

APPENDIX

THE ANIMAL BONES, STOKELEIGH CAMP

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The animal bones from this excavation were, in the main, fragmentary. Only the smaller and more compact bones had survived intact. Insufficient complete bones were recovered to enable measurements to be taken for statistical studies and for sex determination. As the sample was relatively small and very fragmentary, it was considered unnecessary to attempt to separate sheep and goats and hence all bones of the sheep/goat species were designated 'ovicaprid', although no obvious goat bones were identifiable.

METHODS

The bones were identified both anatomically and specifically, age and sex were determined for each bone if at all possible. As the bones were so fragmentary, determination of sex was confined mainly to the teeth, on the assumption that the few very large teeth present were most likely to have been derived from male animals. (Not an entirely satisfactory method but the only one possible). Age determination of the bones were based upon the age at which the epiphyses joined the shafts of the bones, giving an age up to the time when the epiphyses had completely fused. (Silver, 1969). Another method was based on the eruption times and wear on the teeth, both in the jaws and on the loose teeth. Ewbank *et alia.* (1964), in their study of sheep mandibles of the I.A. site at Barley, developed a method whereby the age of sheep could be determined by the state of eruption and wear on mandibular teeth. Using their data, the ages of the ovicaprid mandibles were estimated. This method was extended to include loose teeth both mandibular and maxillary. Estimations of the approximate ages of ox loose teeth was made using a similar method. The wear on ox incisor teeth, relative to age, is discussed by Silver in his data for crossbred stock. Silver's 'old data' for pigs was used for the ageing of the less numerous pigs teeth. Any method for the ageing of animals by the study of the wear on the teeth, must be inaccurate for absolute ageing, but, on the assumption that the feeding habits and food for each species studied was comparable, it will give a reasonable estimate of a relative age. The estimate for pig's teeth are even less accurate, as the dentition is noted for its irregularity in eruption.

On the whole, only three animal species were of any significance, the ox, the ovicaprid and the pig. Other species included the horse, and the dog, both of which were represented by loose teeth and fragments of bone. There were a few isolated bones of hare, rabbit, bird and mole, species which could well be intrusive. No deer bones were identified. The minimum number of animals of each species was estimated for each layer in each area of the excavation, both for the bones alone and for the loose teeth. The significantly larger number of animals represented by the loose teeth, reflects the large number of teeth on the site, which in turn indicates that the bones were strewn about the living area, exposed to physical injury, and not confined to middens.

DISEASE

There is little evidence of disease to be seen in the bones. There was an example of osteoporosis of an ox talus from D4, this may be the result of injury to the hind foot. One example of osteo-arthritis was noted, in a proximal phalanx of a sheep from D5, which may have been caused by injury or old age. The only other pathological condition seen, was the abnormal wear on two ox molar teeth from D4, indicative of dental or masticatory dysfunction. This general lack of evidence of disease is due to two main factors:-

(1) the small sample and (2) that sick animals are rarely allowed to live long enough for the disease process to have any effect on the bone before the animal is slaughtered or has died early from the effects of the disease.

AREA D

Layer 1. Topsoil. There were few bones in this layer and were considered to be of little significance.

Layer 2. The ox, ovicaprid and pig were all represented.

Oxen. There was only one ox of adult age.

Ovicaprids. There was a minimum number of 4 animals (11, from the loose teeth). All were over one year at death.

Pigs. The minimum number of pigs was 3 (4, from the teeth). All were over one year at death.

The horse was represented by a single loose cheek tooth and was therefore of no significance.

The ox being a mature beast, was probably a draught animal. The sheep were also relatively mature and were most likely to have been reared for wool, whereas the pig was raised to an economic size, only as a source of meat. The meat represented by the bones of the three main species, was of moderately good quality but fore-quarter meat predominated.

Layer 3. This layer produced a greater quantity of animal bone, an indication of a more concentrated occupation. Again the same three animal species were predominant. All skeletal elements were present, showing that the diet was of a better quality than in Layer 2.

Oxen. The minimum number of oxen was 7 (14, from the loose teeth). One was juvenile and six were adult. The presence of skull fragments and numerous phalanges

would be evidence of slaughter of oxen on the site and subsequent preparation of hides. Fragmentary horn cores were of *longifrons* type. There was evidence of at least one young male.

Ovicaprids. The ovicaprid bones represented all the skeletal elements from a minimum number of 9 animals, (25, from the loose teeth), and, excluding one foetus and one at about 4½ months, ranged in age from one to two years, then a gap until three years and over at death. This large number of the older age group would suggest that these sheep were wool producers.

Pigs. Apart from one of about 3½ months at death, pigs appear to have been slaughtered at between one to two years, a very economical arrangement. The minimum number of animals was 5 (10, from the loose teeth), and a representative scatter of skeletal elements indicates joints of meat of good quality.

