low down' in excavations near the cave wall.

With the nature of the lower limit of faunal remains clarified, attention turns to the internal stratigraphy of the cave earth and breccia unit and to the upper limit of Lateglacial material. The base of the unit corresponds roughly to Parry's spit 16 over much of the daylight zone of the cave, except immediately adjacent to the cave walls, and there follows a marked increase in the quantity of surviving mammal remains up to a maximum in spit 14. Within spit 13 Parry noted an extensive layer of charcoal up to 1 inch (2.5 cm) thick, containing a quantity of burnt bone. Much of the faunal material recovered from the cave earth and breccia is directly attributable to the phase of human occupation represented by this feature. Lateglacial mammals continue to occur in higher spits, though in diminishing numbers (TABLE I).

TABLE I — *The spit distribution of Pleistocene mammal remains from Parry's 1927-1931 excavations*

spits	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*
Ochotona pusilla						1													
Lepus timidus		2	1	2	5	7	6	3	9	2		1							
Castor fiber					1				1										
Lemmus lemmus						1													
Arvicola terrestris						*	1	1											
Canis lupus			1	1				1	3	2	1	*							
Alopex lagopus						1			*										
Vulpes vulpes	*	1	1		*	3	1			1		1	5						
Ursus arctos				3		*	2	*	3										
Equus ferus	*		10	6	15	25	11	27	63	21	15	12	5	3	4	*	*	*	1
Cervus elaphus	*	*				8	6	8	8	3	1	1	2						
Rangifer tarandus		*	1		3	2			*										
Bos primigenius		*		*	*	2	1			1									
Saiga tatarica									1	1									

Figures indicate the numbers of individual specimens with original excavation data in the British Museum (Natural History) collections.
Asterisks denote material mentioned in published reports but no longer traceable in surviving collections.

Spits 1 to 5 contained only modern animal remains. Spits up to and including 6 contained Lateglacial bones, but with an increasing admixture of more modern material. Miss Bate listed various Flandrian intrusions such as sheep and goat as far down into the cave earth and breccia as spit 12. This more recent material can be readily distinguished from the Lateglacial fauna by its unaltered condition and by the fact that it has not been smashed almost beyond recognition by zealous Lateglacial marrow-eaters. Re-examination of the collections in the B.M.(N.H.) shows that comparatively modern material was recovered as low as spit 14, notably a complete metatarsal of roe deer *Capreolus capreolus* which Bate considered to be Pleistocene on account of its depth, but such deep occurrences of intrusive material are very rare indeed. It is possible that these remains were brought down to lower levels near the cave walls by the same process that had affected the older material, or were spatially restricted in some way.

Parry observed that the oldest post-Pleistocene material was Early Iron Age, nothing attributable to the Bronze Age or Neolithic being present. Jacobi (in prep.) extends the unrepresented period back as far as the later Mesolithic. So what was happening in the cave during this time? It seems very strange that a site as attractive to human utilization as Gough's Cave should remain unused for much of the present interglacial. Examination of surviving data suggests that there has been artificial truncation of the Lateglacial sequence, with a consequent hiatus in the Lateglacial/Flandrian record. Evidence supporting this conclusion lies in the 'Upper Stalagmite' of Davies (1904) which was reported to immediately overlie the Cheddar Man skeleton.

The Upper Stalagmite is still traceable as a major feature around the walls of the entrance area, the vestibule and parts of the Cheddar Man Fissure. It was also observed as a buried remnant, truncated by disturbance, right under the arch of the entrance in a section recorded by Donovan (in Tratman, Donovan and Musgrave, 1972). It is a muddy, finely laminated, tufaceous deposit up to 45 cm thick that would certainly have formed a readily distinguishable layer within the cave earth and breccia unit, yet Parry does not make a single reference to it in any of his reports or tables. The most likely explanation for this extraordinary omission is that the stalagmite had already been largely stripped from the cave. The maximum recorded depth of pottery in the midline of the cave was spit 9, about 4 feet (122 cm) above the base of the cave earth and breccia. Spits 8 and 9 produced only Early Iron Age pottery and a mixture of Pleistocene and recent animal remains. Assuming that a major clearance of the entrance deposits has taken place, the Early Iron Age is the earliest acceptable date for such an event.

