# ANCIENT MONUMENTS LABORATORY

# REPORT

2429

SERIES/No CONTRACTOR

AUTHOR Jennie Coy 7.3.77

TITLE Animal Bones from Ramsbury, Wiltshire

AML Report 2429

Mrs Saraly

Here is the final version of our bone report ~~which has also been sent to the D.O.E. Ancient Monuments Laboratory at Fortress House, London, as a contract report and can be consulted there.~~ for entry Please destroy or return any earlier draft reports to avoid confusion.

If you wish to use any of the information here in any publication we should be grateful if you would give us full details of what you intend to use and allow us to check it before it goes to press.

DEPARTMENT OF THE ENVIRONMENT
FAUNAL REMAINS PROJECT
DEPARTMENT OF ARCHAEOLOGY
UNIVERSITY OF SOUTHAMPTON

7.3.77

# ANIMAL BONES FROM RAMSBURY, WILTSHIRE

JENNIE COY

## List of Contents

## INTRODUCTION

The bones described are from the excavation of a Middle Saxon iron smelting site by Mr Jeremy Haslam at High Street, Ramsbury, Wiltshire (SU 272715). Animal bones from the following periods were studied:

Period 2 A hollow used in Middle Saxon times for iron smelting. During the late 8th century A.D. bones accumulated to the N.W. of the hollow and may represent food waste of the iron smelters.

Period 3b Mid 9th century occupation.

Period 4b A 13th century boundary ditch cut all earlier layers so that some of the bones may be of saxon date.

A detailed analysis of the material in both saxon deposits was undertaken and compared with results from Saxon Southampton (Hamwih) as the latter overlapped Ramsbury to some extent in time. As Period 4b produced a much smaller sample which was of a mixed nature it was studied in less depth.

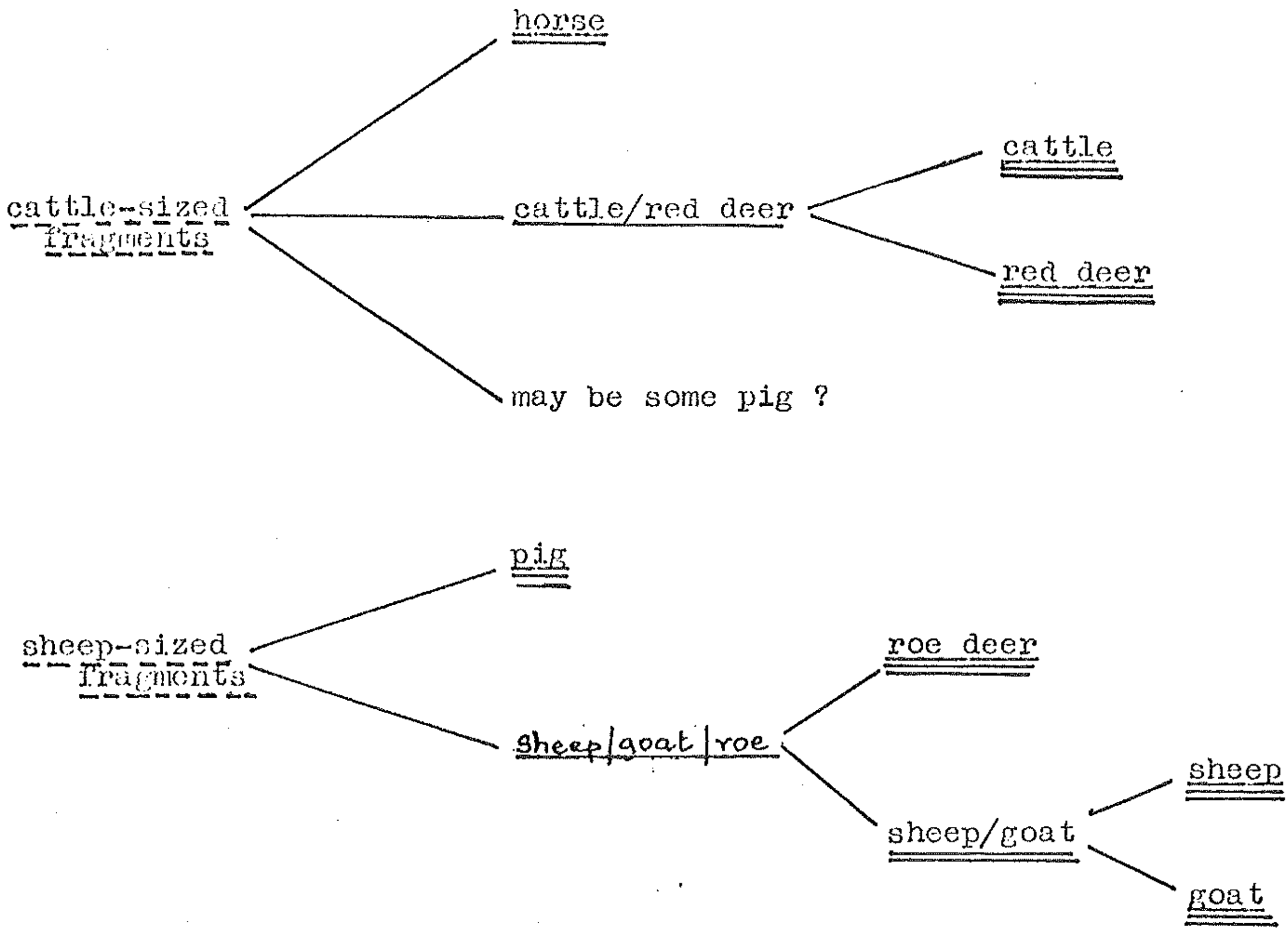
## METHODS OF ANALYSIS

Identifications were taken to species where possible; otherwise bones were placed into some wider category. Figure 1 shows the normal categories used for the majority of mammal bones from those least identifiable on the left to those most identifiable on the right. The fragments from large species may be identified at three levels:

i. They can be classified as cattle-sized fragments when it cannot be ascertained easily whether they come from horse, cattle or red deer (although such fragments may well be classed as "unidentifiable" the anatomical elements can often be identified but the relevance of this when we do not know the species is dubious).

ii. They can be classified to large artiodactyl, which on a site like Ramsbury means cattle/red deer as opposed to horse.

FIGURE 1 IDENTIFICATION CATEGORIES




- - - - "unidentifiable fragments" here put into two categories according to the size of animal they represent.

——— second level of identification

═══ third level

≡≡≡ fourth level

iii. They can be taken to species where anatomical distinctions exist.

Everyday practice for Hamwih material at Southampton Archaeological Research Committee does not include classification to the cattle/red level as all large artiodactyl remains are normally cattle bones (Bourdillon and Coy, in press). At Ramsbury red deer was much more common and specimens were often large so that unless anatomical features for distinction have been worked out it is not easy to separate large deer and cattle reliably. For example, whereas an atlas vertebra could be taken to species - cattle, red deer - a fragment of most other large artiodactyl vertebrae would be classified as cattle/red deer.

Sheep-sized fragments show similar problems - in the case of Ramsbury, roe deer is quite common so that a small artiodactyl category (sheep/goat/roe) is necessary for fragments not easily separable between the three species.

Some workers use more than two general size categories for the "unidentifiable fragments" and certainly bones of large pigs and of fallow deer, Dama dama, do not easily fall into the two categories used above. There is no fallow deer bone at Ramsbury and the majority of pig bone can normally be distinguished as pig because of the distinctive anatomy of the pig. The bone from smaller species was on the whole well-preserved and could be taken to species so that in the writer's view it would be misleading to erect more than two size categories for unidentifiable fragments.

At Hamwih sheep-sized fragments have been counted as 'sheep/goat', and cattle-sized fragments as 'cattle', for calculations of specific percentages. This would obviously compensate for greater ease of specific identification to pig mentioned above. A careful final search of all these "unidentifiable fragments" lowers the possibility of missing the odd fragment of the less common species. If anything broken is found which is of great interest (like the immature beaver skull from period 2) every possible piece must be tried again in the jigsaw of reconstruction. Such finds make the spreading of material from contiguous layers essential.

Species proportions (Table 2,3,4) were calculated using only those bones identified to species (but including all sheep/goat bones). For the tables showing representation of the different elements, however, (Tables 5 and 6) it was decided to include the cattle/red and sheep/goat/roe categories in the domestic figures as their exclusion causes an apparent lack of certain skeletal elements - those difficult to take to species like rib and vertebra fragments - which gives a false idea of the use of whole carcases.

A fragments were recorded by layer for species, element, butchery, texture, pathology and fusion. Measurable material and jaws from the layers were then amalgamated for each period. Full records are kept at the Faunal Remains Project and only summaries of what seems the most relevant information presented here. Weighing of the bone of each species was carried out by layer so that comparison could be made with material from Hamwih from which weights are available. Calculations of minimum numbers of individuals were not made except for mandibles.

Instead another method was tried for overcoming the problems of differential fragmentation. This involved scoring each fragment as a whole bone, half a bone, more than half or less than half - 1,0.5,0.75 and 0.25 respectively - and summing the results for each element of each species (Griffith, 1976). Thus results for cattle femur of 1, 0.5, 0.25, 0.25 would be equivalent to 2 femora. These 'whole bone equivalents' (WBE) should avoid the false picture generated by excessive fragmentation of one species or of one type of bone. A comparison of fragment counts and WBE should give more information on fragmentation but ancient fragmentation must obviously be distinguished from modern breaks. No attempt was made to do this for Ramsbury because the collection had a lot of modern breaks.

For Ramsbury a change in Griffith's method was instituted to attempt to allow for the artificially high totals obtained for skulls and unidentifiable fragments as they usually represent considerably less than o.25 of a whole bone . Small skull fragments, which often represent one of the individual bones making up the skull, were scored o.o5 - on the rough basis that every skull is made up of 20 major bones. These methods are crude but give more information than a fragment count and may be more reliable than minimum number calculations.

Details of the measuring techniques used are given in the measurement section (p. 6 ). The results are set out in a similar way to those from Hamwih to allow for easy comparison with the Statistical Appendix for the analysis of the first batch of material from Melbourne Street, Hamwih. *

*Available, price (1977) from S.A.R.C., 38 Upper Bugle Street, Southampton.

