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THE ANIMAL BONES FROM THE IRON AGE SETTLEMENT AT CHILBOLTON DOWN, HANTS.

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The Animal Bones from the Iron Age Settlement at Chilbolton Down

1,082 animal bone fragments were examined from the excavations. Detailed information about each fragment was recorded on computer punchtape using the method devised by Jones(1977). An archive of the basic data has been produced and can be consulted at the Ancient Monuments Laboratory in London or at the Faunal Remains Project in Southampton.

The Distribution and Identification of the Fragments

As shown in Table 1, most of the animal bone was recovered from Pits 6, 31 and 48 and was associated with the later phase of the site. Feature 72 - a hollow dated to a late phase - also produced over 100 fragments. So too did the excavated section of the ditch that surrounded the settlement and which produced material dated to both the Iron Age phases. The earliest dated feature, Pit 9, contained only seventeen bone fragments. The remaining features also produced only a little bone and those are listed together in Table 1. The density of animal bone mirrored the distribution of artifacts along the trench for the pipeline in that the majority of the material was located in the southern half of the settlement.

A sample of 1,082 fragments is a small one in archaeozoological terms and can only answer some of the questions such studies pose. It should be noted that 605 of these fragments could not be identified to species and are listed in Table 1 as "large mammal" (horse, cattle or red deer), "small artiodactyl"(sheep, goat, pig, roe deer), "large artiodactyl"(cattle or red deer) and "unknown mammal" fragments. The species that were identified were horse, cattle, sheep or goat, pig, dog, water vole(<u>Arvicola terrestris</u>), short-tailed vole(<u>Microtus agrestis</u>) and common toad(<u>Bufo Bufo</u>). The number of fragments of the last three species was augmented by the presence of partial skeletons in Pit 6. Fragmentary remains of sheep and goat are difficult to distinguish and, although goat was not positively identified, it is possible that a few fragments belonged to that species. Fifteen fragments were positively identified as sheep, however, and it seems that this species dominated the sheep/goat remains. Of the identified fragments, sheep(229 fragments) dominated in most features followed by cattle(113) and horse(63). Only a few fragments of pig and dog were found. No deer nor any other wild species of mammal or bird were represented in the sample, which was therefore totally dominated by the domestic species. It is probable that most of the small artiodactyl fragments belonged to sheep and the majority of large mammal fragments belonged to cattle.

Variation and Differential Preservation

The evidence suggests that the inhabitants of the site relied almost entirely on the major domestic animals for their meat supply. More detailed assessment of these remains has to take into account the possibility that the sample may be unrepresentative of the site as a whole and the evidence that differential preservation had an important role to play in the type of bone recovered. The fact that sheep/goat provided 54.1% of the identified fragments of the domestic animals does not mean that 54.1% of the animals exploited or eaten were sheep/goat nor necessarily that they were the most numerous species. The skeletons of domestic animals from archaeological sites can be subjected to fragmentation by butchery, on disposal or on recovery. These fragments may be partially or totally destroyed by the effects of erosion, the chemical constituents of the soil, weathering, the gnawing of animals and other attritional processes (Binford & Bertram 1977). The different skeletal elements of the carcases may have been disposed of in different ways, in association with various activities, such as the slaughtering of stock, jointing, cooking or in the manufacture of tools or glue. Obviously if the skeletons of these species were affected by these processes in different ways, the proportion of surviving fragments on a site(or part of it) may not reflect directly the number of animals originally represented.