Survival of the Cheddar Man skeleton dated at c. 9,000 bp sealed beneath the Upper Stalagmite can be attributed to its inaccessible position deep within the Cheddar Man Fissure beyond the zone of clearance. It is likely that the sediments in the fissure represented the sole surviving major fragment of an undisturbed Lateglacial to Early Flandrian sequence up to the early years of this century and opens up the possibility that Gough's Cave, like Aveline's Hole on the northern side of Mendip, once contained a large number of similar Mesolithic burials. The tufaceous nature of the Upper Stalagmite indicates that the cave entrance was still largely open when it formed: similar deposits in other Mendip caves are attributable to the warmer parts of the Flandrian.

The accumulation of material in the entrance zone of the cave continued after the clearance with sediments of a similar lithology to those of the Lateglacial sequence, hence the inclusion of later archaeological horizons within the cave earth and breccia unit. At this stage there is no satisfactory way of resolving the details of the upper part of the cave earth and breccia with absolute certainly without detailed examination of the *in situ* remnants, particularly those surviving on the east side of Cheddar Man Fissure, but this is beyond the scope and intention of the present work.

SPATIAL LIMIT OF THE FAUNAL REMAINS

Modern Gough's Cave is now an extensive system; however all but the first 50 m of the main cave passage was inaccessible to late Upper Palaeolithic people and their refuse. The limited extent of the cave earth and breccia unit wedge (Collcutt, 1986) sets a spatial limit on the Lateglacial faunal remains towards the back of the Vestibule, but both flints and bones are reported as having increased in abundance towards the daylight. The former extent of occupation debris outside the cave is unknown, any deposits having been removed long since by natural and human agencies, but it is likely that the material preserved in the cave is only a sheltered remnant of a once more extensive zone of activity. It should be borne in mind that any interpretation of the scale of human utilization of the site during the Lateglacial period based solely on surviving evidence from the cave could be very much in error.

THE MAMMALS

A complete list of mammalian species that can reliably be attributed to the Lateglacial period as represented at Gough's Cave is given in TABLE II.

NOTES ON THE SPECIES REPRESENTED

Ochotona pusilla is now found in the steppes of western central U.S.S.R. Late Devensian records of this animal in Britain are restricted to the southern parts of England, with notable concentrations in the Mendip Hills and the Wye Valley. Two mandibular rami from a particularly rich *O. pusilla* accumulation at Great Doward Cave [= Merlin's Cave] in the Wye Valley (Hereford and Worcester) have yielded a ^{14}C age determination of 10,020 ± 120 years bp (OxA-516). Pikas are small, short-eared relatives of the rabbit which have a particular liking for scree slopes, so the sides of Cheddar Gorge must have been something of a haven for them. As with all of the small mammal species in the Gough's Cave assemblage, remains of the steppe pika are rare, but this is probably more a reflection of the nature of the deposits than of their actual local abundance.

Lepus timidus, the arctic hare, appears to have been a very important animal in the Lateglacial human economy. It has warm fur, finely textured bones for needles and points, and is excellent eating. This animal, often listed as *L. anglicus,* is well represented in Lateglacial faunas all over Britain, particularly where there are indications of human occupation. Today the species still has an extensive Palaearctic range, but is replaced in all but the very north of Britain by *L. capensis.*

The beaver *Castor fiber* is a valuable environmental indicator. Its aquatic habits and specific food requirements indicate the presence of a large stream or lake with adjacent deciduous woodland. Beaver is known from other Lateglacial contexts in Cheddar Gorge, notably Gough's Old Cave and Sun Hole, both very close by. As will be discussed later, there