One loose molar tooth was all that was found of horse and was therefore of no significance.

Layers 4a and 4b. By far the greatest quantity of bone was recovered from these layers, showing a maximal occupation at these periods. As with the previous two layers, ox, ovicaprid and pig are the most important animal species and horse is better represented. The only human bone to be found, a left temporal bone from a young female turned up in these layers.

Oxen. The minimum number of oxen was 11 (25, from the loose teeth), three very large upper second molar teeth were most likely to have been derived from three adult males, possibly maintained as stud animals. The bones represented all skeletal elements including 47 phalanges, the presence of which, together with fragments of horn-core (of *longifrons* type), is evidence of animal slaughter on the site and the preparation of hides. Further evidence is afforded by the presence of knife cut marks on the bones of the extremities, notably six tali and two meta-carpals, these latter also having been chopped through, transversely. The joints of meat represented by the bones would have been of good quality, and there were many bones with axe cuts upon them illustrating some prevailing butchery techniques, which were quite unusual, in the light of modern practice. For example:

1. the cutting off of the alae (wings or lateral parts), of several-cervical vertebrae.
2. the spine of a scapular had been chopped off from backwards whilst,
3. another had multiple axe cuts around the neck.
4. some of the bovine long-bones had been split longitudinally, although this is not a butchery practice, it would have allowed easy access to the marrow.

On the whole, the standard of butchery is low, although the quality of the joints would be quite high.

Ovicaprids. These bones were numerous, a minimum number of 17 animals (40, from the loose teeth), with a majority falling into the age range of one to three years at death. This suggests that the importance of sheep was wool primarily and meat was of lesser importance. The instance of neonatal death of about 18% (3 in a total of 17 animals, derived from bone only), is quite high, a figure of 6.4% is quoted by Fraser and Stamp, (1968), for modern singles.

There was evidence of butchery techniques as shown by the various axe marks on the bones. For example:

1. Two cervical vertebrae, both atlases, had been chopped transversely with a single blow.
2. Two lower cervical vertebrae had been chopped obliquely, one from right to left and the other from left to right. All four are examples of decapitation whether as a means of slaughter or after death it is not possible to say. The oblique cuts could have severed the head whilst the animal was supported by the hind limbs. The transverse cuts, close to the skull could have been produced by decapitation as a method of slaughter but, much more likely, was the result of the removal of the head of the already dead animal.

There are numerous small, irregular knife cuts on many of the bones. Those on the extremities may have been produced during the skinning process, whereas, others, such as those on the scapula and humerus, were most likely to have been produced when the meat was crudely carved from the bone.

Pigs. Pig bones were also numerous, there was a scatter of all skeletal elements and represented a minimum number of 14 animals, (19, from the loose teeth). The age at death ranged from about one year to three years and over, with one aged animal,

which, although there is no direct evidence, it is tempting to speculate as being the stud boar.

Evidence of butchery was again noted, more especially in the cervical vertebrae.

1. There were three upper cervical vertebrae which had been chopped transversely, again decapitation but whether pre- or post-mortem is impossible to decide, (decapitation, is not a method of slaughtering pigs due to technical difficulties and to there being more satisfactory ways).

2. Two mid cervical vertebrae had deep, oblique knife cuts on the antero-lateral sides of the bodies. These cuts were almost certainly produced when the animal's throat was cut, a more simple and sure way of killing a pig.

There were numerous fine knife cuts on the shafts and ends of some of the bones, notably the humerus, most of which may have been produced when the meat was carved from the bone.

The horse was well represented by skull and other bone fragments and loose teeth, and indicated three horses, one about 1½ to 2 years and two over five years at death. These were most likely to have been draught or riding horses.

Layer 5. There was much less bone in this layer but the same three main species were present in similar proportions to the previous layers.

Oxen. The minimum number was 4 animals, (none by teeth), one was foetal, one juvenile and two were adult, one of the latter may have been a male. The general scatter of all skeletal elements represented joints of all qualities although fore-quarter bones predominated.

Evidence of the butcher's art was again noted:

1. One mid cervical vertebrae had been chopped transversely.

2. One scapula had axe marks on the lateral borders.

Knife cuts on the lateral sides of a talus and coarse chop marks on the distal and posterior surface of a meta-tarsal, may have been produced during the process of skinning.

Ovicaprids. The minimum number of animals was 7, (10, from the loose teeth); 4 of these were over 2 years at death and included an aged animal which was possibly male. The bones, a scatter of all skeletal elements, represented all classes of joints of meat but there was no evidence of butchery.

Pigs. The minimum number was 6 pigs, (3 only from the loose teeth), with an age ranging from one year to over three years at death, with evidence of two males. The bones were derived mainly from the fore parts of the animal, including parts of the skull and mandible and would therefore represent the poorer quality of meat.