This problem can be investigated further by studying the individual bone elements of each species. Observations about the quantity of each element, its preservation and its fragmentation can throw some light on the destructive processes involved. The state of preservation of each bone was recorded and it was found that the preservation in some deposits was better than others. In total, 340 fragments displayed some degree of erosion and in many cases they were affected severely. Such erosion will have destroyed much of the bone originally deposited. In most layers over 20% of the bone was eroded. Consistenly good preservation was limited to Pit 31 and the lower layers of Pits 6 and 48. Tables 2 and 3 give details of the bone elements recovered from layers with well-preserved bone and those containing over 20% eroded bone respectively. In both cases, fragments of sheep/goat were the most numerous of the identified species followed by those of cattle. Horse was little represented in the layers of poor preservation and most of its fragments were found towards the bottom of Pits 6 and 48. As one would expect, the partially preserved skeletons and most of the isolated bones of water vole, short-tailed vole and toad were found amongst well-preserved material in pits. Of the unidentified material, large mammal and unknown mammal fragments were more common in layers of poor preservation, whereas fragments of small artiodactyls were much more dominant in well-preserved material. The types of bone elements recovered also showed significant variation. The layers with poor preservation were dominated by fragments of high density and good-survival capability. Teeth are the most resiliant parts of the skeleton to attritional forces. The number of loose teeth was much higher in layers with poorly preserved bone. In those, they contributed 59 out of the 109 sheep/goat fragments. On the other hand, only 21 out of 120 sheep/goat fragments in layers of good preservation were teeth. The mandibles and maxillae to which these teeth belonged were not recovered and it is significant that there was a higher proportion of sheep/goat jaws in layers of good preservation. The relative abundance of other bone elements also showed variation. Sheep/goat skull fragments and phalangeswere found almost exclusively in layers of good preservation. In young animals (which most of the sheep/goat were in this sample) these bones are among the most fragile in the skeleton and most vulnerable to destruction in poorly preserved assemblages. Ribs are also very fragile and only eight fragments of small artiodactyl rib were found in layers of poor preservation. This contrasts markedly with the remaining deposits, which produced 63 fragments of rib from the excavation.

Taking the analysis a stage further, the parts of the bone elements that did survive varied in relation to their state of preservation. The shafts of longbones consist almost entirely of cortical bone, which is denser and survives better than the epiphyses, which possess a higher proportion of spongy cancellous bone that is more vulnerable to attrition. In general, the density of bone increases with the age of the animal. Given these facts, one would expect layers of poor preservation to contain relatively fewer epiphyses of longbones and relatively fewer bones of young animals than those of good preservation. Table 4 lists the occurrence of the major longbones of sheep/goat and cattle in layers of good and poor preservation. In the case of sheep/goat, the proportion of fragments with epiphyses was markedly fewer in layers of poor preservation. The proportion of cattle epiphyses, however, was similar in both types of deposit. Such an analysis can be influenced by differential fragmentation of the longbones in the two groups of layers but in this instance there was little evidence for this. It seems that the epiphyses of cattle survived better than those of sheep/goat. One reason for this is that cattle epiphyses are larger and less susceptible to total destruction. More important, however, is the fact that a much greater proportion of the sheep/goat sample belonged to immature animals. Nearly all of the epiphyses of the cattle longbones were fused to the shaft and were quite dense, whereas well over half of the sheep/goat epiphyses recovered were unfused, small and fragile. It is to be expected that these would not survive the poor preservation conditions encountered on parts of the site. Other evidence for the destruction of bone was found but appears to have been less important. Nine bones bore scratches and tooth marks associated with the gnawing by dogs. It is likely that other bones, particularly small and fragile ones were totally destroyed by a similar agency. 26 fragments were burnt or charred and fire may have destroyed many other bones.

Attritional processes therefore attacked the skeletons differentially. The evidence suggests that these processes probably destroyed(or made unidentifiable) more sheep/goat fragments than cattle, particularly in layers of poor preservation. Differential preservation resulted in significant variations in the types of bone represented. This situation makes it difficult to assess with certainty the relative importance of the domestic animals to the inhabitants of the site. Sheep/goat remained the most commonly represented species even in layers of poor preservation, despite the poorer chance of survival of their bones. The best preserved layers in Pits 6, 31 and 48 probably give a more accurate record of the bones deposited but the number of fragments found in these was too small to judge whether they were typical of the site as a whole.

Metrical Analysis

Measurements were recorded where possible but the number of these was very small. Most of the sheep were immature and their bones could not be measured. These were small and slender and characteristic of Iron Age sheep elsewhere in Wessex. Two cattle metacarpi were complete and belonged to animals with shoulder heights of c. 106 and 112 cm., adapting Foch's conversion factors(van den Driesch & Boessneck 1974: 336). These and other cattle measurements fell comfortably within the ranges of cattle from Gussage All Saints in Dorset(Harcourt 1974: 4). The same applied to horses in this sample. Two third metatarsals and a radius belonged to animals with shoulder heights of 124, 125 and 126 cm. respectively, using Kiesewalter's multiplication factors(van den Driesh & Boessneck 1974: 339). This is equivalent to small ponies standing at about eleven hands at the shoulder.