TABLE II — *The Gough's Cave Lateglacial Mammal Fauna*

order Lagomorpha	
family Ochotonidae	
Ochotona pusilla (Pallas, 1769)	steppe pika
family Leporidae	
Lepus timidus Linnaeus, 1758	arctic hare
order Rodentia	
family Castoridae	
Castor fiber Linnaeus, 1758	beaver
family Arvicolidae	
Lemmus lemmus (Linnaeus, 1758)	norwegian lemming
Arvicola terrestris (Linnaeus, 1758)	water vole
order Carnivora	
family Canidae	
Canis lupus Linnaeus, 1758	wolf
Alopex lagopus (Linnaeus, 1758)	arctic fox
Vulpes vulpes (Linnaeus, 1758)	red fox
family Ursidae	
Ursus arctos Linnaeus, 1758	brown bear
order Perissodactyla	
family Equidae	
Equus ferus Boddaert, 1785	wild horse
order Artiodactyla	
family Cervidae	
Cervus elaphus Linnaeus, 1758	red deer
Rangifer tarandus (Linnaeus, 1758)	reindeer
family Bovidae	
Bos primigenius Bojanus, 1827	aurochs
Saiga tatarica (Linnaeus, 1766)	saiga antelope

has been some resistance to accepting obligate woodland species such as the beaver as integral elements of the Lateglacial fauna. The author can find no reason for questioning the material on which the Gough's Cave record is based, nor those from the two other sites mentioned above. From an environmental viewpoint, it is interesting to note that Leroi-Gourhan (1986) has found small quantities of *Alnus, Betula* and *Corylus* pollen in sediment blocks recovered from spits 15 to 11, spanning the main Lateglacial faunal accumulation.

The animal recorded here as *Lemmus lemmus* is usually accepted to be the norwegian lemming, but it is not easily separated on skeletal characters from its close relative the wood lemming *Myopus schisticolor.* While the norwegian lemming now has a very restricted northern distribution, the wood lemming extends well southwards into the coniferous forests of Eurasia. The determination given is believed to be correct but further study of this distinction is justified.

Arvicola terrestris is a far-ranging, catholic species now found from Israel to the Arctic coast. Water voles have no particular climatic significance and are locally adapted to a very wide range of environments.

The wolf *Canis lupus* also has wide tolerance of climatic conditions. It is very well represented by fossil remains in Mendip caves and is apparently the principal agent responsible for introducing other faunal remains at several of them. There are a small number of gnawed bones in the Gough's Cave material that may be attributed to one or more of the canid species recorded, including specimens which also show butchery marks.

Alopex lagopus and *Vulpes vulpes* are best treated together. Small canids are quite well represented in the Gough's Cave assemblage. Most of these are unquestionably the ubiquitous red fox, but a few specimens at the smaller end of the size range show morphological characters more like the arctic fox. One specimen from spit 11 is definitely attributable to *A. lagopus*, a fragmentary right mandibular ramus with P_2 to M_2 (B.M.(N.H.) Palaeont. Dept. M 13797). The entoconid of M_1 is small and distally displaced relative to the hypoconid, while the whole talonid is relatively narrow and reduced when compared with the M_1 of *V. vulpes*. *Alopex* is now found in the arctic tundra, where it hunts small mammals and birds and scavenges from the carcasses of larger animals such as reindeer.

Brown bear *Ursus arctos* is rare in the Gough's Cave assemblage. It is represented by some remarkably complete bones, most of which could belong to a single individual. It seems reasonable to suppose that people and bears would have avoided each other as much as possible, particularly in a confined space, so the presence of one or more bears in the cave suggests that human occupation was not exclusive and that other animals made use of the site in their absence.

Remains of horse dominate the Gough's Cave collections. The name *Equus ferus* has recently begun to appear in Pleistocene faunal lists and deserves some explanation. The more familiar name *Equus caballus* is based on a description of the domestic horse. Domesticated forms, often subject to intensive morphological modifications caused by selective breeding, are almost impossible to deal with in conventional nomenclatural terms. A sound convention established by Bohlken (1961), and now followed in major revisionary works, is to ignore binomials based on domesticated varieties, adopting instead the oldest available name for the wild form. Domestic varieties are referred to by their generic and vernacular name (*vide* Corbet, 1978, p. 8), which in this case would be *Equus* (domestic horse).

