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THE ANIMAL BONES FROM THE EXCAVATIONS AT OWSLEBURY, HANTS. AN IRON AGE AND EARLY ROMANO-BRITISH SETTLEMENT.

Mark Maltby MA

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Summary

This extensive report is concerned with the analysis of an extremely important large sample of animal bones from a small farming settlement that dated from the 4th Cent. BC to the 4th Cent. AD.

There are two major themes in this report. The first deals with the detailed study of intra-site variability, particularly in the analysis of vertical variability within ditches and pits. Various indices were devised to measure this variability and the methods can be applied to other samples. The results showed that faunal samples can be significantly affected by the depth of burial. This had serious repercussions at Owlesbury since the late Romano - British samples were mainly taken from layers nearer the ground surface than samples of earlier date.

The second theme was concerned with the development of animal husbandry during the late Iron Age and Romano-British periods. The results showed that there were gradual changes in the relative number of species eaten. The range in size of all domestic stock increased in the Romano - British period but it was only in the late period that there were consistently larger animals represented. There were also gradual changes in mortality patterns and butchery practices. However, the Romano-British assemblages differ in many ways from the samples from roman Winchester and it is in the broad regional context that the importance of the sample from Owslebury should be seen.

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OWSLEBURY REPORT ON THE ANIMAL BONES

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SECTION 1

INTRODUCTION

AIMS AND METHODS

Animal bone studies have developed in many ways during the past decade. The realisation that many of the observed variations in faunal samples could be due to factors other than changes in the exploitation of animals has led to a reappraisal of the methods of analysis. Binford (1981), for example, has illustrated in detail some of the processes which transform animal carcases into the fragmentary state in which they are found in most archaeological assemblages. Other aspects of variability have been studied by Maltby (1985a). It is the task of the archaeozoologist to attempt to unravel the complicated pattern of variability encountered in their samples.

The methods employed in the analysis of the animal bones from Owslebury are based on the standard macroscopic identification, examination and recording of the material. Observations of fragmentation, gnawing and butchery marks, epiphyseal fusion data, tooth eruption data, bone condition, pathology and bone working evidence were carefully recorded in detail. Whenever possible the bones were measured and sexed. Such data are considered useful not only in the interpretation of how animals were exploited at Owslebury but also in the investigation of how the assemblages recovered in the deposits were formed. Indeed it will be argued that a proper understanding of the pastoral economy at any settlement cannot be obtained without first assessing what processes have been important in the formation of the faunal assemblage.

THE OWSLEBURY EXCAVATIONS

About 110,000 animals bones from the 1962-1972 excavations at Owslebury were recorded at the Faunal Remains Unit, Department of Archaeology, University of Southampton. The collection of animal bones was given a high priority during the excavations. Although no sieving was carried out, the standard of recovery of small bones was of a high order.

Large well-dated samples were obtained, particularly from the Iron Age contexts, 1st Century A.D. deposits and 3rd-4th Century A.D. features. A variety of context types provided bones but the bulk of the material came from a variety of linear features, most of them excavated in several sections. Many of these ditches and gullies had a long history and thier fills sometimes accumulated over several centuries. The problems of the presence of earlier material in the upper layers of these features were ones which caused problems with phasing of many of the fills. However, the detailed analysis of the ceramics (Pierpoint n.d.) has enabled many of the major ditch fills to be accurately dated. The rich variety in date and context t,pe of these assemblages makes the investigation of faunal variability both challenging and important.

IMPORTANCE OF THE ANIMAL BONE ASSEMBLAGE

This is one of the largest assemblages from a rural settlement investigated in Britain to date. However, apart from its sheer size, the importance of the Owslebury assemblage lies in its place in the wider programme of work concerned with faunal analysis of Iron Age and Romano-British settlements in Hampshire. The very large assemblage of Iron Age bones from the hillfort at Danebury (Grant 1984a) and substantial samples from Old Down Farm (Maltby 1981b), Winnall Down (Maltby 1985b) and Balksbury (Maltby AML Report) have already been analysed together with several samples. Large Romano-British samples have been examined at Portchester Castle (Grant 1975) and some samples from the urban settlements at Silchester (Maltby 1984c) and Winchester (Pfeiffer n.d.) have been processed. Much larger samples from these major towns will be analysed during the next few years. Samples from Romano-British rural settlements in Hampshire, have usually been relatively small in size. The Owslebury sample with its large assemblages from all phases of the Romano-British period are by far the largest obtained to date from a rural settlement. The sample is also unique in that it has a sequence of deposits dating from the 3rd Century B.C. right through to the 4th Century A.D.