Ageing Data

The most abundant ageing evidence was obtained from the sheep/goat sample. Sixteen mandibles and ten maxillae, recovered mainly from layers of good preservation, still possessed some of their cheek teeth and could be aged. Loose teeth were not considered in detail, since many of them could have belonged to the same jaws. The sample was characterised by the presence of a lot of young animals. Thirteen of the sheep/goat mandibles belonged to animals which died before they lost their deciduous teeth. Two of these did not even have fully erupted deciduous premolars and belonged to animals that died only a few weeks after birth. Six others died before their first molar was fully erupted and probably were under six months old. Four more had their first molars in an early stage of wear but their second molars had not erupted. These too are likely to have been animals of under twelve months of age, although all too little is known as yet about the rates of tooth eruption in Iron Age sheep and age estimates may be misleading. No mandibles of adult sheep were found in any of the pits, although some of the loose teeth found in them would have belonged to older animals than those described above. The only three mandibles that had completed their tooth eruption sequence(third molar in full wear) were found in layers of poor preservation. These had heavy wear on all of their teeth and belonged to quite old animals. It is probable that young mandibles deposited in such layers had a very poor chance of survival and are not represented in them.

The presence of so many young animals(the maxillae and epiphyseal fusion data supported the results obtained from the mandibles) is interesting since it was also a feature of the sheep/goat assemblage at Gussage All Saints. There, much larger samples of mandibles in all the Iron Age phases showed a similar pattern of high immature mortalities(Harcourt 1974: 6). 52%, 31% and 28% of the mandibles recovered from the Early, Middle and Late phases of that site did not have their second molars in wear. There was also a concentration of mandibles with their third molars in a fairly early stage of wear. At Chilbolton Down, there is no evidence of this second concentration but this may have been a factor of a small and possibly unrepresentative sample. The presence of so many lambs raises the question of whether they were slaughtered deliberately or died from disease or other natural causes. First year mortalities are high in wild herds of sheep(Geist 1971) and in feral herds such as the Soay sheep on St. Kilda(Grubb 1974). Suprisingly little is known from historical or anthropological records about mortalities in domestic herds, although they were probably very high by modern standards. Obviously, the lambs in domestic herds would have a better chance of survival, particularly if shelter or winter fodder was provided. The size of the animals at death was small and they would have not provided much meat, if culling them at that age was an accepted economic practice. It is more likely that most of these animals died from natural causes.

Ageing evidence from other species was very limited. Of seven mandibles and maxillae of cattle recovered, four still possessed deciduous premolars and the other three belonged to fully mature animals. Very few immature horses have been discovered on British Iron Age sites. The numbers are so small that Harcourt(1974: 18) has suggested that horses were not bred but periodically rounded up when old enough for training as working animals. In the light of this, it is interesting that the small sample from Chilbolton produced bones of young horses. Two phalanges found in Pit 31 belonged to a very young foal; a maxilla in the same pit did not have any of its premolars erupted and was probably under 2½ years of age, using modern estimates; a mandible in Pit 6 still had its third deciduous incisors in wear and its first permanent incisors just erupting and therefore belonged to an animal of 2½-3 years of age. It is possible that the two older animals may have been animals selected for training and rounded up but subsequently died at a young age and the evidence is too limited to disprove Harcourt's hypothesis. On the other hand, the possibility that horses were kept and reared at some sites in the Iron Age cannot be dismissed. Four other jaws of horse were recovered and all of them belonged to mature individuals and these were probably employed as working animals.

Butchery Evidence

Study of butchery marks on animal bones can provide detailed information about the ways carcases were prepared. It is often difficult, however, to determine whether bones have been fragmented by deliberate butchery or by damage during and after disposal. Consequently only definite chop marks or knife cuts were recorded. Eighteen such cases were observed - a number too small for detailed analysis. Butchery on cattle bones was found most frequently. Two humeri, a femur, a radius, a scapula, two pelves, a vertebra, a calcaneum and a metatarsus all bore some sort of butchery on them, showing the importance of cattle as a meat resource. No definite butchery was discovered on any of the sheep/goat bones, although two "small artiodactyl" ribs and one long bone fragment, which probably belonged to sheep, did have knife cuts on them. The small size of most of these animals would not have necessitated much butchery and the low occurrence of cut marks is to be expected. The youngest and smallest of the lambs may not have been butchered for food at all. Three horse fragments, an ischium and two second phalanges displayed evidence of butchery. As Table 2 shows, bones from the hooves of horse were found in relatively large numbers in the pits. These have little food value and the presence of butchery marks on them is unusual. Possibly they were caused when the feet were detached from the rest of the limbs and discarded as waste.