Even with this clarification, there remains great confusion over the specific identity of Pleistocene horses. It is common for them to be represented by fragmentary material, particularly their teeth, and few mammals have teeth so complex in their fine structure or with so much potential for incredibly minute examination and quantification of their inevitable variation. The list of described forms and varieties of *Equus* is consequently great. While the patterns of variation may be of great interest and importance in establishing the temporal and geographical ranges of particular populations of horses, it is ecologically unlikely that dozens of distinct species ranged the Eurasian region during the Pleistocene. For the present, all British Late Pleistocene true horses are referred to as *Equus ferus* following Groves (1974).

The assumption is often made that all Late Pleistocene equids from British sites must be true horses rather than asses or hemiones (also called onagers). However, analysis of cave paintings of European Late Pleistocene equids shows that this assumption may not be completely safe, several distinct morphologies being represented. The Gough's Cave equids survive as a highly selected sample of fragmentary dentitions, isolated teeth and dissociated distal limb elements. The postcranial material, mainly broken-off distal metapodials, 1st, 2nd and terminal phalanges, is of relatively limited value in drawing comparisons with finds from other sites as nearly all of the descriptive work on European Pleistocene equids is based on features of the skull and dentition. Basic measurements of the Gough's Cave 1st and 2nd phalanges are given in TABLE III as an aid to future comparison. Lateglacial bone-smashing and recent disposal has done away with any information that could have been derived from the overall proportions of long bones which have been shown to be of value in distinguishing skeletal material of the living groups of equids.

TABLE III — *Measurements of distal limb bones of* Equus ferus *from Gough's Cave*

BM(NH) Palaeont. Dept. No.		*spit*	*max. length* mm	*max. width* mm	*max. depth* mm
1ST PHALANGES					
M 49734	left fore	10	80.0	59.0	41.5
M 49737	left hind	10	88.5	58.0	39.5
M 49787	left fore	11	83.0	57.0	41.5
M 49788	right fore	11	80.0	58.0	38.0
M 49797	left hind	8	83.0	56.5	37.5
M 49835	right hind	12	84.0	57.5	35.5
M 49840	right hind	13	87.0	55.0	36.0
M 49912	left fore	14	84.0	58.5	44.0
M 49913	right fore	14	84.5	57.5	40.0
M 49922	right fore	14	80.5	55.5	37.0
M 49933	right hind	14	80.5	55.5	36.0
M 49958	left fore	14	81.0	60.5	41.0
M 49969	left hind	16	80.0	53.5	36.5
M 49975	left fore	15	80.5	56.0	39.0
M 50002	left fore	16	76.5	55.5	39.0
M 50030	left fore	—	86.0	60.5	41.5
M 50044	right fore	19	82.0	61.0	40.0
M 50073	right hind	—	82.0	57.0	35.0
2ND PHALANGES					
M 49730	right hind	11	53.0	60.0	35.0
M 49774	right fore	10	46.5	54.5	31.5
M 49785	right hind	—	48.0	55.0	32.5
M 49829	left hind	12	52.5	56.0	34.5
M 49841	left hind	13	48.5	54.0	33.0
M 49853	right hind	13	50.0	52.0	33.0+
M 49855	right hind	13	48.5	53.0	32.0
M 49856	right hind	14	52.5	55.0	35.0
M 49999	right fore	—	48.0	57.0	32.0
M 50075	left fore	15	47.5	53.5	33.0

In the present case, this leaves only the teeth. Groves and Willoughby (1981) have drawn attention to the generally poor value of dental characters in distinguishing between modern equids, but they accept that one feature, the development of the ectoflexid in the lower cheek teeth, is of some practical value. In true horses, the ectoflexid typically extends between the preflexid and postflexid but without reaching the linguaflexid, leaving a dentine isthmus connecting the metaconid to the metastylid. This feature helps to distinguish horse from ass and hemione which tend to have lower molars with shorter ectoflexids that do not separate the pre- and postflexids, and from the zebras where the ectoflexids are usually strongly developed, often extending right across to the linguaflexid. This character state is variable within horse populations but in those instances in which the ass-like condition is found in relatively unworn teeth, sectioning towards the base often reveals the more typical horse ectoflexid condition. All of the Gough's Cave material examined falls within the range of ectoflexid development seen in true horses.

Individuals of all ages are represented, from young foals to animals with teeth worn down almost to the roots. There is no strong age grouping as judged by eruption sequence and crown height, but as further material comes to light in museum collections it may ultimately be possible to build up a sample by which this point may be better judged.