Some evidence of butchery was noted:

1. One humerus had been chopped across the distal part of the shaft, not a recognisable practice.

Some fine knife cuts, transversely across the distal part of the shaft of a fourth meta-tarsal, could have been produced when the animal was skinned.

There were three loose horse teeth, one duck (?) radius and a rook humerus, all of which are of little significance.

ANIMAL	As determined from Bones		As determined from loose Teeth	
	Weight of Meat (lbs)	Percentage of Total	Weight of Meat (lbs)	Percentage of Total
OX	6,900	74.6	15,900	80.5
OVICAPRID	950	10.3	2,050	10.4
PIG	1,400	15.1	1,850	9.3
TOTAL WEIGHT OF MEAT	9,250		19,800	

1. Total carcass weight, area D.

Weight of Meat

On the assumption that all the bones were food refuse, and using data suggested by Chaplin, (1971), (for mediaeval animals), estimates were made of the quantity of meat represented by the minimum number of each animal species. Chaplin estimates the dressed carcass weight as follows:

Ox . . . 300 lbs. Sheep . . . 25 lbs. Pig . . . 50 lbs.

Figure 23 shows the comparison between the total weights of meat of each species and the minimum number of animals, determined both from the bones and from the teeth. From this figure, it can be seen that beef provided by far the greatest amount of meat for the diet and that mutton and pork were of much less importance. Table 1 was produced by combining the weights of meat of each of the three main species from areas D2, D3, D4 and D5, giving the total amount of meat from area D.

Table 2 shows the distribution of animals and the age at death, both for bones only and for teeth. From this table, it can be seen that the majority of oxen were juvenile, (one to two years), and adult, in fact between 70 and 90%. This must surely indicate that oxen were primarily draught animals and that meat production was of lesser importance.

Sheep were probably reared for their wool, as over 70% of the animals were a year old or more at death, (the first shearing could be made at this age). Again food production would have been of secondary importance.

Pigs were not slaughtered until they had reached an economical size, at about a year or more, and pork accounted for about 15% of the available meat.

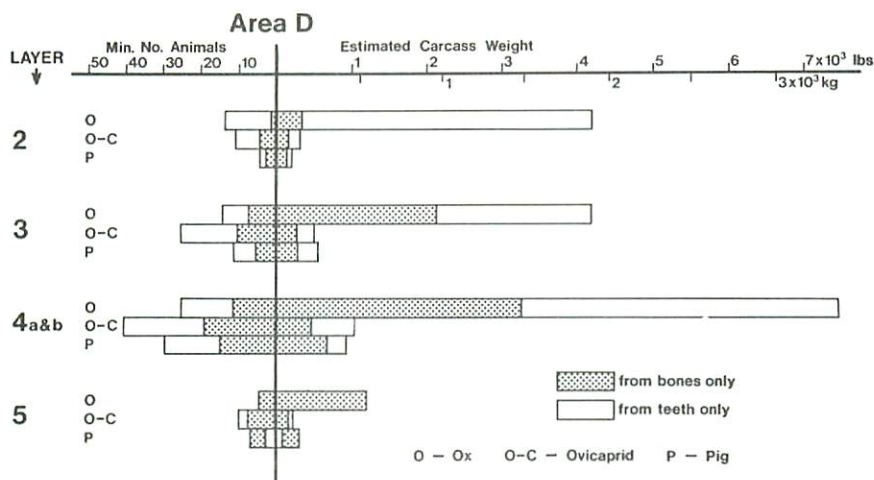


Fig. 23. Distribution of Minimum Number of Animals and Carcass Weight for Area D.

ANIMAL	AGE OF ANIMAL (months)	LAYER 2		LAYER 3		LAYER 4 a&b		LAYER 5	
		From Bones	From Teeth	From Bones	From Teeth	From Bones	From Teeth	From Bones	From Teeth
OX	neonatal	-	-	-	1	1 F	-	1 F	-
	0 - 6	-	1	-	-	1	3	-	-
	juvenile	-	1	1	6	-	9	1m	-
	adult	1	10	6	7	9	10	1	-
	aged	-	-	-	-	-	3m	1	-
OVICAPRID	neonatal	-	-	1 F	-	1 F	-	1	-
	0 - 3	-	-	-	-	2 S	-	-	-
	4 - 8	-	-	1	1	-	2	2	2
	9 - 12	3	-	-	9	3	5	-	1
	13 - 18	-	4	-	5	3	8	-	-
	19 - 24	-	5	6	7	-	15	1	4
	25 - 36	1	2	2	3	3	7	2	2
	36 +	-	-	-	-	5	3	1	1
PIG	0 - 6	-	-	1	-	-	2	-	-
	7 - 12	-	3	1	1	3	4	3	1
	13 - 24	-	-	3	4	2	5	2(1m)	-
	25 - 36	-	-	-	2	3	6	-	2(1m)
	36 +	3	1	-	3	6	2	1	-
HORSE	juvenile	-	-	-	-	1	-	-	-
	adult	-	1	-	1	1	-	-	1

F = foetal S = stillborn m = male

2. Distribution of animals and their ages in area D.

If on the other hand, oxen were primarily, draught animals and sheep kept for wool, the amount of meat available would be relatively small. In this case, it could mean that we are dealing with a community based on agriculture (or possibly that the bone sample is not representative of the site as a whole).

