

UNCORRECTED ARCHIVE REPORT

APPENDIX 16 – ANIMAL BONES AND MARINE SHELLS

by Bob Wilson with identification of birds by Enid Allison

Introduction

Site objectives and bone analysis

The following specialised interests were linked to more general site objectives before analysis of bones began:

1. The retrieval of bones by sieving soil samples would indicate the quantities of smaller items not normally collected by hand and thus allow more reliable estimates of the material variation among:
 - Features of different type
 - Debris of different periods
 - Spatial spread of bones
2. Relatively good presentation of bones would allow some elaboration of taphonomic and cultural patterns observed or suggested elsewhere from poorly preserved bones.
3. The relatively high second terrace location might aid topographical comparisons of sites at Iron Age to Saxon periods.
4. Similarly, the long chronological Sequence of settlement could allow useful considerations of environmental and cultural changes on a single site.

The results are presented below and are interpreted and discussed in Appendix A1 together with other lines of environmental evidence and are summarised in the main report.

Collection of the bones

Nearly 8,500 scattered fragments and articulated bones were gathered by normal excavation. A further 3000 were collected by soil sieving with a screen mesh of 6 mm.

The normally collected bones, their fragment number data, and the articulated bones are described at length before presentation of results from the sieved bones. Afterwards information is given on the following headings: minimum numbers of individuals, bone measurements and size and sex of animals, pathology, butchery environmental considerations, site economy and observations about approaches to excavation.

Since much information is detailed and at a low but necessary level of analysis the reader is advised to be selective, look for headings of interest, and be prepared to skip

other sections of the report.

Condition of bones: In general bone surfaces were in a good state of preservation or slightly leached. Other points about preservations will be made where relevant data is presented.

Species identifications: Of most interest is a radius of a Romano–British donkey *Equus asinus*, F605/B/1, the first known record in the region. However, a pathological Romano British metatarsal from Curbridge, Oxon, though slender boned, was included with those of horse-, but is now recognised also as of donkey (the medial end proximal outgrowth of bone may be classified as a case of spavin rather than strictly of osteoarthritis (Baker and Brothwell 1980) and may have resulted from the riding or other draught purposes of this individual).

A horn core of goat was found in an Iron Age pit F326, and another, in F283/B, was Saxon. Wild animal species present in the collection included fox and badger (see later); two broken bones of otter from Saxon pit F283/B/5 & F283C/5 (the fibula is distinctive); an Iron Age femur of *Marten Martel* sp. which must be of pine marten; and a distal humerus of an Iron Age cat from F151/B is of sufficient size (dw and Bd of 18 mm) to suggest wild cat *Felis sylvestris sylvestris*. Two Saxon cat bones are small ones and are comparable to domestic cat bones from urban Saxon and medieval sites.

An uncertain identification concerns a fragment of a large proximal radius of cattle from the later Bronze Age waterhole F162/?14 and which indicates a width measurement (Bp) of 89 mm. This estimate is very close to the size of radii of *Bos primigenius* from Durrington Walls, Wiltshire (Harcourt 1971, Fig. 108b) but the fragment cannot be confirmed to be of this species.

Fragment number counts were made and summarised as in other previous reports (eg Wilson 1975, 1976, 1978) subject to a few detailed considerations:

- Newly broken fragments were not counted as such but a note was made where they were numerous in some features.
- Although a variety of information was recorded data was only tabulated where useful conclusions might be drawn. This was decided after the whole collection had been examined and recorded.
- Fragment frequencies and percentages are given in terms of bones collected by normal excavations.

General results and commentary

The results are principally presented in a series of tables as follows:

- Number and percentages of bones collected by normal excavation (Tables A16:1-A16:10)
- Animal skeletons and other articulated debris including wild animals (Table

A16:11)

- Separate limbs and articulated vertebrae of domestic animals (Tables A16:12- A16:13)
- Sieved bones (Tables A16:14- A16:31)
- Minimum numbers of individuals (Tables A16:32- A16:33).
- Age data and mortality
- Body size and sex (Tables A16:34- A16:43)
- Pathology notes (Table A16:44)
- Comparison with other Romano British sites nearby (Table A16:45)

General conclusions and observations on animal representation, animal husbandry, environment and comparisons with other sites are presented in the main report. The following sections provide additional details and commentary.