The wild horse or tarpan is now a very rare animal indeed, probably now restricted to captive herds. We have little direct knowledge of its preferred habitat, so it is difficult to interpret the significance of its abundance in the Lateglacial faunas of Britain. In broad terms it is taken to indicate regionally open conditions, most probably dry grassland similar to the modern steppes.

The relative abundance of red deer *Cervus elaphus* at Gough's Cave is one of the more significant features of the main faunal assemblage. Reindeer is the dominant cervid in nearly all British Lateglacial faunas. Its replacement in Gough's Cave by red deer is taken to reflect the effects of relative climatic amelioration on regional vegetation during the Lateglacial Interstadial. Until recently, red deer was present throughout the woodland and semi-steppe regions of Eurasia and North America. It is completely absent from the tundra. The modern distribution of *C. elaphus* has been considerably modified by man, but preferred habitats seem to include deciduous trees, the leaves of which form a significant part of its normal diet (Hobbs *et al.,* 1979).

Having suffered a similar fate to the horse remains, those of the red deer are largely limited to partial dentitions, isolated teeth and distal limb elements. The Gough's Cave material has been included in a systematic review of British Pleistocene red deer being undertaken by Adrian Lister. The adult animals are intermediate in size between the huge red deer of the Middle Devensian [Owen's *Cervus (Strongyloceros) spelaeus*] and the smaller animals of the Flandrian. Curiously, there is no reliable record of red deer antler in the surviving collections.

The full significance of the poor record of reindeer *Rangifer tarandus* is dealt with later. On present dating evidence there is no direct association of reindeer with the main Interstadial faunal assemblage other than for a small group of well fashioned reindeer antler artefacts. The precise stratigraphic position of the principal specimens is open to doubt, but Roger Jacobi (personal communication) assigns them to the c. 12,000 bp phase of occupation on typological grounds. They may not be of local origin.

In a major taxonomic review of the genus *Rangifer*, Banfield (1961, p. 36, table 5) makes specific reference to material from Gough's Cave in an entry concerning the extinct temporal subspecies *R. t. guettardi.* Usually associated with the tundra, reindeer are also found in forests and on high ground to the south of the tundra belt, having well developed seasonal migration patterns enabling them to utilize the relatively sparse resources of the arctic regions. Reindeer are specialists at obtaining forage from beneath snow cover, though the precise nature and thickness of the snow cover can have a major influence on their local distribution.

TABLE IV — *^{14}C Age Determinations relating to the Lateglacial Interstadial Fauna (All specimens from the B.M.(N.H.) collections)*

Material	*Lab. No.*	*Radiocarbon Date*
Equus ferus	BM-2183	12,120 ± 120 yrs. bp
Equus ferus	BM-2184	12,020 ± 120 yrs. bp
Equus ferus	BM-2185	11,970 ± 230 yrs. bp
Equus ferus	BM-2186	12,240 ± 220 yrs. bp
Equus ferus	BM-2187	12,070 ± 170 yrs. bp
Equus ferus	BM-2188	12,160 ± 210 yrs. bp
Saiga tatarica	OxA-463	12,380 ± 160 yrs. bp
Equus ferus	OxA-464	12,470 ± 160 yrs. bp
Equus ferus	OxA-465	12,360 ± 170 yrs. bp
Cervus elaphus	OxA-466	12,800 ± 170 yrs. bp
Bovini	OxA-588	12,030 ± 150 yrs. bp
Bos primigenius	OxA-813	11,900 ± 140 yrs. bp
There are also four repeat determinations based on separate collagen and amino acid fractions from two of these samples:		
collagen of BM-2183	OxA-589	12,340 ± 150 yrs. bp
amino acids of BM-2183	OxA-590	12,370 ± 150 yrs. bp
collagen of BM-2187	OxA-591	12,260 ± 160 yrs. bp
amino acids of BM-2187	OxA-592	12,500 ± 160 yrs. bp

There were times during the Lateglacial when the range of reindeer extended in a continuous sweep down the western seaboard of Europe and into the Pyrenees. Its rarity or absence in S.W. England at c. 12,000 years bp, coupled with the expansion of red deer, might be expected to be more than a local phenomenon, but it is hard to trace similar faunal changes of the same age elsewhere in Europe. It is possible that over-zealous collecting during the nineteenth and early twentieth centuries has destroyed much of the detailed stratigraphic information relating to this period in many parts of the Continent, just as it has in Britain.