The examination of the bones from Owslebury, therefore, represents an important opportunity to study the development of animal exploitation at one settlement in a period which witnessed major changes in society, the economy and settlement patterns. Possible developments in animal husbandry witnessed at Owslebury may therefore be symptomatic of more general changes in the economy and society.

THE SPECIES REPRESENTED

The animal bones at Owslebury were identified mainly at the University of Southampton, using the modern comparative collections of mammals, birds and fish of the Faunal Remains Unit. A handful of the bird bones were taken for identification to the Natural History Museum's Bird Section at Tring. The following species were positively identified.

Domestic Mammals

Cattle; Sheep; Goat; Pig; Horse; Dog; Cat.

Wild Mammals

Boar (*Sus scrofa*); Red Deer (*Cervus elaphus*); Roe Deer (*Capreolus capreolus*); Hare (*Lepus* sp. cf *capensis*); Fox (*Vulpes vulpes*); Hedgehog (*Erinaceus europaeus*); Badger (*Meles meles*); Weasel (*Mustela nivalis*); Rabbit (*Oryctolagus cuniculus* - probably all intrusive); Pygmy Shrew (*Sorex minutus*); Common Shrew (*Sorex araneus*); Water Shrew (*Neomys fodiens*); Mole (*Talpa europaea* - some intrusive); Water Vole (*Arvicola terrestris*); Short-tailed Vole (*Microtus agrestis*); Harvest Mouse (*Micromys* minutus); Mouse (*Apodemus* sp.); House Mouse (*Mus musculus*).

Birds

Domestic Fowl; Domestic/Greylag Goose (*Anser anser*); Domestic Duck/Mallard (*Anas platyrhynchos*); Teal (*Anas crecca*); Falcon (*Falco* sp.); Woodcock (*Scolopax rusticola*); Snipe (*Gallinago gallinago*); Pigeon sp. (*Columba* sp.); Lark sp. (*Alaudidae*); Thrush sp. (*Turdus* sp.); Robin (*Erithacus rubecula*); House Sparrow (*Passer domesticus*); Starling (*Sturnus vulgaris*); Jay (*Garrulus glandarius*); Rook/Crow (*Corvus frugilegus/Corvus corone*); Raven (*Corvus corax*); Buzzard (*Buteo buteo*).

Fish

Common Eel (*Anguilla anguilla*); Flounder (*Platichthys flesus*); Herring (*Clupea harengus*).

Amphibians

Frog (*Rana* sp.); Toad (*Bufo* sp.).

The following sections will attempt to assess how these species were exploited during the seven centuries of occupation at Owslebury. Sections 2-4 will be concerned with a detailed intra-site analysis of deposits in all periods, in which the causes of faunal assemblage variability will be examined. The relative importance of the major domestic mammals will be compared through time.

Sections 5-7 will be concerned in turn with the ageing, metrical analysis and butchery analysis of the bones of the major domestic species (cattle, sheep/goat, pig, horse and dog). Section 8 will examine the evidence for pathology and boneworking in these species. Section 9 will describe and assess the evidence for other mammals, birds, fish and amphibians identified in the assemblages.

Section 10 will consider the results of the analyses of the exploitation of the major domestic species in the light of other animal bone reports from contemporary settlements and attempt to assess Owslebury's role in animal husbandry in regional terms.

SECTION 2

THE ANALYSIS OF THE ASSEMBLAGES OF THE MAJOR FEATURES

INTRODUCTION

In the analysis of large samples of animal bones such as the one from Owslebury, it is tempting to assume that the samples from a particular phase somehow form a representative cross-section of the animals kept and eaten. This, however is an escapist philosophy. Archaeological faunal assemblages are usually a product of a complex series of processes and modifications which transform carcases into a collection of bone fragments (Meadow 1980; Maltby 1985a). Variability between samples obtained even from one site can be of great magnitude.

The list of potential causes of assemblage variability is a long one: for example, sampling; retrieval methods; differential preservation of bones because of trampling, erosion and scavenging; butchery and disposal strategies; trade and redistribution; ceremonial or ritual behaviour. Any combination of these factors can have a significant bearing on the types of bone recovered and the relative proportions of the different species represented. The possible effects of these processes have to be considered in order to understand the nature of the sample. Only then can we attempt to answer questions concerning the exploitation of the animals represented, possible changes in the meat diet etc.

The purpose of the next three Sections is to examine intra-site variability of the animal bone assemblages at Owslebury in detail. This Section will consider the assemblages of the major deposits (usually samples of over 1,000 fragments). Section 3 will then examine smaller assemblages subdivided into groups on the bases of date and context type. The data presented in Sections 2-3 will be assessed in Section 4.