Overall character of the material

Figure 44 in the main report gives a graphical summary of the proportions of main domestic species at different periods. Tables A16:1 to A16:4 provide more detailed results.

Table A16:1: Some results for general classes of material are given. Some 7,300 fragments of larger mammals are represented but there are very few of small mammals, birds and oyster shells, except for aggregations of rodent and frog bones (see archive). Burnt bones were not commonly recorded except in a few features: F3 F38, F326 & F664.

Tables A16:2 and A16:3: These show fragment frequencies of mammal and bird species.

Table A16:4: Percentages of fragment frequencies of species are given. These indicate an abundance of pig bones during the Neolithic and Beaker phases, and of cattle during the middle to late Bronze Age. Percentages of sheep and horse increase in the Iron Age groups while cattle and horse are more prominent in Roman and Saxon ones.

Species trends in northern and southern areas of the site

Table A16:5: A comparison of the percentage of species is made for the northern and southern areas of the site. The chief differences are between the two ETA groups and between the Roman groups. In both cases percentages of cattle bones are more abundant in the southern area.

Species trends and feature type

Table A16:6: This compares percentage trends of species bones grouped according to the type of feature they were found in. The most obvious differences are

- The Bronze Age ring ditch group F101 - but cattle bones appear more abundant

at this period

- Early Iron Age pits from the southern area where the early and middle Iron Age, and Roman waterholes containing cattle bones were located. Although 58% of the EIA pit group was collected from F652 (archive) and 29% from F671, the remaining features still indicate that relatively more cattle and horse bones occurred in this southern area.
- The Late Bronze Age and Saxon waterhole debris occurred in the northern area, but the debris of both these periods at this site appears more homogeneous than that of the other periods.

Percentages of identified, burnt and species bones according to feature type

Table A16:7: This compares the percentages of identified and burnt fragments, and those of cattle and horse in the feature type groups. Higher percentages of identified debris and of cattle and horse appear associated with an absence or low percentages of burnt bones. Conversely, burnt bones, lower percentages of unidentified debris, and the higher percentages of pig and sheep appear associated.

Similar relationships between these variables, expressed as fragment frequencies, were also examined (see archive) but correlations between them are not immediately obvious. The relationships are complicated by problems of the diverse numbers of bones in bone groups, the small number of feature groups and probably by other variables, for example cultural differences between groups from different periods. Nevertheless groups of similar feature type indicate deposits of similar character. Ditch groups tend to be intermediate between groups from water holes and pits (Fig. a, c, e, f. Archive)

The most distinctive exception to the generalisation about debris in different types of feature appears to be the EIA pit group from the southern area and which shows similarities to the debris from the water holes where cattle and horse bones were very common (Fig. a, c, f). Since the Iron Age and Roman water holes occurred in the same area as those pits, it appears that similar deposition or human activity extended less typically to this particular pit group. It appears more usual for pits to be associated with smaller less identifiable bone debris and with sheep and burnt bones. Ditches appear less associated with these kinds of debris³. This trend will be discussed more later (Table A16:10)

Skeletal elements of sheep and degradation of bones

Table A16:8: This gives the percentages of some identified elements of sheep and in their general classes of head foot and body of sheep (Wilson 1978) which have been useful in detecting different stages of the processing of animal carcasses particularly on urban sites (Wilson 1975). On prehistoric sites however such results only indicate the general extent to which bones complete in the carcass were degraded by cultural and natural agencies. This Degradation of bones is at least in part an inverse though crude measure

of their preservation.

As degradation by leaching and various mechanical damage proceeds, the most resistant elements become relatively abundant. At Mingies Ditch, Hardwick with Yelford (Tables A16:8 and A16:10: R.N.S.6), loose teeth made up most of the fragments identified to species. Loose teeth also become more common where bones are newly broken by excavation - as observed for the ditch groups from Barton Court Farm, Abingdon (Tables A16:8 and A16:10: in all these results an individual tooth was only identified and counted if half or more of it was present or could be reassembled).