Bos primigenius is usually a good indicator of temperate conditions in British Pleistocene faunas. The presence of any bovine during the Lateglacial is of interest, but the fact that it is *Bos* rather than *Bison* (J.-P. Brugal, personal communication) particularly so. A new accelerator date of 11,900 ± 140 yrs bp (OxA-813) on an astragalus of *B. primigenius* confirms that this species is a member of the main faunal assemblage (see TABLE IV).

The Lateglacial Interstadial has been likened to a 'false start' to the present interglacial, truncated by the events of the Younger Dryas Stadial (Watts, 1980). The presence of aurochs, red deer and beaver among the Gough's Cave faunal remains lends support to this model in that they would appear to herald a more fundamental improvement in environmental conditions than ultimately took place. Bovine records are actually very rare in the assemblage, but contemporary descriptions of the ferocity of this recently extinct species suggest that it may not have been sought out of preference if other animals were readily available in the area.

The fact that *Saiga tatarica* was overlooked by Bate in her initial examination of the Gough's Cave mammals is a little surprising. She evidently found the material interesting enough to retain, but makes no specific reference to it. The two specimens concerned, a third lower molar and a calcaneum, will be fully described in a forthcoming account of saiga antelope remains in Mendip caves (Currant, in prep.). This fascinating animal has also been recorded from Sun Hole (Collcutt, Currant and Hawkes, 1981) and has recently been identified by the author from two other Mendip sites. Apart from the famous specimen from Twickenham, London, fossil saiga antelope is only known from Lateglacial cave deposits on Mendip. The Gough's Cave calcaneum is one of the dated Lateglacial Interstadial series.

Today the living saiga antelope is found in the arid steppe regions of the central southern U.S.S.R. The expansion of its range during the Lateglacial was dramatic, records extending from Alaska to Britain. It is possible that this expansion was related to a short, particularly dry, continental phase during the Lateglacial Interstadial that was previously interpreted as a cold oscillation (the Older Dryas Stadial of authors). This animal is reported to avoid broken or hilly country (Bannikov, 1961), so it is likely to have been restricted to the flat ground of the area now forming the Somerset Levels. Its main modern predator other than man is the wolf.

STRATIGRAPHIC FRAMEWORK

In recent years there has been a concerted effort to confirm, delimit, and stabilize the nomenclature of the major climatic events which influenced N.W. Europe during the Lateglacial period, c. 14,000 to 10,000 radiocarbon years bp (Mangerud *et al.,* 1974; Sissons, 1974; 1976; Coope, 1975; Coope and Pennington, 1977; Gray and Lowe, 1977; Lowe and Gray, 1980; Berglund, 1979). Major difficulties have been encountered in applying to the Quaternary the same criteria for stratigraphic subdivision that have been proposed for the rest of the geological record (Hedberg, 1976), and we are currently in a period of discussion and trial-and-error application to assess the merits of the special procedures suggested by various authors.

The scheme proposed by Lowe and Gray (1980) (see TABLE V) is adopted here for two main reasons. Firstly, its simplicity ensures wide geographical application allowing local variations and the reported non-synchroneity between major changes in environment as inferred from different fields of study to be discussed within a comprehensive framework. Secondly, the novel insertion of transitional phases between named climatostratigraphic units is a very welcome departure from traditional practice, in which essentially continuous environmental variation through time is expressed in terms of discrete events with sharp and readily definable boundaries, a far from realistic model.