OVERALL RESULTS

Altogether 7,685 fragments were identified to species or ascribed to one of the categories described in the previous section (see Table 1). In addition there were four unidentifiable fragments of bird and one piece of human cranium.

The collection is the equivalent of about 1,391 whole bones and weighed approximately 116½ kilogrammes.

The distribution of these fragments between the various wild and domestic species is shown in Table 2 for the late 8th century period 2; in Table 3 for the 9th century period 3b; and in Table 4 for the mixed bones from period 4b. This separation into domestic and wild categories is not 100% accurate for a number of reasons which will be discussed in the sections which discuss the results species by species.

It is important to understand that whereas Table 1 shows almost all the fragments that were in the collection, the Tables 2,3 and 4 only show those bones which were identified to levels 3 or 4 - that is either to species or to the sheep/goat category.

after p.4.

TABLE 1 DISTRIBUTION OF FRAGMENTS, WHOLE BONE EQUIVALENTS AND WEIGHTS

| | identified to levels 3 & 4 | cattle/ red deer | sheep/goat/ roe deer | sheep-sized fragments | cattle-sized fragments | TOTALS |
|---|---|---|---|---|---|---|
| **no. fragments** | | | | | | |
| period 2 | 1,032 | 132 | 10 | 678 | 522 | 2,374 |
| period 3b | 1,489 | 133 | 0 | 1,748 | 1,559 | 4,929 |
| period 4b | 270 | 11 | 2 | 26 | 73 | 382 |
| TOTALS | 2,791 | 276 | 12 | 2,452 | 2,154 | 7,685 |
| **whole bone equivalents** | | | | | | |
| period 2 | 429 | 67 | 4 | 30 | 26 | 556 |
| period 3b | 517 | 42 | 0 | 87 | 78 | 724 |
| period 4b | 99 | 4 | 2 | 2 | 4 | 111 |
| TOTALS | 1,045 | 113 | 6 | 119 | 108 | 1,391 |
| **weights (g)** | | | | | | |
| period 2 | 38,026 | 4,767 | 90 | 2,478 | 4,675 | 50,036 |
| period 3b | 30,013 | 4,330 | 0 | 4,870 | 16,870 | 56,083 |
| period 4b | 7,661 | 303 | 20 | 375 | 2,173 | 10,532 |
| TOTALS | 75,700 | 9,400 | 110 | 7,723 | 23,718 | 116,651 |

(After Table

TABLE 2 SPECIES REPRESENTATION - ALL METHODS - PERIOD 2

Domestic Animals

| | Number of Fragments | % | WBE | % | Weights (g) | % |
|---|---|---|---|---|---|---|
| HORSE | 64 | 6.7 | 40 | 10.5 | 5,795 | 16.3 |
| PIG | 249 | 26.1 | 90 | 23.4 | 3,870 | 10.9 |
| CATTLE | 339 | 35.6 | 137 | 35.5 | 21,205 | 59.7 |
| SHEEP/GOAT TOTAL | 247 | 25.9 | 85 | 22.0 | 4,310 | 12.1 |
| above includes: | | | | | | |
| SHEEP | 54 | 5.7 | 33 | 8.7 | 1,300 | 3.7 |
| GOAT | 9 | 0.9 | 6 | 1.6 | 567 | 1.6 |
| DOG | 2 | 0.2 | 1 | 0.2 | 97 | 0.3 |
| BIRD | 52 | 5.5 | 32 | 8.3 | 213 | 0.6 |
| TOTALS | 953 | 100 | 385 | 100 | 35,490 | 100 |

Wild Animals

| | Number of Fragments | % | WBE | % | Weights | % |
|---|---|---|---|---|---|---|
| BEAVER | 6 | 7.6 | 4 | 8.7 | 177 | 7.0 |
| FOX | 9 | 11.4 | 6 | 13.9 | 46 | 1.8 |
| BADGER | 2 | 2.5 | 2 | 4.0 | 30 | 1.2 |
| RED DEER | 20 | 25.3 | 10 | 23.1 | 1,817 | 71.6 |
| ROE DEER | 42 | 53.2 | 22 | 50.3 | 466 | 18.4 |
| TOTALS | 79 | 100 | 44 | 100 | 2,536 | 100 |

Note. Although calculations were carried out with much greater accuracy all results are here rounded to the nearest whole figure and percentages to one decimal place.

TABLE 3 SPECIES REPRESENTATION - ALL METHODS - PERIOD 3b

## Domestic Animals

| | Number of Fragments | % | WBE | % | Weights(g) | % |
|---|---|---|---|---|---|---|
| HORSE | 204 | 14.2 | 83 | 16.7 | 8,020 | 27.6 |
| PIG | 353 | 24.6 | 108 | 21.8 | 3,390 | 11.6 |
| CATTLE | 447 | 31.1 | 133 | 26.8 | 14,355 | 49.4 |
| SHEEP/GOAT TOTAL | 307 | 21.4 | 91 | 18.3 | 2,900 | 9.9 |
| above includes: | | | | | | |
| SHEEP | 29 | 2.0 | 6 | 1.2 | 430 | 1.5 |
| GOAT | 10 | 0.7 | 7 | 1.3 | 400 | 1.4 |
| DOG | 24 | 1.7 | 18 | 3.7 | 170 | 0.6 |
| CAT | 2 | 0.1 | 2 | 0.6 | 10 | <0.0 |
| DOMESTIC BIRD | 99 | 6.8 | 61 | 12.2 | 217 | 0.7 |
| TOTALS | 1,436 | 100 | 497 | 100 | 29,062 | 100 |

## Wild Animals

| | Number of Fragments | % | WBE | % | Weights | % |
|---|---|---|---|---|---|---|
| FOX | 5 | 9.4 | 5 | 23.5 | 60 | 6.3 |
| RED DEER | 16 | 30.2 | 2 | 11.1 | 610 | 64.1 |
| ROE DEER | 31 | 58.5 | 10 | 50.6 | 275 | 28.9 |
| WILD BIRD | 1 | 1.9 | 3 | 14.8 | 6 | 0.6 |
| TOTALS | 53 | 100 | 20 | 100 | 951 | 100 |

TABLE 4 SPECIES REPRESENTATION - ALL METHODS - PERIOD 4b

Domestic Animals *

| | Number of Fragments | % | WBE | % | Weights(g) | % |
|---|---|---|---|---|---|---|
| HORSE | 12 | 4.6 | 5 | 5.1 | 910 | 12.0 |
| PIG | 44 | 16.8 | 16 | 16.5 | 515 | 6.8 |
| CATTLE | 99 | 37.8 | 35 | 36.0 | 4,888 | 64.6 |
| SHEEP/GOAT TOTAL | 96 | 36.6 | 37 | 38.0 | 1,187 | 15.7 |
| above includes: | | | | | | |
| SHEEP | 10 | 3.8 | 6 | 6.2 | 340 | 4.5 |
| GOAT | 2 | 0.7 | 2 | 2.1 | 82 | 1.0 |
| DOG | 5 | 1.9 | 2 | 2.1 | 60 | 0.8 |
| DOMESTIC BIRDS | 6 | 2.3 | 2 | 2.1 | 6 | 0.0 |
| TOTALS | 262 | 100 | 95 | 100 | 7,566 | 100 |

* The only remains of wild animals were :

red deer 4 fragments
roe deer 2 "
badger 1 "
peregrine falcon 1 fragment

The distribution of the fragments between the different skeletal elements of the various species is given for period 2 in Table 5 and for period 3b in Table 6. Bones identified to level 2 are included here as explained earlier. An abbreviations list is included.

More detailed analysis of the frequency of the different skeletal elements was attempted but with such a small sample and the frequency of modern breaks results were difficult to interpret. They tended to show that there was a rather high frequency of cattle mandibles and an overall paucity of toes. The latter may be due to lack of sieving. The method used here is illustrated by 2 tables dealing with period 2 fragments. In Table 7, 14 fragment types have been selected and then corrected by dividing by the number of each element represented in one animal (it is scarcely fair to compare numbers of pig skulls with numbers of toes as each pig has 1 and 48 bones in these regions respectively)

In Table 8 these results from Table 7 are turned to whole figures to ease visual comparison. First crania were used as a basis but tibia seemed more consistently linked to sample size - it is easily recognizable and apparently well-preserved on most sites-so results are then compared with the values for tibia.

Although these methods are basically those of Griffith (in prep.) the cranial values are based on results using 0.05 scores for cranial fragments as described in the methods section.

The writer considers that these results from fragment analysis are strongly linked with identifiability and differential preservation. Interpretation of carcase usage is therefore very difficult but it might be possible with larger samples studied in this way from other sites and by inter-site comparison to come to some important conclusions concerning this. Similar techniques were used with interesting results at Haithabu ( Reichstein and Tiessen, 1974).