After teeth among the degraded bones from Mingies Ditch, the next most commonly recorded fragments were of tibia, radius (particularly their shafts) and mandible, but their percentage representations were lost because of the predominance of teeth. Variable representation of elements as a result of degradation therefore affects the use of general categories of cultural activity. High proportions of bones from the heads of sheep at Mingies Ditch did not directly result from butchery but because of large numbers of teeth being produced by degradation of most other cranial bone. Clearly from Table A16:8, at Mount Farm the degradation of bones occurred to a much lesser degree, but the representation of mandible, tibia and radius is substantial while that of less resistant elements such as vertebrae is still low.

Although the sample numbers of feature groups at the site are not large, it was thought useful to calculate a crude index of bone degradation for each feature group. This index comprises the percentage of the combined frequencies of tooth, mandible, radius and tibia among the total number of sheep bones.

Results are given in Table A16:8. The scale of percentage degradation should be used with caution. It is not certain whether the percentages represent equal sized deposits in units of degradation. Allowance must be made for some inconsistency of method at several levels of investigation varying for example, from archaeological classification of features site to site, the objectives in the use of the index of fragment frequencies, and increasing experience in reassembling and identifying degraded or newly broken material.

Nevertheless degradation provides useful qualitative information about different feature types. Table A16:9 summarises results in Table A16:8.

The results in Table A16:9 are complicated in part by greater excavation of superficial deposits and of degraded material at Mingies Ditch. Degradation of bones also appears to have been greater at sites on the lower gravel terraces like Mingies Ditch.

Nevertheless an interesting separation of feature types is obtained for the sites on the second gravel terrace with degradation more evident for ditches, waterholes and superficial layers and less so for pits (including those with exceptional groups of cattle bones).

It was also observed that bones from the waterholes are in good condition, probably

Table A16:9: An index of degradation of bones in features of different type at four sites: summed percentages of loose teeth, mandibles, radii and tibiae of sheep

<i>Feature type and sites</i>	<i>Percentage range of degradation</i>	<i>Assessment of degradation</i>
<i>Pits</i>		
IA Ashville Trading Estate, Abingdon	43	Least
EIA groups from Mount Farm	34-43	
<i>Ditch groups</i>		
MIA-RB Mt. Farm & Ashville	54-67	Moderate
IA-Saxon Barton Court Farm, Abingdon	45-76	
<i>Waterholes</i>		
IA-RB Mount Farm	70-12	Most
Mingles Ditch, Hardwick	81	

because they were deeply buried and especially where they were below the water table. As the element percentages are held to be substantially explained by general bone degradation this must have occurred prior to burial. Nevertheless the greater part of the small samples from the waterholes are comprised of radius and fibia and suggest other factors may influence the results. Possibly one is recovery. No small bones were retrieved and teeth were few. A more important factor may be that of fragment size (archive)

Skeletal elements of cattle and degradation

Table A16:10: Percentages of grouped and individual skeletal elements of cattle are given for feature groups and several other sites. Some variation in the figures given will be a result of degradation as well as of small sizes and perhaps other factors.

Where the percentages of the loose teeth of cattle and of sheep are added together (as at Mingles Ditch) to compare the overall degradation of bones according to feature type, pit groups at Mount Farm and Ashville have summed percentage ratings of 2-14%, ditches 12-19% and waterholes 7-11%. At Barton Court Farm the ditch groups range between 23-40% with newly broken bones prominent in the sample groups. At Mingies Ditch the rating for the overall IA group is 94%.

By this rating the degradation of bones is considerably less at Mount Farm and Ashville than at Mingies Ditch, cattle bones at Mingies Ditch being strongly affected.

The two indicators of degradation which have been used, although poorly inter-related, generally separate out pit groups from ditches, and suggest degradation is greater for ditch groups. Differences in degradation between these feature types appears less by the combined percentage index of degradation. This is not surprising if cattle bones are less subject to degradation than of sheep.

Degradation indices from waterholes are contradictory (see below).

Element representation of cattle and sheep

Close quantitative comparisons between cattle and sheep bones in Tables A16:9 and A16:10 are unwise because individual percentages depend on factors which are different for each species. It will be observed that while the percentages of loose teeth of sheep and cattle are fairly comparable, vertebrae of cattle are very well represented.