TABLE V — *Stratigraphic subdivision of the Lateglacial Period. (adapted from Lowe & Gray, 1980)*

Radiocarbon years bp	*Climatostratigraphic units*	*Gough's Cave*
	Flandrian Interglacial	Cheddar Man
10,000		
	transition	reindeer
10,500		
	Younger Dryas Stadial	
11,000		
	transition	
12,000		
	Lateglacial Interstadial	human occupation. horse, red deer, arctic hare fauna
13,000		
	transition	
14,000		
	Late Devensian Main Stadial	

The least familiar unit here is the 'Lateglacial Interstadial'. This effectively incorporates three more widely known divisions, the Bolling Interstadial, Older Dryas Stadial and Allerod Interstadial. Watts (1980) presents evidence for regarding these as localized, often poorly expressed fluctuations within a single event of greater significance. In particular he shows that the Older Dryas Stadial is a short phase of climatic deterioration which has its clearest expression on the extreme maritime fringe of N.W. Europe, i.e. western Britain and Ireland, its effect on vegetation diminishing sharply towards the continental interior.

DISCUSSION OF THE MAMMALIAN FAUNAL ASSEMBLAGE

In the only recent synthesis of information on British bone caves, Stuart (1983) selects Sun Hole in the cliffs opposite Gough's Cave as one of the more significant cave sites to yield data relevant to the later part of the Late Devensian. His appraisal of the Sun Hole fauna helps to highlight a problem pertinent to the Gough's Cave assemblage.

Collcutt, Currant and Hawkes (1981) reviewed the Sun Hole mammal fauna, placing the animal remains from the upper part of the Pleistocene sequence – Unit 1 – in a single Late Devensian group. They could find no firm evidence for subdivision, either in the form of stratigraphic information or of differences in bone preservation. Stuart selectively removed from the quoted faunal list all of those elements that he regarded as being possible Flandrian contaminants (mole, beaver, bank vole, wood mouse, weasel and wild cat). In doing this he was clearly trying to make an orthodox Late Devensian cold assemblage out of the remainder of the fauna. An objection to this kind of treatment of fossil assemblages is that such ecological 'sifting' of faunas tends to harden the artificial boundaries that we like to create between successive climatic phases in the Quaternary, yet the Lateglacial period had such a wide variety of climatic events in so short a period that all environments were arguably transitional. Under such circumstances, it will be a rare site where the lithostratigraphic units contain evidence of conditions which exactly correspond to the isolated peaks and troughs of major climatic events with all transitional phases being unrepresented. Within any one unit in a Lateglacial sequence, apparent faunal mixing may be the rule rather than the exception.

At Gough's Cave we have a coherent group of Lateglacial Interstadial mammals that can be shown to be a contemporaneous assemblage by virtue of (*i*) a very fine series of closely grouped ^{14}C dates (see Burleigh, this volume), and (*ii*) bones bearing suites of butchery marks that appear to belong to a single major phase of human occupation. Some of the dated bones also bear cut marks (see Parkin *et al.,* this volume), thus linking together the two sets of correlative data. To this tight group belong *Equus ferus, Cervus elaphus, Bos primigenius, Saiga tatarica* and *Lepus timidus* (see TABLE IV).

Of the remaining species, most could easily belong to the same Lateglacial Interstadial group, particularly when account is taken of the wide range of possible habitats that could be supported by the complex local topography, yet the site contains a few features which beg a more complex interpretation. The principal focus here must be the rare occurrence of reindeer, an otherwise dominant element of British Lateglacial faunas. If reindeer was present in the Cheddar area at the same time as horse and red deer, they why is it not more common at Gough's Cave? It was after all a much favoured prey of human hunters elsewhere, and its bones and antlers were evidently prized for the manufacture of cultural objects.

The simplest explanation would appear to be that reindeer was not present for much of the main period of Lateglacial human utilization of the site, and there is some corroborative evidence for this in the form of a ^{14}C age determination on a fragment of reindeer antler from spit 8 of 9,920 ± 130 years bp (Q-1581), almost 2,000 years later than the recently dated material from the main phase of human activity (Burleigh, this volume).