TABLE 5

## PHASE 2 FRAGMENT COUNTS OF IDENTIFIED MATERIAL

| | H/C ANT | CRA | U/T | MAN | L/T | HYD | VER | RIB | STE | COR | SCA | HUM | RAD | ULN | PEL | FEM | TIB | FIB | AST | CAL | C/T | M/P | PHA | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DOMESTIC SPECIES | | | | | | | | | | | | | | | | | | | | | | | | |
| HORSE | | 9 | | 2 | 3 | | 9 | 5 | | | 1 | 6 | 1 | 2 | 2 | 4 | 1 | | 1 | 1 | | 9 | 8 | 64 |
| CATTLE (may inc. some red deer) | 32 | 71 | 31 | 45 | 21 | 2 | 83 | 42 | | | 20 | 16 | 19 | 2 | 10 | 9 | 14 | | 2 | 5 | 4 | 29 | 14 | 471 |
| PIG | | 72 | 5 | 51 | 20 | | 8 | 1 | | | 4 | 12 | 3 | 7 | 8 | 10 | 16 | 7 | | 3 | | 10 | 2 | 249 |
| *SHEEP/GOAT (may inc. some roe deer) | 30 | 22 | 22 | 52 | 16 | 1 | 3 | | | | 9 | 10 | 17 | 1 | 11 | 3 | 30 | | 1 | 1 | | 27 | 1 | 257 |
| DOG | | 1 | | | 1 | | | | | | | | | | | | | | | | | | | 2 |
| GOOSE † | | 1 | | | | | 1 | 1 | 5 | 1 | 1 | 4 | 3 | 2 | | 2 | 2 T/T | | | | | 2 C/M 2 T/M | | 27 |
| DOMESTIC FOWL | | | | | | | 1 | | 1 | 6 | 1 | 3 | 3 | 3 | | 3 | 1 T/T | | | | | 1 C/M 2T/M | | 25 |
| | | | | | | | | | | | | | | | | | | | | | | | TOTAL | 1,095 |
| WILD SPECIES | | | | | | | | | | | | | | | | | | | | | | | | |
| FOX Vulpes vulpes | | 2 | | 1 | | | 2 | | | | | | 1 | | 1 | 1 | | | | | | 1 | | 9 |
| BADGER Meles meles | | | | 1 | | | | | | | | | | | | | 1 | | | | | | | 2 |
| RED DEER Cervus elaphus | | 5 | 4 | 5 | | | | | | | | 1 | | 1 | | | | | 1 | | | 2 | 1 | 20 |
| ROE DEER Capreolus capreolus | 2 | 7 | 1 | 13 | | | 2 | | | | 4 | 1 | 4 | 1 | | | 1 | | | | | 6 | | 42 |
| BEAVER Castor fiber | | 1 | 1 | 1 | 1 | | | 1 | | | | | 1 | | | | | | | | | | | 6 |
| | | | | | | | | | | | | | | | | | | | | | | | TOTAL | 79 |
| | | | | | | | | | | | | | | | | | | | | | | | GRAND TOTAL | 1,174 |

*10 of these fragments were of goat and 54 of sheep, the rest were not diagnostic.

† included here was one almost complete goose skeleton.

TABLE 6

## PHASE 3b FRAGMENT COUNTS OF IDENTIFIED MATERIAL

| | H/C ANT | CRA | U/T | MAN | L/T | HYD | VER | RIB | STE | FUR | COR | SCA | HUM | RAD | ULN | PEL | FEM | TIB | FIB | AST | CAL | C/T | M/P | PHA | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DOMESTIC SPECIES | | | | | | | | | | | | | | | | | | | | | | | | | |
| HORSE | | 3 | 21 | 6 | 37 | | 43 | 32 | | | | 2 | 3 | 3 | 1 | 10 | 5 | 3 | | 4 | 4 | 6 | 16 | 5 | 204 |
| CATTLE (may inc some red deer) | 20 | 68 | 88 | 52 | 66 | 3 | 51 | 10 | | | | 10 | 18 | 24 | 11 | 20 | 9 | 25 | | 5 | 12 | 9 | 53 | 26 | 580 |
| PIG | - | 73 | 37 | 45 | 66 | | 14 | 10 | | | | 9 | 17 | 10 | 18 | 4 | 3 | 14 | 4 | | 4 | | 24 | 1 | 353 |
| *SHEEP/GOAT(may inc.some roe deer) | 18 | 15 | 53 | 33 | 50 | | 9 | 2 | | | | 14 | 10 | 18 | 1 | 18 | 3 | 15 | | 2 | 1 | | 40 | 5 | 307 |
| DOG | | | 1 | 1 | | | 1 | | | | | 3 | 1 | 2 | 2 | 5 | 2 | | | | 1 | | 4 | 1 | 24 |
| CAT | | | | | | | | | | | | | | | | | | 1 | | | | | 1 | | 2 |
| GOOSE | | | | | | | | | 1 | | | 2 | 4 | | 1 | | | 2T/T | | | | | | 1 | 11 |
| FOWL | | | | | | | 1 | | 3 | 3 | 9 | 3 | 15 | 9 | 9 | 2 | 10 | 8T/T | | | | | 12T/M | | 84 |
| DUCK‡ | | | | | | | | | | | | 1 | | | | | | 1T/T | | | | | 2C/M | | 4 |
| | | | | | | | | | | | | | | | | | | | | | | | | TOTAL | 1,569 |
| WILD SPECIES | | | | | | | | | | | | | | | | | | | | | | | | | |
| FOX | | | | | | | 2 | | | | | | | | | 1 | | 1 | | | | | 1 | | 5 |
| RED DEER | 1 | | 7 | 2 | 4 | | | | | | | | 1 | | 1 | | | | | | | | | | 16 |
| ROE DEER | 3 | | 2 | 10 | 2 | | | | | | | 1 | 3 | | 1 | 1 | | | | | | | 7 | 1 | 31 |
| SNIPE | | | | | | | | | | | | | 1 | | | | | | | | | | | | 1 |
| | | | | | | | | | | | | | | | | | | | | | | | | TOTAL | 53 |

GRAND TOTAL 1,622

*10 of these fragments were of goat and 29 of sheep, the rest were not diagnostic.

‡See text for a discussion of whether these were domestic or wild.

## Abbreviations

| | |
|---|---|
| H.C. | Horn core |
| ANT | Antler |
| CRA | Cranium |
| U/T | Upper teeth |
| MAN | Mandible |
| L/T | Lower teeth |
| HYD | Hyoid |
| VER | Vertebra |
| SCA | Scapula |
| HUM | Humerus |
| RAD | Radius |
| ULN | Ulna |
| PEL | Pelvis |
| FEM | Femur |
| TIB | Tibia |
| FIB | Fibula |
| AST | Astragalus |
| CAL | Calcaneum |
| C/T | Other tarsals and carpals |
| M/P | Metapodial |
| PHA | Phalanx |
| STE | Sternum |
| COR | Coracoid |
| FUR | Furcula |
| C/M | Carpometacarpus |
| T/T | tibio-tarsus |
| T/M | tarsometatarsus |

TABLE 7

PHASE 2 SELECTED ANNOTATED FRAGMENT COUNTS, (1 REPRESENTS THE EQUIVALENT OF A WHOLE BONE) OF MAJOR DOMESTIC ANIMALS

| | H/C | CRA | MAN | SCA | HUM | RAD | ULN | PEL | FEM | TIB | AST | CAL | M/P | PHA | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HORSE | | 0.2 | 1.25 | 0.75 | 5 | 0.25 | 1 | 1.25 | 2.25 | 2.25 | 1 | 0.75 | 9 | 9.75 | 36.95 |
| CATTLE | 13.5 | 4 | 20 | 6.75 | 5.5 | 5.75 | 1.75 | 3.5 | 2 | 6.75 | 2 | 6.5 | 15.75 | 14.5 | 108.25 |
| PIG | | 3.5 | 20.5 | 2.75 | 6.25 | 3.75 | 3.5 | 5.5 | 2.75 | 8.75 | | 3 | 9.5 | 2 | 71.75 |
| SHEEP/GOAT | 19.5 | 2 | 32.5 | 4.5 | 6.5 | 10 | 1.75 | 6.25 | 1.75 | 16.75 | 1 | 0.75 | 14.5 | 1 | 118.75 |

PHASE 2 CORRECTED ANNOTATED FRAGMENT COUNT, (1 REPRESENTS "1 ANIMAL'S WORTH" OF THE BONE)

| | H/C | CRA | MAN | SCA | HUM | RAD | ULN | PEL | FEM | TIB | AST | CAL | M/P | PHA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HORSE | | 0.2 | 0.63 | 0.38 | 2.5 | 0.12 | 0.5 | 0.62 | 1.12 | 1.12 | 0.5 | 0.38 | 0.75 | 0.81 |
| CATTLE | 6.75 | 4 | 10 | 3.38 | 2.75 | 2.88 | 0.88 | 1.75 | 1 | 2.25 | 1 | 3.2 | 3.94 | 0.6 |
| PIG | | 3.5 | 10.25 | 1.38 | 3.13 | 1.88 | 1.75 | 2.75 | 1.38 | 4.37 | | 1.5 | 0.59 | 0.04 |
| SHEEP/GOAT | 9.75 | 2 | 16.25 | 2.25 | 3.25 | 5 | 0.88 | 3.12 | 0.88 | 8.38 | 0.5 | 0.37 | 3.63 | 0.04 |

TABLE 8

PHASE 2

REDUCTION OF CORRECTED ANNOTATED FRAGMENT COUNT TO A NUMBER. SKULL VALUE = 100

| | H/C | CRA | MAN | SCA | HUM | RAD | ULN | PEL | FEM | TIB | AST | CAL | M/P | PHA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Horse | | 100 | 315 | 190 | 125 | 60 | 250 | 310 | 560 | 560 | 250 | 190 | 375 | 405 |
| Cow | 169 | 100 | 250 | 84 | 69 | 72 | 22 | 44 | 25 | 56 | 25 | 80 | 90 | 15 |
| Pig | | 100 | 293 | 39 | 89 | 54 | 50 | 79 | 39 | 125 | | 43 | 17 | 1 |
| Sheep/Goat | 487 | 100 | 812 | 112 | 162 | 250 | 44 | 156 | 44 | 419 | 25 | 18 | 181 | 2 |

REDUCTION OF CORRECTED ANNOTATED FRAGMENT COUNT TO A NUMBER. TIBIA VALUE = 100

| | H/C | CRA | MAN | SCA | HUM | RAD | ULN | PEL | FEM | TIB | AST | CAL | M/P | PHA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Horse | | 18 | 56 | 34 | 223 | 11 | 45 | 55 | 100 | 100 | 45 | 34 | 67 | 72 | Very small sample. |
| Cow | 300 | 178 | 444 | 150 | 122 | 128 | 39 | 78 | 44 | 100 | 44 | 142 | 175 | 27 | |
| Pig | | 80 | 234 | 32 | 72 | 43 | 40 | 63 | 32 | 100 | | 34 | 13 | 1 | |
| Sheep/Goat | 116 | 24 | 194 | 27 | 39 | 60 | 10 | 37 | 10 | 100 | 6 | 4 | 43 | 0.48 | |

(After Table 7)

## MEASUREMENTS OF THE MAIN DOMESTIC ANIMALS

Measurements were taken according to von den Driesch (1976) and are in millimetres. Measurement titles are translated and are followed by the German abbreviations or numbers given by von den Driesch.