Another difference between the species is the high representation of bones of feet or limb extremities of cattle in some groups and which characteristically comprise the small bones of the carpal and hock joints and the phalanges of the feet which are not well represented among sheep bones.

The higher proportion of 'small bones' of cattle is in part due to the size of species bones and some bias against the recovery of sheep bones (see discussion of sieving in archive) but also is due to the contribution of one other factor.

Element proportions and articulated cattle bones

The common occurrence of foot bones of cattle in the ELA pits results from their association with limb bones which were articulated when buried (F671, and more especially F652 in the southern area, and F326 in the northern area).

Although the recognition of articulated limb bones increases the probability of the recovery of smaller bones, this type of debris itself reinforces the view that the cattle bones and others buried in the pits were less degraded than in other features. This conclusion is specially relevant because none of the sheep bones in the pits were obviously articulated and yet the results in Tables A16:8 and A16:9 indicate quite independently that a decreased amount of degraded material was present.

Some other articulated bones did occur, however, in other types of feature. An articulated calf skeleton in Roman waterhole F605 (excluded from Table A16:10) indicates that some of the waterhole debris is less degraded but other evidence from these features is limited to a higher proportion of Roman cattle vertebrae some of which were articulated. Similar vertebrae of cattle, articulated at burial (F534 and F610), make up part of the higher 21% in one Roman ditch group. Other articulated cattle vertebrae occurred in the pit group from the southern area. These observations confirm the lesser degradation of cattle bones. Perhaps they also query some of the conclusions above but equally some variation in small samples is to be expected.

Animal skeletons (relatively complete articulated bones)

It is now necessary to describe the articulated bones more fully in order to understand the relationships between them, the general scatter of bones, and the different types of feature.

1st-2nd century A.D. calf skeleton: water hole F605/A/1

22 limb and vertebral bones indicate the presence of a whole skeleton. The lack of

epiphysial fusion especially on the proximal metatarsal suggests that the bones are of a new born calf. Possibly these bones are linked with half articulated bones of a cow in the same feature (Table A16:12)

Three sheep skeletons: pits F53 & F54

These skeletons are labelled F53 and F54 but almost certainly are from one feature F53. Those apparently from F54 appear mislabelled because no articulated debris was noted for F54 but at least one skeleton was drawn in the planning of F53; a few other bone fragments from F54 are of a different colour to the bones of the skeletons; and complementary fragments and elements from the skeletons in both labelled groups can be matched satisfactorily.

Useful information on the skeletons is summarised in Table A16:11. Extra data is provided below.

Skeleton a:

At least 21 major elements are present.

Measurements (in mm). Gl; ju 141, ra 151 151, ti 203 203e, mc 126, & mt 141. d.w.; hu 29, 29, ti 26 25, mc 24 & mt 23. scapula; min. width of neck (KHB) 17.1 glenoid -- spine base (A.S.G. 22.2 pelvis; Width rect. fem. Ridge 4.7

Skeleton b:

At least 19 bones

Measurements. GL; ti 181, mc 111, & mt 126 126 d.w.; hu 26, ti 22, 22 & mt 22 pelvis; acet. ridge 2.8 (pubis hollowed; thin il. pect ridge)

22 other bones from skeletons a and b are present.

Skeleton c:

10 bones of a lamb

These skeletons are probably of sheep carcasses which were buried whole but where subsequently damaged by modern disturbance. The absence of butchery marks suggest that these sheep died of disease.

There is little evidence to date the burial, but the confirmation of Skeleton a is very similar to that of IA burial in F153. Skeleton b resembles that in F588 which was butchered in a manner suggestive of the Iron Age or Roman period. All of these skeletons are distinctly different from those of the modern burials.

Iron Age (EIA?) sheep skeleton: pit F152

At least 57 bones with ribs are present.

Measurements. GL: hu 141, fe 170 169e, ra 158 158, ti 208 208, mc 131 131, & mt

141 142. dwq: hu 30 29, ti 24 24, mc 24 24, mt 22 22. Scapula; min width of neck (KHB) 18.3 glenoid-spine base (ASO) 20.4 Pelvis; width rect. fem ridge 3.2 3.4 acet. Ridge 1.8 1.9 (hollow pubis, thin ilispect. ridge)

Artefacts suggest the skeleton may be of early Iron Age, and it is possibly of a short tailed type standing about 62 cm at the shoulder – relatively tall for an Iron Age sheep. Slight bone abnormalities (Table A16:11) may not be unusual for the age stage. An absence of butchery marks may indicate the animal died of disease.