Examination of the original spit records compiled by Bate shows that *Rangifer* was recovered from spits 7, 11 and 14 (Bate, in Parry, 1929, p. 105). Miss Bate's copy of Parry's report is annotated with an additional record from spit 8 (see below). The spit 14 record, the only specimen of reindeer apparently reliably recorded in association with the main phase of Lateglacial human presence in the lower spits of the cave earth and breccia (other than the clearly displaced bâton from spit 19), was based on an antler fragment which Bate initially listed in her notes as '?*Rangifer tarandus*', suggesting that it was not a particularly diagnostic specimen. Jacobi (personal communication) has suggested the possibility that this might have been a re-utilized fragment of a broken bâton, putting it in the same category as the reindeer material mentioned previously. It may also be important to note that Parry's excavations extended just outside the present entrance of the cave into an area of poorly known stratigraphy, and it is notable that the partial reindeer skull from spit 8 (B.M.(N.H.) Palaeont. Dept. M 13789) was recovered at the time when he is known to have been digging in this area.

The possibility of a later phase of faunal input can only be explored by direct dating of well identified material. Further age determinations on the rare Gough's Cave reindeer material are now being sought. At present there is no reliable evidence on which to group other species with the reindeer, but accelerator dates are also being sought for *Alopex lagopus* material in particular because of its modern status as a companion species in the arctic tundra.

On the day that this account was finalized, Jill Cook of the British Museum discovered further archival material relating to the 1948 to 1951 excavations in Gough's Cave. A manuscript faunal list prepared by Judith King of the B.M.(N.H.), dated 7th March 1952, suggests that no further record of reindeer was found in the cave earth and breccia unit during this phase of work. As these excavations were well inside the cave entrance, this adds further support to the suggestion that Parry may have encountered younger deposits with a Younger Dryas Stadial fauna somewhere near the entrance during his earlier explorations.

Taking the Lateglacial Interstadial material as a group, they fit best into a landscape with at least some deciduous woodland, but also extensive areas of rough grazing. The plateau-like surface of Mendip, its steep south-western flank and the rock slopes of Cheddar Gorge, and the relatively flat expanse of the Somerset Levels clearly offer considerable scope for a wide range of micro-environments, hence the mixture of open country and woodland species. The extensive charcoal spread in spit 13 suggests that trees were fairly readily available, probably spreading in a belt along the scarp slope of Mendip. The presence of the Cheddar rising may also have favoured local woodland development. Exactly how large the faunal catchment area of the Gough's Cave hunters was can only be guessed at (Campbell, 1977), but there must have been fairly long distance movement to bring in flint for the manufacture of implements.

A few general observations arise from this account. Firstly and obviously, it is highly desirable that any future discovery of fossiliferous material in Gough's Cave should be very carefully recorded and excavated if removal is necessary, and that absolutely everything should be kept.

On a matter applicable to other Lateglacial sites, it is clearly a major advantage to select readily identifiable faunal material if dating samples are to be submitted. Unidentified bone scraps and poorly determined specimens have often been used to obtain absolute age determinations, but their value is very limited. The arrival of new technology requiring comparatively small sample sizes should help encourage use of better material. At Gough's Cave, a good series of age determinations on well identified specimens has completely revitalized an uninspiring collection.

The general lack of agreement concerning the timing, duration and extent of Lateglacial climatic changes arising from different lines of evidence, other than in the very broadest terms, indicates that it is premature to tie mammalian data to biostratigraphic frameworks based on other fields of study. In the case of the Mendips, it is hoped that this account will provide the basis for the development of a local, internally consistent, mammalian biostratigraphy which can then be integrated with other models. Most mammalian species are not very good climatic indicators, in fact the factors influencing mammal distribution are rather poorly understood. There are some good indicators of general conditions – in the case of Gough's Cave the relative abundance of reindeer and red deer is used with some confidence – but such instances are rare. Regional vegetation type is significant for some species, particularly the herbivores, but food selection varies enormously, with major modifications of seasonal intake arising from changes in the relative nutritional value of food plants. Population numbers in many mammalian species were probably well in excess of anything we have experience of today and their environmental impact would have been very great indeed. Against an overall background of climatic limitations, it could be argued that herbivorous mammal distribution determined vegetation patterns for much of the Pleistocene rather than the other way around.

There is no question but that there are major variations in mammalian faunal composition through Pleistocene time and that these changes are particularly marked in Britain. Though it may not always be possible to explain precisely why the variations have taken place, with care a stratigraphic sequence of changing faunas can be constructed. The Gough's Cave mammals are an important contribution to this end.

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