Calculations are rounded to one decimal place but unnecessary noughts are left out. Only mature epiphyses were measured. Wither's heights were calculated as recommended in von den Driesch and Boessneck (1974) and are in centimetres.

### ABBREVIATIONS

| | | |
|---|---|---|
| ( ) | - | an estimate |
| n | - | number of readings in the sample |
| s | - | standard deviation (calculated when n exceeds 5) these values are in millimetres. |
| v | - | co-efficient of variation. This is obtained from $\frac{\text{standard deviation}}{\text{mean}} \times 100$ and is a percentage value which expresses the amount of variation in each sample on a similar basis for all bones however big or small. |
| w.h. | - | wither's height (shoulder) |
| $\bar{x}$ | - | mean value |
| * | - | denotes which bone used for wither's height calculations |

Where there are more than 5 measurements in a sample the individual measurements may not be shown, so that bones from the two periods are not shown separately. In most cases there are too few bones to allow statistical analysis of the two samples separately but where any differences between periods are noticeable this is mentioned in the relevant portion of the text. Where such calculations are not considered profitable each bone is given a letter so that it can be identified and is put under a period heading.

TABLE 9

HORSE MEASUREMENTS

All horse measurements are given in full as samples are small.

Scapula

| | | period 2 | period 3b | |
|---|---|---|---|---|
| | | a | b | c |
| minimum neck length | KLC | | 71 | 71.3 |
| glenoid length | AL | | 56 | |
| glenoid width | AW | 46.1 | 46 | |

humerus

| | | period 2 | | | period 3b |
|---|---|---|---|---|---|
| | | a | b | c | d |
| *lateral length | GLl | 276 | 253 | (248) | |
| proximal width | Bp | | 77.2 | | |
| minimum shaft | KD | 39 | 27 | 32.3 | |
| distal width | Bd | 82 | 64 | | 77.8 |
| trochlea width | BT | | 62.3 | | |
| w.h.(Kiesewalter) | | 134 | 123 | (121) | |
| height in hands | | 13/1" | 12/1" | (12) | |

ulna

| | | period 2 |
|---|---|---|
| | | a |
| length olecranon | LO | 78 |
| diameter over beak | TPA | 64.1 |
| min.diam. olecranon | KTO | 46.5 |
| articular width | BPC | 40 |

pelvis

| | | period 2 |
|---|---|---|
| | | a |
| acetabulum length | LA | 73 |

tibia

| | | period 2 | | | period 3b |
|---|---|---|---|---|---|
| | | a | b | c | d |
| minimum width shaft | KD | 42.8 | 42.8 | | 44.7 |
| distal width | Bd | 74 | 74.7 | 69.5 | |
| distal depth | Td | 47 | 46.2 | 45 | 45 |

TABLE 9 HORSE MEASUREMENTS (continued)

talus

| | | period 2 | period 3b | |
|---|---|---|---|---|
| | | a | b | c |
| maximum height (length) | GH | 55.6 | 62 | 56.9 |
| maximum width | GB | 59 | 65 | 63.6 |
| length medial trochlea | LmT | 58 | 64.2 | 56.2 |

calcaneum

| | | period 2 | period 3b | |
|---|---|---|---|---|
| | | a | b | c |
| maximum width | GB | 55.4 | 55 | 53 |

metacarpus

| | | period 2 | | | period 3 |
|---|---|---|---|---|---|
| | | a | b | c | d |
| total length | GL | 219 | | 227 | 226 |
| *lateral length | Ll | 210 | 216 | 218 | 217 |
| proximal width | Bp | 49.3 | 49.4 | 50.5 | 49 |
| minimum shaft | KD | 35.7 | 33.6 | 36 | 34.4 |
| distal width | Bd | 48.3 | 48 | 48.7 | 48.8 |
| w.h. (Kiesewalter) | | 135 | 138 | 140 | 139 |
| height in hands | | 13/1 | 13/2 | 13/3 | 13/2 |

metatarsus

| | | period 2 | | period 3 |
|---|---|---|---|---|
| | | a | b | c |
| total length | GL | 263 | | 271 |
| *lateral length | Ll | 255 | 259 | (263) |
| proximal width | Bp | 50 | | 50 |
| minimum shaft | KD | 32.3 | 31.4 | 30.5 |
| distal width | Bd | 51.5 | 50 | 50.5 |
| w.h. (Kiesewalter) in cm. | | 136 | 138 | (140) |
| height in hands | | 13/2 | 13/2 | (13/3) |

Average horse wither's height (n = 8) 135cm. or 13 hands 1".

TA_E 10 - PIG MEASUREMENTS

M3 - in wear

| | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| length | L | 29.2 | 26.7-31.2 | 9 | 1.3 | 4.5 |
| width | B | 18.3 | 17.3-20.4 | 10 | 1.1 | 5.8 |

mandible - M3 in wear

| | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| Behind C-behind M3 | 6 | | 114, 116(2)/118, 127(3b) | 4 | | |
| P2-M3 | 7a | 94.4 | 90 -101 | 6 | 3.8 | 4.0 |
| molar row | 8 | 64.4 | 58.6- 68 | 6 | 4.1 | 6.3 |
| P2-P4 | 9a | 35.5 | 32.1- 39.9 | 6 | 3.2 | 9 |
| M3 length | L | 30.7 | 27.6- 32.7 | 17≠ | 1.5 | 5 |
| M3 width | B | 14.9 | 13.5- 16 | 17≠ | 0.7 | 4.8 |

≠Samples from the two periods were 8 and 9 respectively but values showed no significant differences.

Scapula

| | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| minimum neck length | KLC | 23.3 | 22.6-24.1 | 6 | 0.5 | 2.3 |
| max.articular process | TLP | | 33.7(3b) | 1 | | |
| glenoid length | LG | | 29.2 (3b) | 1 | | |
| glenoid width | BG | | 25.3(2) ≠31.6(3b) | 2 | | |

≠this could be wild pig.

humerus

| | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| proximal width | Bp | | 49(2) | 1 | | |
| minimum shaft | KD | 15.9 | 13.5-17.5 | 5 | 1.6 | 9.8 |
| distal width | Bd | 40 | 39 -41 | 5 | 0.9 | 2.3 |
| trochlea width | BT | 29.9 | 29.2-31.6 | 6 | 0.9 | 3.1 |

radius

| | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| *total length | GL | | 147 | 1 | | |
| proximal width | Bp | 27.9 | 25 -31.7 | 12 | 2.2 | 7.8 |
| minimum shaft | KD | 16.8 | 14.7-19.4 | 12 | 2 | 12 |
| distal width | Bd | | 32 | 1 | | |
| w.h. (Teichert) | | | 59cm. | 1 | | |

TABLE 10 PIG MEASUREMENTS (continued)

| ulna | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| min. depth olecranon | KTO | 29.1 | 27.8-32.9 | 6 | 2.6 | 9 |
| diameter beak | TPA | 36.1 | 33.3-41.3 | 13 | 2.7 | 7.6 |
| articular width | BPC | 21.5 | 18.4-22.5 | 15 | 1.8 | 8.4 |

| pelvis | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| acetabular length | LA | 33.4 | 31.8-38 | 4 | | |
| inner acetabular length | LAR | | 29, 29.5/29.5 | | | |

TABLE 11 CATTLE MEASUREMENTS

horn cores - probable males

| | | x̄ | range | n | s | v |
|---|---|---|---|---|---|---|
| basal circumference | 44 | 184 | 144 -206 | 6 | 25.6 | 13.9 |
| maximum basal diameter | 45 | 65.8 | 49.8- 74 | 6 | 10.2 | 15.6 |
| minimum basal diameter | 46 | 54.3 | 38 - 57 | 6 | 17.4 | 32.1 |
| outer curve | 47 | | 290 | 1 | | |

horn core - probable cow (period 2)

| | | a |
|---|---|---|
| basal circumference | 44 | 138 |
| maximum basal diameter | 45 | 46 |
| minimum basal diameter | 46 | 36 |

mandible (M3 in wear)

| | | x̄ | range | n | s | v |
|---|---|---|---|---|---|---|
| cheek tooth row | 7 | 132 | 129 -140 | 8 | 3.4 | 2.6 |
| molar row | 8 | 85 | 80 - 94 | 9 | 4.7 | 5.5 |
| premolar row | 9 | 48.6 | 42 - 54 | 8 | 4.2 | 8.6 |
| jaw height behind M3 | 15a | 68.8 | 59.3- 75 | 11 | 4.8 | 6.9 |
| jaw height before M1 | 15b | 47.4 | 40.7- 50 | 9 | 2.8 | 5.9 |
| jaw height before P2 | 15c | 38.9 | 33.1- 44.8 | 6 | 5.04 | 13 |

scapula

| | | period 2 | | period 3b | | | |
|---|---|---|---|---|---|---|---|
| | | a | b | c | d | e | f |
| minimum length neck | KLC | 47.6 | 58 | 49.5 | 55 | 46.5 | |
| max. articular process | GLP | 60.5 | 76 | | 71 | 63 | 68 |
| glenoid length | LG | 52.3 | 63 | | 56.5 | 50.7 | 57 |
| glenoid width | BG | 39 | 48 | | 50.5 | 43.3 | 49.7 |

humerus

| | | period 2 | | period 3b | | |
|---|---|---|---|---|---|---|
| | | a | b | c | d | e |
| minimum shaft | KD | 37 | | | 34.8 | |
| distal width | BD | 81.6 | | 67.2 | | |
| trochlea width | BT | 73 | 63.6 | 63.3 | | 77 |

radius

| | | period 2 | | | | | period 3b |
|---|---|---|---|---|---|---|---|
| | | a | b | c | d | e | f |
| proximal width | Bp | 71.9 | | | | | 81.7 |
| minimum shaft | KD | | | 39.7 | | | |
| distal width | Bd | | 64.2 | 66.5 | 81≠ | 79.8 | |
| distal articular width | BFd | | 48.5 | 47.8 | 56 | 58.5 | 73.4 |

≠ includes a slight anomalous protuberance.