Butchered remains of sheep F588, a possible post hole

Forty butchered bones probably from one individual.

Measurements. Gb: hu 120, mc 111. & mt 117 118. dw: hu 26 mc 21 22. & mt 21 21.

The carcass was skinned around the horn base(s) and the proximal metatarsal(s). Marks inside the abdominal cavity show that gutting occurred although such knife cuts on Os and transverse processes of lumbar vertebrae and the sacrum may result from removal of meat rather than of intestines, kidneys etc.

Cuts through the right and left edges of the sacrum from the ventral and posterior side indicate the severance of the pelvis and the hind limbs (and by implication a similar separation of the forelimbs about the same time). Chops and breakages occur on left and right sides of sacral vertebrae (one left side chop) thoracic (one right side) and cervical (7th, left side chop) with at least the left side chopping indicating blows directed from the ventral and posterior direction and presumably part of carcass division just off the medial line.

The spine however appears severed between about the 9th and 10th thoracic vertebrae since ventrally made cuts occur across the base of the neural process and in line with the tissue filled gap between the vertebral bodies

Rib fragments bear occasional cuts indicating meat removal adjacent to the middle of the first rib and dorsal to one of *the* posterior rib condyles. Other cuts near the rib condyles have an uncertain interpretation.

The head, especially the brain case, was split from the dorsal side to extract the brains. The lingual side of the mandible bears cuts near the base of the teeth and indicates the cutting out of the tongue. Division of the head probably occurred after the removal of it from the backbone since most of the major butchery of the body appears to have been done from the ventral side.

Possibly the chopping along the backbone suggests a Roman or Saxon date, yet the size of the bones may suggest an Iron Age animal.

Lamb or hogget skeleton: grid ref 780.240-780.260

At least 10 unfused limb bones with robust autobulum, possibly of a male.

Modern sheep burials F208

This burial group includes related bones from F207 & F257.

Skeleton a (labelled 4):

At least 17 bones and whole cranium.

Measurements UL: hu 168 168, fe 206, ra 114 174, ti 236, mc 143, mt 155 dw: hu 38 38, ti 33 33, me 33, 8 ra 38 37 scapula: min width of neck (RHB) 25.0 25.0 glenoid -- spine base (ASG) 24.8 23.0 pelvis: rect. fem ridge 8.3 {prom. thin il. pect, acet. ridge 40 hollowed pubis)

Skeleton b (labelled 3):

At least 12 bones and cranium

Measurements GL: hn 164 163, ra 170 172, mc 146 146, & mt 158 159. dw: hu 40e 42e, ra 38 37. mc 33 34 & mt 32. scapula: min width of neck (KMB) 27.4 glenoid-spine base (ASG) 24.7 pelvis rect. fem. ridge 8.1 acet. ridge 6.0 (il pect. well developed but no marked hollowing of pubis).

Skeleton c (labelled 2):

At least 10 bones

Measurements GL: hu 142, ti 201. & mt 136 137 dw: hu 35, ti 30 & mt 29 29 scapula: min width of neck (KHB) 19.3 glenoid-spine base (ASG) 23.9 pelvis rect. fem. ridge 5.7 acet. ridge 2.0 (it is pub. thin & pubis is hollowed)

Modern sheep burial F256: at least 28 bones

Measurements GL; hu 157, ra 170, ti 216, & mt 144. dw hu 40e, & ti 31. pelvis rect. fem. ridge 10.0

All the modern sheep burials were from carcasses skinned around the cranium (across the frontal or prefrontal elements) and, most distinctively, skinned around the hooves rather than nearer the hock joint (Table A16:11). The sheep were polled, medium to large size and probably (scapula index: 8) of long tailed breeds. Their limb bones are very robust on comparison to the other skeletons (distal widths of the humerus range from 35 to 40 mm compared to 23 to 33 mm for Iron Age to medieval sheep: Wilson 1980 Table L). These sheep were mature when they died. Presumably in the absence of meat removal and scavenging marks, the carcasses were buried quickly after skinning. Overall, the evidence suggests the sheep in F208 were a group fatality perhaps from disease or severe weather.