Pathology

Seven cases of dental, axial and appendicular pathology were observed. Two of the eldest sheep/goat jaws had suffered an ante-mortem loss of their fourth permanent premolars, a factor probably significant of their old age. Overcrowding of the cheek teeth was found on a sheep/goat maxilla and is indicative of poor nutrition. Overcrowding and malocclusion of teeth was also observed in one of the adult horse jaws. Three other horse bones were deformed pathologically. The proximal joint surface of a third metatarsal displayed evidence of porosity and distorsion. Such a condition of the ankle joint in horses is found quite commonly on archaeological sites and is usually thought to be caused by degeneration in old age. A horse's axis had a small area of porous bone on the ventral aspect of the vertebral foramen and its caudal articular surface showed some pitting and distorsion which was matched by the cranial articular surface of the third cervical vertebra found in the same layer. The cause of this condition is unclear.

Conclusions

Despite their small numbers, the faunal remains from Chilbolton Down produced some interesting evidence. The site clearly demonstrated the effects that differential preservation can have on animal bone assemblages and showed how important that factor is in the interpretation of intra- and inter-site studies. The discovery of very young horse bones is at present unique to this site in Iron Age Wessex. The high rate of immature sheep mortalities has an interesting parallel with the assemblage at Gussage All Saints. On this and other observations, the results from this site have raised more questions than the size of the sample can answer. These questions can, however, be considered on other sites of the same date in Wessex and in Britain as a whole.

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Table 1

Number of Animal Bone Fragments from Chilbolton Down

Species	Pit 9	Pit 6	Pit 31	Pit 48	Ditch	F.72	Others	Total
Horse	1	20	8	26	4	4	–	63
Cattle	8	15	25	28	13	18	6	113
Sheep/Goat	1	79	50	31	13	38	17	229
Pig	1	2	4	–	4	3	1	15
Dog	–	–	–	1	2	–	–	3
Water Vole	–	21	–	–	–	–	–	21
Short-tailed Vole	–	6	–	–	–	–	1	7
Common Toad	–	26	–	–	–	–	–	26
Large Mammal	5	52	33	23	35	31	34	213
Small Artiodactyl	1	150	66	28	24	36	37	342
Large Artiodactyl	–	1	1	–	–	–	–	2
Unknown Mammal	–	10	7	1	11	16	3	48
Total	17	382	194	138	106	146	99	1082

Table 2

Analysis of Fragments Recovered from Layers with Good Preservation

Bone	Hor	Cow	S/G	Pig	Dog	WV	STV	Td	LM	SA	LA	UM	Total
Mandible	5	4	13	–	–	2	3	–	1	–	–	–	28
Maxilla	1	1	8	1	–	–	–	–	–	–	–	–	11
Teeth	13	7	21	2	–	–	–	–	–	–	–	–	43
Skull fgs.	1	5	12	–	–	2	2	–	1	–	–	1	24
Scapula	1	5	8	–	–	–	–	2	–	2	1	–	19
Humerus	–	6	3	1	–	–	–	2	–	–	–	–	12
Radius	1	2	9	–	–	–	–	2	–	2	–	–	16
Ulna	1	2	1	–	–	–	–	–	–	–	–	1	5
Pelvis	4	4	4	–	–	3	–	2	–	–	–	–	17
Femur	–	3	5	–	–	4	1	1	–	–	–	–	14
Tibia	1	1	11	–	–	4	–	3	–	–	–	–	20
Metacarpal	–	4	5	–	1	–	–	–	–	–	–	–	10
Metatarsal	5	3	6	–	–	–	–	–	–	–	–	–	14
Metapodial	–	–	2	–	–	1	–	–	–	–	–	–	3
Calcaneum	–	2	1	–	–	–	–	–	–	–	–	–	3
First Phalanx	1	2	7	–	–	–	–	–	–	–	1	–	11
Second Phalanx	5	2	1	–	–	–	–	–	–	–	–	–	8
Third Phalanx	5	–	1	–	–	–	–	–	–	–	–	–	6
Sesamoid	3	–	–	–	–	–	–	–	–	–	–	–	3
Axis	1	1	–	–	–	–	–	–	–	–	–	–	2
Other Vertebrae	1	2	–	–	–	5	–	3	11	15	–	2	39
Patella	1	–	2	–	–	–	–	–	–	–	–	–	3
Rib	–	–	–	–	–	–	–	–	8	63	–	1	72
Long bone fgs.	–	–	–	–	–	–	–	–	12	78	–	–	90
Frags.	–	–	–	–	–	–	–	10	43	40	–	8	101
Total	50	56	120	4	1	21	6	25	76	200	2	13	574