TABLE 11

CATTLE MEASUREMENTS (continued)

**pelvis**

| | | period 2 | | period 3b |
|---|---|---|---|---|
| | | a | b | c |
| acetabulum length | LA | 73.7 | 72.5 | 62.8 |

**femur**

| | | period 2 | | | |
|---|---|---|---|---|---|
| | | a | b | c | d |
| Length from caput | GLC | 312 | | | |
| proximal width | Bp | | | 125 | |
| minimum width shaft | KD | 30.8 | 30.4 | | |
| distal width | Bd | 79.4 | | | |
| caput diameter | TC | | | 45.5 | 45 |
| w.h. (Matolsci) | | 108 | | | |

**calcaneum**

| | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| maximum length | GL | | 128(period 2) 137(period 3b) | 2 | | |
| maximum width | GB | 44.1 | 41 -46.5 | 6 | 1.8 | 4.1 |

**talus**

| | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| lateral length | GLl | 61.9 | 57.5-66.5 | 6 | 2.9 | 4.7 |
| medial length | GLm | 56.7 | 61 -56.73 | 6 | 2.8 | 4.9 |
| distal width | Bd | 40 | 36 -44 | 6 | 2.6 | 6.6 |

**metacarpus**

| | | period 2 | | | | period 3b | | |
|---|---|---|---|---|---|---|---|---|
| | | a | b | c | d | e | f | g |
| *total length | GL | 201 | 209 | 193 | | 191 | | |
| proximal width | Bp | 64 | 63.4 | | 53 | 53 | | 59 |
| minimum shaft | KD | (39) | 35.5 | 27 | 34.5 | 30.7 | 34.5 | |
| distal width | Bd | 70 | 65.5 | 51 | | 56.8 | | |
| w.h. (x 6.125) | | 123 | 128 | 118 | | 117 | | |
| sex by appearance | | ♂ | ♂ | ♀ | ♂ | ♀ | ♂ | ? |

**metatarsus**

| | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| *total length | GL | | 221,209 (+estimates 190-220) | 2 | | |
| proximal width | Bp | 44.6 | 40.3-54.5 | 13 | 3.9 | 8.9 |
| minimum shaft | KD | 25.2 | 22-30.4 | 16 | 2.2 | 8.9 |
| distal width | Bd | | 49.1(per.2),49.2,48.3,47.6(3b) | 4 | | |
| w.h. (x5.45) | | | 120, 140 (+estimates 103-120) | | | |

All metatarsal withers height calculations and estimates are from bones in period 3b apart from one of 120 (est) from period 2.

**mean withers' heights**

Matolcsi (from femur) 108cm. (n = 1)
Foch (metapodials) 120cm. (n = 6)

TABLE 12

SHEEP AND GOAT MEASUREMENTS

goat horn cores

| | | period 2 | | | | period 3b | |
|---|---|---|---|---|---|---|---|
| | | a | b | c | d | e | f |
| basal circumference | 40 | 170 | 130 | | 93 | 163 | 130 |
| max.basal diameter | 41 | 64.5 | 48.3 | 52 | 35.4 | 63.8 | |
| basal diameter | 42 | 43.3 | 33.3 | 31.7 | 22.8 | 39.4 | 34 |
| length outer curve | 43 | (250) | (160+) | | (110+) | (230+) | (143+) |
| probable sex | | ♂ | ♂ imm | ♂ | ♀ | ♂ | ♂ imm |

sheep horn cores

| | | period 2 | | | | period 3b | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | a | b | c | d | e | f | g | h |
| basal circumference | 40 | 148 | (133) | 130 | 148 | | 145 | 110 | 77 |
| max. basal diameter | 41 | 54 | | 43.8 | 55.1 | 52 | | 40.4 | 26 |
| min. basal diameter | 42 | 41.5 | 37 | 35 | 39 | 37 | 40.3 | 27.1 | 19.7 |
| length outer curve | 43 | (230+) | (185+) | (170+) | | (180+) | 100 | | |
| probable sex | | ♂ | ♂ | ♂ | ♂ | ♂ | ♂ | ♀ | ♀imm |

sheep/goat mandibles (M3 in wear) period 2

| | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| cheek tooth row | 7 | 66.5 | 62.8-70.2 | 12 | 2.8 | 4.2 |
| molar row | 8 | 47 | 44.7-50 | 11 | 1.5 | 3.2 |
| premolar row | 9 | 21.71 | 19.6-23.8 | 10 | 1.2 | 5.8 |
| depth behind M3 | 15a | 33.8 | 31.3-37 | 7 | 2.3 | 6.8 |
| depth before M1 | 15b | 20.8 | 17.7-23.7 | 11 | 2 | 9.5 |

There is only one measurable mandible from period 3b

| | | a |
|---|---|---|
| cheek tooth row | 7 | 71.4 |
| molar row | 8 | 47.9 |
| premolar row | 9 | 23.5 |
| depth behind M3 | 15a | 38.2 |
| depth before M1 | 15b | 22.5 |

scapula

| | | period 2 | | | period 3b | | | | |
|---|---|---|---|---|---|---|---|---|---|
| species | | G | S | S | G | S | S | S | S |
| minimum neck | KLC | 24.4 | 19.4 | 19 | 21.3 | | 20 | 17.7 | 19 |
| max.articulation | GLP | 37.4 | | 29.2 | | 33.4 | | | |
| glenoid length | LG | 29.5 | | | | 26.5 | | | |
| glenoid width | BG | 26.4 | 19.8 | 19 | | 21.5 | | | 19.3 |

TABLE 12 SHEEP AND GOAT MEASUREMENTS (continued)

| humerus | | period 2 | | | | | | | | period 3b | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| species | | S | S | S | S | S | S | S | ? | S | S | S |
| proximal width | Bp | | | 34 | | | | | | | | |
| minimum shaft | KD | | 13.8 | | | 13.7 | | 13.3 | | | | 14.2 |
| distal width | Bd | 29.4 | | | 29.5 | | 32.3 | 27 | 27 | 28.3 | 32.2 | |

| radius | | period 2 | | | | | | | period 3b | |
|---|---|---|---|---|---|---|---|---|---|---|
| species | | S | S? | S? | S? | S | S | S | S | S |
| total length | GL | (15.3) | | 154 | | | | | | |
| proximal width | Bp | | 32.5 | 32.1 | | 31.2 | 32 | 28 | 28.4 | 31.1 |
| minimum width | KD | 18.5 | 17.5 | 17 | 16.9 | 17 | 18.2 | | ? | |
| distal width | Bd | 30.6 | | 28 | 28.5 | | | | | |
| w.h. | est | 61cm. | | est 62cm. | | | | | | |

| femur | | period 2 |
|---|---|---|
| species | | G |
| proximal width | Bp | 47.6 |
| width caput | TC | 21.4 |

sheep/goat tibia

| | | $\bar{x}$ | range | n | s | v |
|---|---|---|---|---|---|---|
| total length | GL | | (195) | 1 | | |
| minimum shaft | KD | 14.5 | 13 -16 | 7 | 1.1 | 7.3 |
| distal width | Bd | 25.6 | 22.7-28 | 12 | 1.6 | 6.4 |
| w.h. (Teichert prehist.) | | | (59cm.) | 1 | | |

| metacarpus | | period 2 | | | | | period 3b | |
|---|---|---|---|---|---|---|---|---|
| species | | G? | S | S | ? | S | S? | S? |
| total length | GL | | | | | | | 122 |
| proximal width | Bp | | 22.5 | 22.4 | | 22.3 | 23.8 | 22.2 |
| minimum shaft | KD | 15 | | 13.8 | 13.7 | 14.1 | | 14.3 |
| distal width | Bd | | | | | | | 26.5 |
| w.h. (Teichert prehist.) | | | | | | | | 60 cm. |

| metatarsus | | period 2 | period 3b | | | | | |
|---|---|---|---|---|---|---|---|---|
| species | | S | S | S | S | S | S | G |
| total length | GL | | | | | | | 117 |
| proximal width | Bp | | 21.3 | 20.7 | | 20.6 | | 19.8 |
| minimum shaft | KD | 10.8 | | 13 | 12.3 | 12.3 | 10.7 | 12.6 |
| distal width | Bd | | | | | | | 23.8 |
| w.h. | | | | | | | | 62 cm. |

THE DOMESTIC MAMMALS

HORSE

There were 268 saxon fragments of horse at Ramsbury compared with only 49 from Melbourne Street, Hamwih, although the latter site yielded approximately 11 times the amount of bone. At Hamwih horse formed only 0.1% by relative frequency of the main domestic animals (horse, cattle, pig, ovicaprid), at Ramsbury it formed 7% in period 2 and 14% in period 3b by fragment count. In period 2 there were 9 occurrences of butchery of horse bones but only one such occurrence in period 3b. Many of the horse bones are burnt or chewed, the latter not necessarily by humans.

The Saxon horse bones give wither's heights ranging from 121-140cm. The upper part of this range corresponds with the very few results we have from Melbourne Street but there are two humeri at layer 37 (Ramsbury, period 2) which give wither's heights of about 121-3 cm , or 12 hands. Horses of 14 hands 2 inches or less are normally today called ponies although some breeds of "pony" may contain larger individuals. The majority of the wither's height calculations at Ramsbury and at Hamwih therefore represent large ponies. The two small humeri at Ramsbury represent smaller ponies. This does not necessarily mean that such small ponies were not also present at Hamwih because some of the Hamwih bones are quite small but are too broken to give height information.

The two small humeri do not appear to be a pair but are in the same layer . They could represent two small mares or merely be a reflection of a wide range of horse size in Middle Saxon times. There are no such small individuals in period 3b but samples of measurable bone are small here. It is clear that in the Iron Age a wide size range of ponies was kept in Wessex (Harcourt, 1975) as on the continent (e.g., Boessneck et al , 1971, 201) but generally continental sites c temporary with Ramsbury show ponies at the larger end of the range shown here and much larger animals which can only be described as horses.

There is evidence of butchery on both smaller and larger pony humeri in period 2. None of the smaller bones at Ramsbury were anatomically closer to donkey than horse.