Possibly all of the pre-modern sheep burials are of Iron Age date but they could also extend to the Roman or even the Saxon period. The skeletons include two, F153 & F152, which are relatively tall and large for regional Iron Age sheep. Two, F152 & F588, have small horns or scurrs which also made them unusual for the Iron Age period.

Dog skeleton possibly Iron Age F166/a/l

This deposit included at least 28 bones, mainly vertebrae, also ribs.

Measurements: GL fe 173, ti (shortened by healed fracture 162 mm).

Age stage: The maxillary carnassial tooth was in wear and the epiphyses of the femur and tibia are fused: probably a mature dog.

Pathology: Healed fractures occur in two lumbar neural spines. The Tibia is foreshortened and twisted from the healing of a midshaft fracture. Height estimate From femur. 53.3 cm, under estimate from tibia 48.2 cm. *Butchery:* There are unmistakable transverse knife cuts on the anterior distal end of the tibia. The cuts were slightly high to have disarticulated the hock joint and in any case the astragalus and three metatarsals remained close enough to be recovered and also do not indicate that the joint was disarticulated. Skinning around the hock joint is the most obvious interpretation.

Early Iron Age puppy or possible fox cub skeleton: pit F75/A/1

Eight bones and 16 ribs were recovered.

Sieving and sampling of bones

Sampling strategies and coarse mesh sieving of soil for bones provided useful information on the standardised recovery of bones. Interpretive difficulties were produced by sieving and sampling differences which were intended to compare methods of recovery. For despite much effort being put into sieving, sample numbers of bones recovered were rarely large enough to readily avoid the necessity of lumping together results from features of different type or period. Interpretation became complicated because of the problems of isolating the contribution of the different variables involved.

Fortunately the possible effects of differential recovery from wet and dry sieving of soil could finally be excluded. Sampling strategy did however influence the results. Non random 'judgement' sampling and bulk sieving of soil selected deposits contained bones which were significantly better preserved than bones obtained from random sampling

This finding appears due partly to deposits in both shallow and deep features being selected by random sampling, whereas nonrandom bulk sieving necessarily selected the deeper features. Possibly the selection of the prominent ditches F200 F203 & F206, which were extensively bulk sieved, was coincidental. Numerous better preserved bones from these three ditches reduced the average difference in bone preservation between overall grouped results for bones from ditches and pits.

Sieving of soil showed that percentages of loose teeth of sheep were between 3 and 6 times more abundant in sieved samples than among normally recovered bones. Small

bones of the joints and feet and vertebral fragments were also more abundant.

Nevertheless the additional recovery of sheep teeth and small bone fragments is put into perspective when it is realised that the weight of the combined Iron Age and Romano British sieved bones is made up of 61% cattle, 18% horse, 12% sheep, 8% pig and less than 1% of dog.

Further, even if the proportion of sheep among the Iron Age fragments numbers rose significantly from 42% to 58%, and that of the Romano British rose from 31% to 64% of the respective totals of identified unsieved and sieved bones, the equivalent representation of the minimum number of individual sheep (MNI) was 57% for the Iron Age and 38% for the Romano British. Thus while there is some discrepancy between the results for the smaller Romano British group, the representation of Iron Age sheep by estimation of MNI is similar to that among the fragment numbers of sieved bones and is roughly comparable to figures determined elsewhere at other Iron Age sites on the Thames. The contribution of sieved elements to the estimation of MNI (from the mandible and teeth debris) appears negligible, but might prove significant with large samples of bones.

Unlike the variability of skeletal element representation discovered among samples taken by different methods of sample sieving, the overall representation of species showed little difference as a result of random or non random soil sampling. However, intra site differences of species representation, for example the deviation of the southern pit group (see later), were observed among the small samples of bone retrieved from the same feature groups. Random sampling of ditches and pits indicated that sheep and pig bones were more abundant in the main pit group although sample numbers would have to have been double to have shown a significant difference.

The increased recovery of these elements by sieving appeared to give approximately even increments to the frequencies which were used to calculate the index of bone degradation of normally collected bones. Thus sieved and unsieved material appeared to yield comparable assessments of bone preservation.