Table 3

Analysis of Fragments Recovered from Layers with Poor Preservation

Bone	Hor	Cow	S/G	Pig	Dog	WV	STV	Td	LM	SA	LA	UM	Total
Mandible	1	4	11	1	1	–	–	–	–	1	–	–	19
Maxilla	–	3	2	2	–	–	–	–	–	–	–	–	7
Teeth	3	10	59	2	1	–	–	–	–	–	–	–	75
Skull fgs.	1	4	2	1	–	–	–	–	2	–	–	1	11
Scapula	–	4	1	1	–	–	–	–	–	–	–	–	6
Humerus	2	5	2	–	–	–	–	–	–	2	–	–	11
Radius	2	5	5	–	–	–	–	–	–	2	–	–	14
Ulna	–	–	1	–	–	–	–	–	–	–	–	–	1
Pelvis	3	2	2	–	–	–	1	–	–	–	–	–	8
Femur	–	5	2	2	–	–	–	–	–	–	–	–	9
Tibia	–	2	6	–	–	–	–	1	–	1	–	–	10
Metacarpal	–	1	4	–	–	–	–	–	–	–	–	–	5
Metatarsal	–	2	2	–	–	–	–	–	–	–	–	–	4
Metapodial	–	2	1	–	–	–	–	–	–	–	–	–	3
Carpal	–	–	1	–	–	–	–	–	–	–	–	–	1
Calcaneum	–	1	3	–	–	–	–	–	–	–	–	–	4
First Phalanx	–	–	2	–	–	–	–	–	–	–	–	–	2
Second Phalanx	1	1	–	–	–	–	–	–	–	–	–	–	2
Third Phalanx	–	–	–	1	–	–	–	–	–	–	–	–	1
Atlas	–	2	–	–	–	–	–	–	–	–	–	–	2
Other Vertebrae	–	4	1	–	–	–	–	–	17	4	–	–	26
Patella	–	–	2	–	–	–	–	–	–	–	–	–	2

Table 3(cont)

Bone	Hor	Cow	S/G	Pig	Dog	WV	STV	Td	LM	SA	LA	UM	Total
Fibula	-	-	-	1	-	-	-	-	-	-	-	-	1
Rib	-	-	-	-	-	-	-	-	6	8	-	-	14
Long bone fg.	-	-	-	-	-	-	-	-	29	92	-	-	121
Frags.	-	-	-	-	-	-	-	-	83	32	-	34	149
Total	13	57	109	11	2	-	1	-	137	142	-	35	508

Key to Tables 2-3: Hor = horse; S/G = sheep/goat; WV = water vole; STV = short-tailed vole; Td = toad; LM = large mammal; SA = small artiodactyl; LA = large artiodactyl; UM = unknown mammal.

Table 4

Occurrence of Epiphyses of Sheep/Goat and Cattle Long Bones

	Layers with Good Preservation		Layers with Poor Preservation	
Sheep/Goat	Fragments	Epiphyses	Fragments	Epiphyses
Humerus	3	3	2	2
Radius	9	3	5	-
Femur	5	2	2	1
Tibia	11	2	6	1
Metacarpus	5	2	4	-
Metatarsus	6	3	2	-
% with epiphyses - 38.5			19.1	
Cattle	Fragments	Epiphyses	Fragments	Epiphyses
Humerus	6	4	5	4
Radius	2	2	5	3
Femur	3	1	5	2
Tibia	1	-	2	1
Metacarpus	4	3	1	-
Metatarsus	3	1	2	-
% with epiphyses	57.9		50.0	