A collection of horse teeth in layers 55 and 57 (period 3b) shows horses of a wide range of ages. In the absence of a series of mandibles it is difficult to give a reliable breakdown of age frequencies as each tooth must be treated separately except where two or more teeth are obviously contiguous. A rough array of these teeth into age groups is as follows:

| approximate age in years | 5 | 5-10 | 10-15 | 15-20 | 20+ |
|---|---|---|---|---|---|
| number of teeth | 2 | 3 | 5 | 13 | 8 |
| minimum no. horses represented | 2 | 3 | 4 | 6 | 3 |

At Melbourne Street all horse remains were from mature animals and it is suggested that horses were only brought into Hamwih when of working age. The best age for working is usually reckoned to be 5-12 years but many horses work for longer and here all age groups are represented, including young ones. There are several vertebrae with unfused epiphyses and one unfused calcaneum - these would belong to animals less than 4/5 years and less than 3 years respectively according to modern fusion data like that of Habermehl (1961). The ratio of horse bones showing exostosis (bony outgrowths) or more severe cases of fusion between neighbouring bones was less than 1 in 14 but compared with the incidence of pathological alterations in the other species this was quite high. Such cases were not always in mature animals: the immature calcaneum and some distal foot bones from the same animal showed considerable exostoses but the fact that this animal did not survive to maturity may mean that it was not typical and work did not necessarily start this early. Such changes are often seen in animals which are subjected to heavy strain.

## 2. PIG

The pigs form a higher proportion of the domesticated animal bulk than they do from Melbourne Street. The animals are small, within the range of the Melbourne Street pigs, and from their long-bone measurements and their third molar measurements they are obviously domestic stock with no evidence for cross-breeding with wild boar if these were still living in the area. Lower third molars average out at total length 30.7mm compared with the Melbourne Street average of 31.1. The low variation coefficient and deviation that they show suggests that these teeth represent a single population of pigs and that the 8th and 9th century pigs do not show a difference in size.

There are three fragments which could belong to the wild boar, _Sus scrofa_, - a scapula with a glenoid width of 31.6 in layer 55 of period 2; a maxillary fragment in level 37 of period 2 with an estimated M3 width of 20.4mm and a mandibular fragment in layer 82 of period 2 with an estimated M3 length of over 37mm. Although the teeth themselves are missing the last two fragments are solid and large enough to have come from the wild boar. In the absence of other evidence they have all been recorded with the domestic pig as the occasional large domestic boar cannot yet be ruled out.

Of the pig upper canines found, 10 were from males and two from females. Lower canines are not so easy to sex as those of the castrated males may not be distinguishable from those of females. The lower canines fell into two size groups - 13 in the presumed male group and 12 into the female or castrate group. Most mandibular fragments, however, could not be sexed as they were too fragmentary so these divisions may be unreliable. The results from top and bottom jaws certainly seem at odds, but not necessarily so if we presume most of the second group of lower canines belonged to castrates and the first group either to entire males or those in which castration had been too late to have had an effect on the growth of the canines.

The total saxon collection shows a fairly even killing pattern according to tooth eruption and wear. There is a slight peak at the stage corresponding to Hamwih tooth wear stage 1 (see Statistical Appendix mentioned on page 3). At stage 1 the first molar is not yet coming into wear - this probably represents a pig of less than 6 months. Another slight peak comes at that corresponding to Hamwih stage 5 ( M3 in full wear but not heavily worn -this could represent an age of 2-3 years or more). At Melbourne Street the peak of pig deaths seems to be at Stage 3 (M3 not yet coming into wear - representing an age of anything from 18-30 months). The overall picture from Ramsbury is only based on 49 jaws and is heavily affected by 11 immature jaws from layer 55 in period 3b. If these are left out as a chance occurrence the picture is a peak slightly later than that at Hamwih when the M3 is in full wear, with killing occurring at earlier and later stages as well. Probably only a few pigs were more than two or three years old. We can only use modern or wild pig data to give absolute ages and the figures used above are those of Huser for wild pigs quoted by Habermehl (1961)

The only wither's height obtained was for 77cm from a radius in period 2 and compares with the highest value obtained for Melbourne Street. Although these pigs were smaller and shorter in the leg than wild boar they were not very much so. They were however much modified from their original ancestor by their shorter jaws and smaller teeth. [Su]ch changes had already occurred in Britain in prehistoric times. By modern standards they were however very small pigs and we cannot assume that a pig eaten before the first molar was in wear would have yielded much meat although presumably it would have been very tender.

3. CATTLE

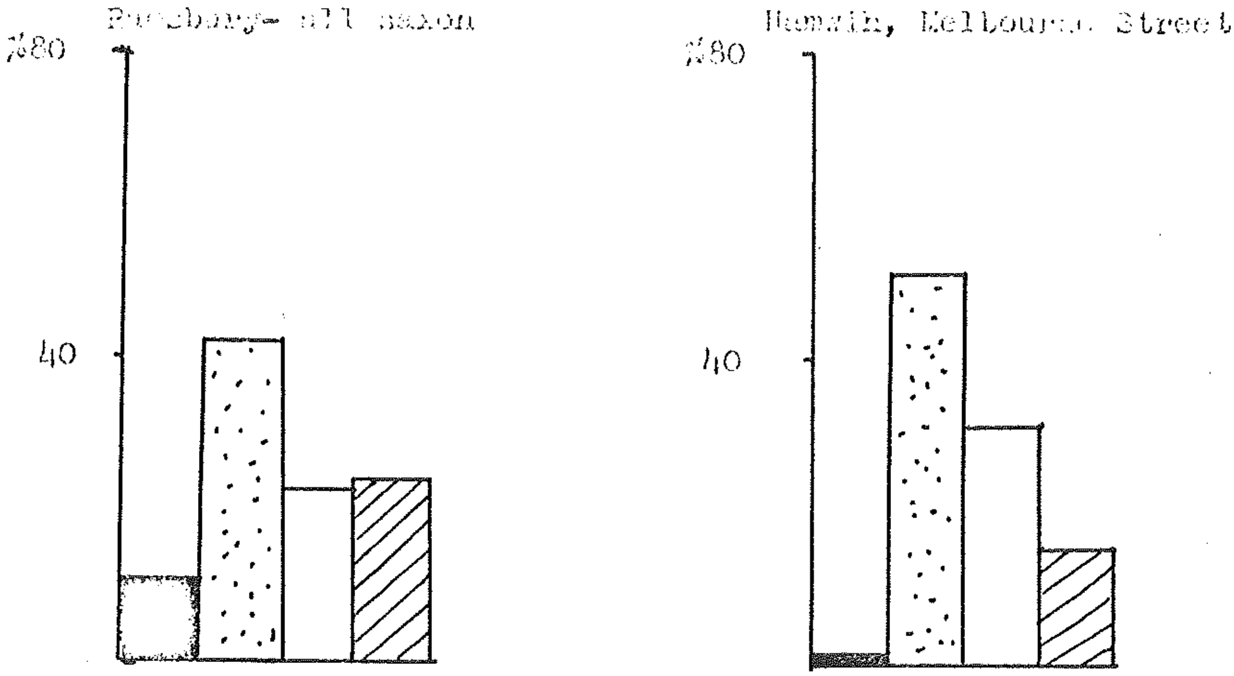
The proportion of true cattle bones is around 35% by fragment count for period 2 and slightly less for period 3b. This is a much lower figure than for the Hamwih sample where values of 49.2%-54.3% were obtained for the Melbourne Street sites. This partially balances the higher pig and horse values for Ramsbury but not entirely. As will be seen later the sheep/goat values for Ramsbury are also lower than those from Hamwih.

Higher values would however result for Ramsbury cattle and ovicaprid if all level 2 identifications were included. Thus the value for cattle is raised to 45% for period 2 and to 40% for period 3b. These are still lower than the Melbourne Street value however. Figure 2 compares values for the two sites including level 2 identifications.

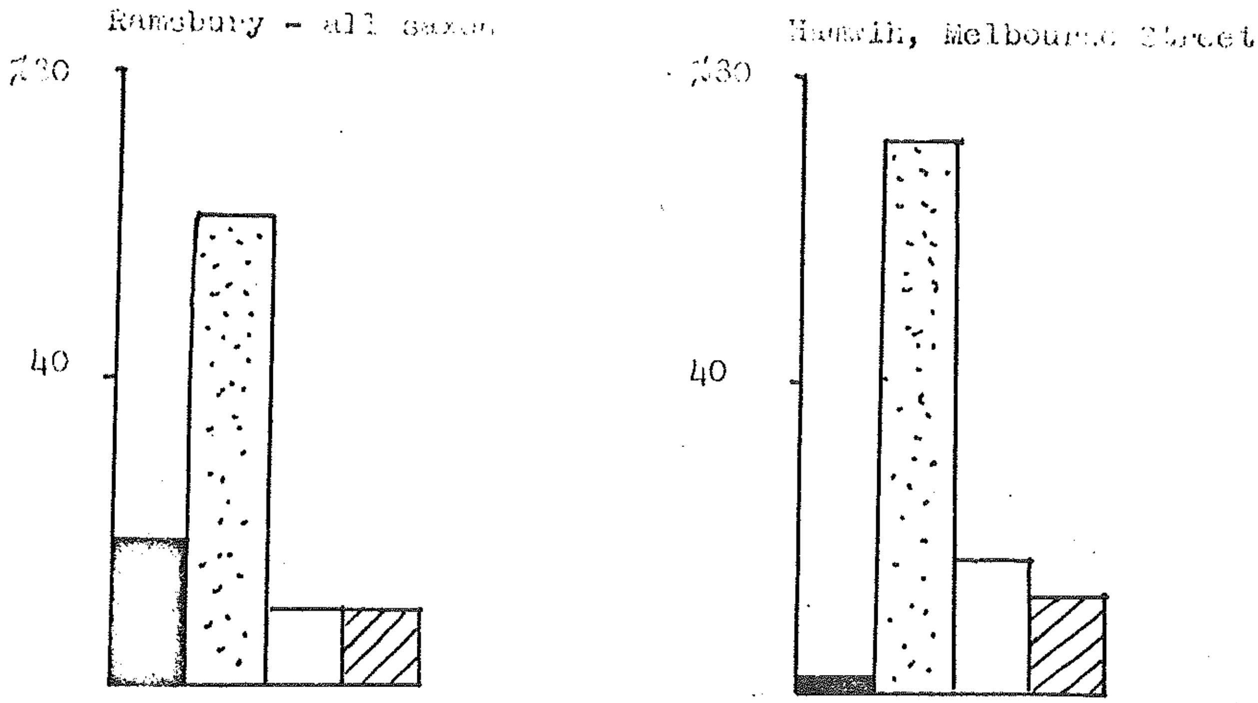
The cattle horn cores were analysed according to the method of Armitage and ~~Jewell~~ Clutton-Brock (1977). The index they use does not seem a wholly reliable indicator of whether a horn core is 'round' or oval in section. The horn cores subjectively called 'round' here gave indices of 100, 88, 81, 77 and 74 respectively, The indices of those considered 'oval' were 56 - 79. The problem is caused by a 'ballooning out' of the horn core accompanied by flattening - this can occur from a fairly round base. Most of the horn cores which did this were considered to be from castrated males as they had a very thin wall in places.