Sieving did indicate that around 25% of identifiable elements of sheep were not recovered during normal excavation. By contrast the estimate of non recovered cattle bones is less than 10%. Bones of small animals such as rodents, birds, and frogs were, as expected, more common in the sieved debris. No extra species from soil sieving were recorded but this was not expected from the use of coarse 6mm mesh sieves.

The increased recovery of bone debris of small and medium sized mammals significantly boosted the representation of sheep and pig among the fragment numbers of the four main species. The increased representation of sheep reversed the order of percentage abundance of cattle and sheep in two of the three periods for which sieved and unsieved samples could be compared. Similarly the order percentage abundance of horse and pig was reversed in all three comparisons. However sheep and cattle remained the most abundant species.

The overall effect of sieving on the interpretation of fragment number results is disconcerting particularly where comparisons might be made between results for sites excavated by differently motivated excavation teams -- here much of the labour was employed through a Manpower Services Commission Scheme.

One implication from excavation results is that although species representation in different deposits may indicate no differences among them the preservation of bones in the deposits could vary considerably. This is consistent with conclusions obtained from heavily degraded bones at Mingies Ditch.

Results there indicated that small, fragile and immature elements disintegrate more rapidly than the large, robust and mature. Sheep and pig bones are more vulnerable to degradation than those of cattle and horse. The disappearance of fragile elements appears compensated numerically by the fragmentation of other robust elements and particularly where the mandibles and maxillae break up to give large numbers of loose teeth.

Providing that the recovery of degraded elements is satisfactory, therefore species representation of medium sized mammals among degraded bones should not be altered much. As observed already the recovery of sheep teeth at Mount Farm has thrown some doubt on close comparisons of fragment number percentages at the site.

Sieving has shown usefully that the densities of bones in pit deposits are greater than in the ditches. Since the results include small unidentifiable fragments the higher densities may be related to better preservation of such material found in pits. They must also reflect the spatial distribution of bones and the concentrations of occupation debris on the site. For example field ditches would be expected to contain less occupation debris than pits and house gullies.

Unfortunately the sieved bones did not reveal any additional evidence of the differential spread of refuse, especially where large parts of ditches F200, F203 & F206 were sieved. This appears partly attributable to the complexity and diffuseness of successive occupation. Some of the difficulties may be avoided by more refined and vigorous methods but the potential of sites to resolve these difficulties must be carefully considered first.

Other Results

Tables A16:32- A16:43 and Figures 45 to 46 in the main report provide the minimum number of individuals of different species, age of death from mandible wear and sex and stature from bone measurements. Scattergrams give details of the measurements of the distal metatarsals and metacarpals of cattle. The interpretation of these results in terms of animal husbandry are presented in the main report.

REFERENCES

- Baker, J and Brothwell, D, 1980 *Animal Diseases in Archaeology*.
- Harcourt, R A, 1971 Animal bones from Durrington Walls, in Wainwright, G J and Longworth, I H 1971 *Durrington Walls: Excavations 1966-1968* Society of Antiquaries Research Report **29**, 338-50.
- Harcourt, R A, 1974 The dog in prehistoric and early historic Britain, *J. Arch. Sci.* **1**, 151-175.
- Noddle, B, 1978 Some minor skeletal differences in sheep, in Brothwell, D R, Thomas, K and Clutton Brock, J (eds.) *Research Problems in Zooarchaeology* Institute of Archaeology London. Occ. Publ. 3 133-139.
- Wilson, R, 1975 Animal bones from the Broad Street and Old Goal sites Abingdon, *Oxoniensia* **40**, 105—121.
- Wilson, R, 1976 The animal bone in Chambers, R A and Williams, G A late Iron Age and Romano-British settlement at Curbridge, *Oxoniensia* **40**, 51
- Wilson, R, 1978 The animal bones, in Parrington 1978, 110—126 and 133—139.
- Wilson, R, 1980 Bone and shell report, in Hinchliffe and Thomas 1980, 84-90
- Wilson, R, 1993 Reports on the bones and oyster shell, in Allen and Robinson 1993, 123-45
- Wilson, R, 1995, The bone and shell remains, in Boyle et al 1995, 109-11