AREA J

Area J was smaller than area D, and in consequence, produced fewer animal bones. These were all fragmentary but the same three species were present in similar proportions to area D.

Layers 2a and 2b

Oxen. The minimum number of oxen was 9 (12 from the teeth), one juvenile, seven adults and one aged animal. All skeletal elements were present, although fore-quarter bones predominated, yielding up to 2700 lbs. (3600 lbs. from the teeth) of beef of moderate quality. (Fig. 24). There was little evidence of butchering.

Ovicaprids. The minimum number of animals was 6 (13 from the teeth), all over 1½ years at death. The presence of skeletal elements of some of the better class joints, would suggest that up to 150 lbs. (325 lbs. from the teeth), of meat of good quality. There was one male.

Pigs. There were 5 pigs (2 only from the teeth), three were between one and one and a half years, and two were over two years at death. The bones could represent up to 250 lbs. of good quality pork.

There were a few fragments of horse bone, one dog tooth and three pieces of rabbit bone, all of which are of little significance.

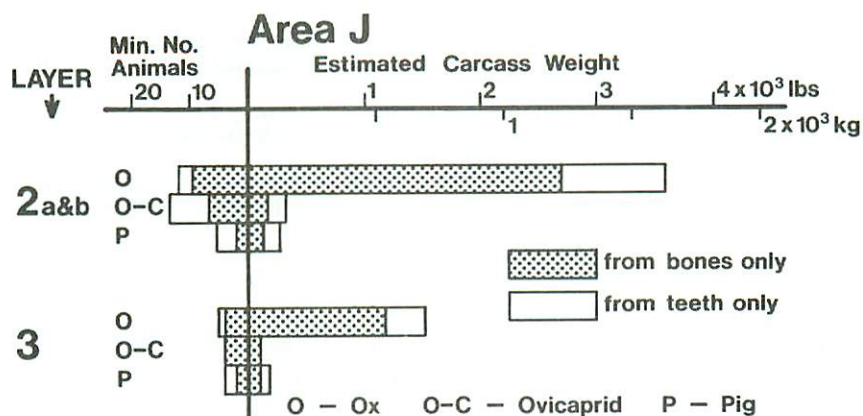


Fig. 24. Distribution of minimum number of animals and carcass weight for area J.

ANIMAL	AGE OF ANIMAL (months)	LAYER 2 a&b		LAYER 3	
		From Bones	From Teeth	From Bones	From Teeth
OX	0 - 6	-	1	1	-
	juvenile	1	3	1	-
	adult	7	5	3	4
	aged	1	3	-	-
OVICAPRID	0 - 3	-	-	-	-
	4 - 8	-	1	-	-
	9 - 12	-	1	3	-
	13 - 18	4(1m)	4(1m)	-	1
	19 - 28	2	4	-	3
	28+	-	3	1	-
PIG	0 - 6	-	-	1	-
	7 - 12	-	-	-	-
	13 - 18	3	1	2	2
	19 - 24	-	-	-	-
	24+	2	1	-	-
HORSE	adult	1	-	1	1

m = male

3. Distribution of animals and their ages in area J.

Layer 3. There was less bone in this layer.

Oxen. The minimum number was 5 (4 from the teeth), one neonate, one juvenile and three adults. The meat, up to 1500 lbs., was of moderate quality, mainly from the fore-quarter.

Ovicaprids. There was a minimum of 4 animals (4 also from the teeth), three were six to nine months and the other was over two years at death. These bones would represent less than 100 lbs of meat of good quality.

Pigs. There were 3 pigs (2 from the teeth), one was less than three months and two were about 18 months at death. The bones represented about 100 lbs. of pork of moderately good quality.

There were a few fragments of horse bone and one rabbit tibia which are not of any significance.

In area J, the evidence for horse and dog is so insignificant that they can be disregarded and although the amount of bone from area J is quite small, the general trend reflects that of area D, and the observations made about that area will apply to area J also.

Table 3 shows the distribution of the animals and their ages at death and *Fig. 24* gives the minimum number of animals and the weight of meat represented.

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