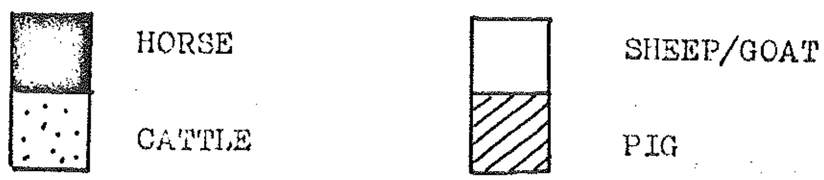
FIGURE 2 DISTRIBUTION OF FRAGMENTS AND WEIGHTS OF THE MAJOR DOMESTIC SPECIES AT RAMSBURY AND HAMWIH

A. FRAGMENT COUNTS




B. WEIGHTS



There was one hornless skull . This was from a naturally hornless animal and there is a roughening of the frontal bones where the horns would normally grow. Hornless cattle appear in Wessex at least as early as the Iron Age, an example being the All Cannings Cross skull illustrated by Armitage and ~~Jewell~~ Clutton-Brock (p.333).

Apart from the hornless individual all the animals are, according to the Armitage and ~~Jewell~~ Clutton-Brock classification, medium- or long-horned. All the horns are curved and those well-enough preserved show torsion. The angle they make with the skull is less than 60 degrees, all the cores coming out horizontally or slightly upwards. There was little evidence for frontal bone shape but the three fragments which showed this were of type 3. Some of the horn cores showed saw marks.

Of the measurable horn cores 9 were estimated as male but the thinness of the wall suggested that all but two were probably from castrates. One was assessed as female. Some of the male horn cores were bigger than anything found at Hamwih. The only whole horn core in this series (judged to be from a bullock) measured 290mm along the outer curvature.

Only four metapodials were whole enough to produce useful width/length indices (another method of assessing sexual dimorphism) so speculations using this seem somewhat pointless.

Cattle ages from teeth show two slight peaks as at Hamwih - one at a stage when M2 was not yet in wear. The Hamwih peak here may be slightly later but the Ramsbury sample is small. This stage corresponds to an age of anything from 6 months to 1½ years according to modern data. The second peak was at the stage when M3 had come into full wear and a similar peak occurs at Hamwih. It will not be clear until a more detailed wear analysis of individual tooth wear patterns is attempted for the two sites whether these peaks represent exactly the same stage of development.

All cattle long bone measurements were within the range of the Melbourne Street bones and often showed an equally large coefficient of variation suggesting quite a wide range of cattle sizes - possibly at least partly due to castration.

The wither's height value obtained for a femur was 108 cm and those from metapodials ranged from 103-128 cm. This fits comfortably within the ranges obtained overall for Melbourne Street. These cattle compared well with continental cattle sizes for the same period and were on the whole larger than the Iron Age cattle of Wessex. For a fuller discussion of this see Boudillon and Coy (in press)

4. SHEEP AND GOATS

These two species together account for about a quarter of the total domesticated animal bone. Many of the pieces are so fragmentary that it is difficult to assess the ratio of the two species but goat seems to be of far less importance than sheep. Melbourne Street figures show a higher proportion of ovicaprid - ranging from 25% on the occupation surface to 37% on Site I.

The horn cores of goat are mostly very large, upright and straight and from males. They were exploited for horn. They compare in size with those from Melbourne Street and there are 6 horn cores which fit into the supposed male distribution from that site and one which is more likely to be from a female. The very few measurable bones are larger than anything found at Melbourne Street with the exception of a metatarsus shorter than the Southampton range - it has a total length of 117mm - giving the only goat withers height estimation - 62cm. Obviously with the other larger bones showing up there must have been some much bigger goats than this.

Unfortunately nothing can be said about the age of the goats as their mandibles are not yet separable from those of the sheep. Consequently all the ovicaprid mandibles here were ascribed to sheep, as goat was so much in the minority.

The sheep were probably on the whole smaller than the goats - wither's height estimations of 60 and 62 cm were made from a metacarpus and a radi us respectively - this compares with an overall height range for Melbourne Street of 50 - 71 cm and is about equal to the Melbourne Street mean. Measurements of the Ramsbury sheep long-bones fit this picture, falling in the middle of the Melbourne Street ranges.

Of the sheep horn core fragments examined, 16 were probably from rams, with no evidence of the depressions and weakening of the core described by Hatting (1976) and thought to indicate castration. There was one other small horn core fragment which could have come from a castrate and 5 which could have come from females.

Taking all the 50 ovicaprid mandibles together there is a peak at Ramsbury at stage 5 (M3 in full wear) in both saxon periods. At Melbourne Street, stages 3, 4, and 5 all have a fair number. Sheep at stage 5 were probably 2 years old or more at death but there were no stage 6 sheep (M3 in heavy wear) recognizable at Ramsbury.

5. DOG

The dog bones were few and fitted within the ranges given by Harcourt (1974) for Saxon dogs. In layer 55 (period 3b) there were 18 dog bones, from at least three individuals, including a very straight large humerus and well-sculptured ulna which look especially wolf-like but there are no jaw fragments on the site which are wolf-like. Dr Juliet Jewell of the British Museum (Natural History) is at present studying these bones and her provisional opinion is that they could as well represent a large dog which had a lot of exercise. This would certainly fit the mandibular fragment in layer 55 which has well-spaced teeth like the modern long-jawed dogs and a lower carnassial tooth length of 22.6 mm. According to Zollitsch (1969) this is lower than the range for Canis lupus.

6. CAT

Cat was represented by only two bones not worthy of comment at this stage.

THE WILD MAMMALS

1. BEAVER , Castor fiber.

The beaver remains were all from period 2. There was an immature skull in layer 64, a mandible in 58, a radius in 65 and a tooth in 68. Its presence in several layers suggests that several animals are represented.

The skull has knife marks, made during skinning, on the frontal bones and zygomatic arch.

2. FOX, Vulpes vulpes

A very small amount of material from red fox was found in period 2 (layers 58, 64, 65 and 66 ) and period 3b (layers 55 and 57) . The two bones in layer 57 are from different individuals.

3. BADGER, Meles meles

There were only two bones of this species, both in period 2 - one from layer 58 and another from 60.

4. RED DEER, Cervus elaphus

Remains of this large deer were probably not always 100% separated from those of cattle as the bones were of a similar robusticity. Where no distinctive anatomical features could be found the cattle/ red deer category was used. There was very little red deer antler in the bone samples although the bones were large enough to have come from stags.

The age frequency of the small sample of jaws is shown in figure 3.

5. ROE DEER, Capreolus capreolus.

Separation of these bones from those of sheep and goat was more simple and the comments above for red deer do not apply to the same extent to the separation of roe deer bones. This small deer was even better represented than red deer although each individual would only have provided a fraction of the meat that would be provided by a large red deer stag. There was a higher proportion of deer in period 2 than in 3b.

The jaw fragments of roe deer are put into age categories in figure 3 which shows a peak of young roe deer 1-2years in age. The tooth eruption and wear data used was that of Habermehl (1961). This peak and the fair number of 0-1 year-olds no doubt represents the relatively inexperienced young animals which would fall to the hunters.

There are five roe deer antlers : one a good specimen and with much pearling which must have been from a roebuck in its prime.

THE BIRDS

1. DOMESTIC FOWL

Cocks, hens, and capons, and small fowl the size of modern bantams are all represented as at Melbourne Street. There was a high proportion of immature fowl bones.

2. GOOSE

The goose bones, especially the almost entire skeleton found in layer

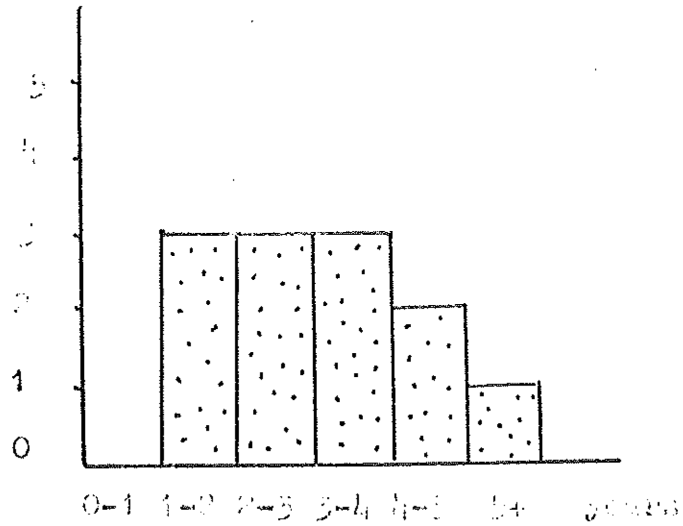
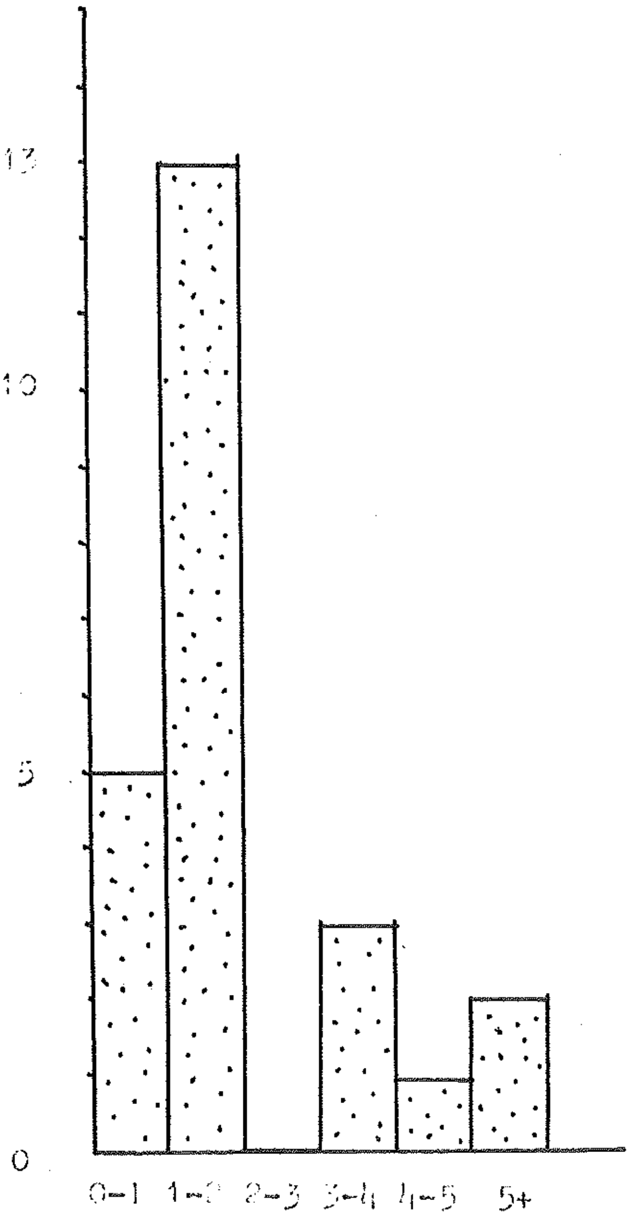



FIGURE 4 AGE FREQUENCY - ECE DEEP



121 (period 2) will , like those from Melbourne Street, be studied in ore detail. They are from large geese little different from the wild greylag, Anser anser, but must have been domestic.

3. DUCKS

The few bones of duck could either have come from the wild mallard, Anas platyrhynchos, or from an unspecialised domesticated form. The duck bones have therefore been included with the domestic animals for the moment, pending further study on saxon duck material. Duck bones were only found in period 3b.

4. THE WILD BIRDS

Only two bones of wild species were found - a snipe humerus in layer 55 (period 3b) and a humerus fragment of peregrine falcon in period 4b.

The snipe - probably in this case the common snipe, Gallinago gallinago, - is a common bird and there would have been a variety of suitable habitats for snipe around Ramsbury.

The fragment of peregrine falcon, Falco peregrinus , compares well in size with skeletons of the smaller male. It is of course not possible to say whether this is a 13th century find or a residual saxon bone or whether it was a wild bird or one kept for falconry.

DOMESTIC/ WILD RATIOS

In Table 9 the saxon bones assigned to domestic and wild species are expressed as a range. The major figures of the table give the maximum possible bones to domestic animals i.e. they include the cattle/red deer and sheep/goat/roe deer categories. This gives the minimum possible percentages for wild animals that can be considered.

TABLE 9 DOMESTIC /WILD PERCENTAGES AS A RANGE (see p.17)

PERIOD 2

| | domestic | | wild | | totals |
|---|---|---|---|---|---|
| no. fragments | 1,095 | 953 | 79 | 221 | 1,174 |
| % | 93.3 | 81.2 | 6.7 | 18.8 | 100 |
| WBE | 457 | 385 | 43 | 115 | 500 |
| % | 91.4 | 77 | 8.6 | 23 | 100 |
| weight (g) | 40,347 | 35,490 | 2,536 | 7,393 | 42,883 |
| % | 94.1 | 82.8 | 5.9 | 17.2 | 100 |

PERIOD 3b

| | domestic | | wild | | totals |
|---|---|---|---|---|---|
| no. fragments | 1,569 | 1,436 | 53 | 186 | 1,622 |
| % | 96.7 | 88.5 | 3.3 | 11.4 | 100 |
| WBE | 539 | 498 | 20 | 62 | 560 |
| % | 96.4 | 88.9 | 3.6 | 11.1 | 100 |
| weight (g) | 33,392 | 29.062 | 933 | 5,263 | 34,325 |
| % | 97.3 | 84.7 | 2.7 | 15.3 | 100 |

Figures have been rounded off although calculations were carried out to greater accuracy.

The boxed figures give a maximum value for wild animals as the cattle/ red deer and sheep/goat/roe deer categories are included with the fragments of wild species. The truth may lie somewhere in between these two sets of values. Pigs and ducks have all been included in the figures for domestic animals.

Even on the minimum values the proportion of wild animals by fragment count is 6.7% for phase 2 and 3.3% for phase 3b. The figures for wild animals for Hamwih are less than 1%. Obviously wild animals were exploited to a greater extent at Ramsbury. The species exploited were all mammals with the exception of a single snipe. The wild value may be as high as 18% in period 2.

Variation in the domestic:wild proportions is small in period 3b when results from the various layers are compared (2-4% minimum values for wild animals). It is greater in period 2 (0 - 15% minimum values for wild animals). Layers 60, 64 and 65 are especially rich in wild species with layers 58 and 66 not far behind. These are the layers containing most of the beaver, fox and badger bones.

These figures certainly suggest a drop in the proportion of wild animal exploitation from the 8th to the 9th century.

## CONCLUSIONS

These bones are a very interesting sample of middle saxon animal bone from a settlement in a varied rural context. They provide an adequate sample to draw some parallels with the much larger collection from saxon Southampton worked last year . On the whole the domestic stock at Ramsbury was similar to that at Southampton but there are some interesting diffences. Domestic horses, cattle, sheep, goats, pigs, dogs, cats, chickens, geese, and probably ducks were kept.

There is more evidence for horse at Ramsbury. The horses kept were eaten , at least in the 8th century. Ponies of c. 12 hands were also present. 'Ponies' can describe all the horses kept both at Ramsbury and Hamwih. Some of the Ramsbury ones may have been needed for draught work associated with the iron-workings.

There is also a slightly higher proportion of pig at Ramsbury than at Hamwih with more evidence of young pig. The sheep bones were mostly mature. This may mean that sheep were fairly long-lived being kept mainly for wool and milk and only normally eaten when they did not do well or were barren. The horn core evidence for goats and sheep is difficult to interpret and the large number of large male horn cores may only mean that these were selected for horn removal.

There is a suspicion that cattle were at a good size for eating slightly earlier than at Southampton. This certainly fits the fact that land around Ramsbury is of a higher grade than that around the Solent. There must also have been extensive woodlands and available browse as we can see by the presence of roe deer and beaver. The Savernake Forest is only across the river Kennet from Ramsbury. During the collection of timber for the iron-working process the workers would have had close contact with the woodland and its creatures and they and all local people were probably orientated towards the woodland environment as well as the downland. There is evidence that long-legged, long-jawed , active dogs were kept. We cannot know whether the iron-workers caught these wild animals themselves, and whether they were allowed to do so . It would seem to be an easy matter for them to have done so during the course of their work especially if they were allowed to keep suitable dogs.

Deer, beaver, badger and fox would also provide skins and there is evidence that the beaver at least was skinned. The reduction in wild fauna from period 2 to period 3b may even be linked with a reduction in the extent of the woodlands themselves but more evidence is needed. There are no beaver remains in period 3b. Both the iron-working activities and the actions of beavers may have been contributory factors in such a decline. As far as the writer knows this is the latest archaeological record of beaver for Wessex so far. Some beaver bones from Wirral Park Farm, Glastonbury, have been excavated by Miss Jane Hassall from levels which are mostly producing 11-12th century pottery but there is an admixture of residual material in these levels which makes the dating of the beaver bones far from sure. A report on the Wirral Park Farm bones is now in preparation.

The Ramsbury bones will be studied in more depth alongside the large quantities of other saxon bone now being worked at the Faunal Remains Project.

REFERENCES

ARMITAGE, P.L. AND CLUTTON-BROCK, J. (1976)
A system for the classification and description of the horn cores of cattle from archaeological sites, Journal of Archaeological Science, 3, (4), 329-348.

BOESSNECK J.A. et al (1971)
Die Tierknochenfunde aus dem keltischen Oppidum von Manching, Die Ausgrabungen in Manching, 6, Wiesbaden, Franz Steiner.

BOURDILLON, J and COY, J (in press)
The animal bones. In Saxon Southampton: excavations in Melbourne Street, ed. P.Holdsworth, CBA publications

DRIESCH, A von den (1976)
Das Vermessen von Tierknochen aus vor- und frühgeschichtlichen Siedlungen. University of Munich.

DRIESCH, A von den, and BOESSNECK, J (1974)
K tische Anmerkung zur Widerristhöhenberechnung aus Längenmasses vor- und frühgeschichtlicher Tierknochen. Säugetierkundliche Mitteilungen, 22, (4), 325-348.

GRIFFITH (1976)
The Animal Bones from Knight's Enham, Andover. Report to the Ancient Monuments Laboratory, London ( Report No. )

GRIFFITH (in preparation)

The Animal Bones from Site R27, MARC 3. Report to the Ancient Monuments Laboratory, London.

HABERMEHL, K.H. (1961)
Die Alterbestimmung bei Haustieren , Pelztieren, und beim jagdbaren Wild . Paul Parey, Berlin.

HARCOURT, R.A. (1974)
The dog in Prehistoric and Early Historic Britain. Journal of Archaeological Science, 1, (2), 151-175.
HARCOURT, R.A. (1975)
The Animal Bones from Gussage-All-Saints, Dorset. Report to the Ancient Monuments Laboratory No. 1804
HATTING, T. (1975)
The influence of Castration on Sheep Horns. In: Archaeozoological Studies, ed. A Clason, Elsevier, 345-51.

REICHSTEIN, H. and TIESSEN, M. (1974)
Materialen zur Kenntnis der Haustiere Haithabus. Berichte über die Ausgrabungen in Haithabu, 7, 9-101.

ZOLLITSCH, H. (1969)
Metrische Untersuchungen an Schädeln adulter Wildwölfe und Goldschakale. Zoologischer Anzeiger, 182, (3/4), 11-182.