RECORDING

Each animal bone fragment was carefully recorded by individual layers using the Ancient Monuments Laboratory's system of computer recording (Jones et al. AML Report 3342). Where possible the fragments were identified to species. Unidentifiable fragments were assigned where possible either to "large mammal" (cattle, horse or red deer) or "sheep-sized mammal" (sheep, goat, pig, roe deer or dog) categories. Where possible records were made of the side of the body to which the bone belonged and the amount and area of the bone represented (i.e. proximal, distal, caudal, cranial, ventral, dorsal, midshaft, joint surface, epiphysis etc.). All bones apart from loose teeth were assigned to one of five size categories (complete, c.75%, c.50%, c.25%, <25% of the bone). Any modern breaks were also recorded. In addition to any metrical data, detailed records of gnawing, butchery, epiphyseal fusion data, toothwear, boneworking, pathology, sex and bone condition were made where applicable. The most commonly recorded bone condition was that of surface erosion and the degree to which fragments were affected was noted (slight, moderate or severe). Occurrences of charred, calcined, ivoried and weathered bones were also recorded.

A feature of the faunal assemblages was the number of groups of articulated or associated bones recovered from the excavations. Over 600 such groups were recorded. These ranged from complete skeletons to associations of just two bones. The bones in each group were given the same specimen number. In a few instances it was impossible to distinguish individual skeletons amongst the jumble of articulated bones. In those cases the whole group was assigned the same specimen number, although several animals may have been represented.

PREVIOUS STUDIES OF INTRA-SITE VARIABILITY IN WESSEX

There have been several analyses of intra-site faunal variability on rural sites in Wessex. At Winnall Down, such studies have shown marked variations in the contents of pits, ditches, gullies and other features throughout the Iron Age and Romano-British deposits (Maltby 1985b). Sophisticated statistical analysis showed that the contents of pits and ditches also varied significantly at the banjo enclosure at Micheldever Wood, Hampshire (Coy 1978 and AML Report 3288; Griffith AML Report 2647). Examination of the bones from the different layers of the Iron Age pits excavated during the 1973 season at Balksbury, Hampshire has shown that there was a great deal of variability between the contents of their lower and upper fills (Maltby AML Report). At Danebury, Grant (1984a: 533-543) discussed in detail the "special bone deposits" of partial or complete skeletons or complete skulls that were found in the layers of some of the pits. Even the small sample from Iron Age deposits at Chilbolton Down, Hampshire, revealed that differential preservation of bones in various features produced quite different assemblages (Maltby 1984a). Generally the variations observed in these samples can be ascribed to a combination of preservation conditions and disposal strategies. The very large sample from Owslebury offered the opportunity to examine such fluctuations further.

THE MAJOR ASSEMBLAGES

Table Section2.1 lists the 31 features which produced the largest faunal assemblages. They include the largest samples from all the major context types (pits, cess pits, ditches, quarries, track gullies) of various dates. Altogether they contributed 83,962 fragments. Nearly a quarter of these were obtained from F133 and F642 produced almost 12,000 fragments. The majority of the other contexts contained over 1,000 fragments. The size of most of the samples was large enough, therefore, to allow detailed analysis of variability between different layers. In addition, many of the major features were ditches and gullies that had been excavated across several sections. Many of the layers were found in different sections and it was possible to examine horizontal as well as vertical variation in the faunal contents within a feature. Many of these features had fills that were dated (mainly by the pottery) over a wide timespan. The lower fills sometimes contained material that was several centuries older than most of the contents of the upper layers. Such temporal variation was often complicated by the presence of redistributed earlier material in the upper fills. Analysis by individual layers was therefore essential to monitor temporal variations as well as fluctuations in preservation conditions and disposal practices.

TABLE SECTION2.1

Major Faunal Assemblages from the Owslebury Excavations

Feature	Date Range	Context Type	Total Fragments
36	1st-4th A.D.	Ditch	938
42	1st A.D.	Track Gully	1526
55	3rd B.C.	Ditch	2891
75	1st-4th A.D.	Ditch	2579
132	1st B.C.-4th A.D.	Ditch	2541
133	1st-4th A.D.	Ditch	19739
135	1st B.C.-4th A.D.	Gully	1068
147	Mostly 1st A.D.	Track Gully	2718
150	3rd-4th A.D.	Track Gully	3589
236	2nd B.C.	Quarry	1301
290	3rd B.C.	Pit Complex	719
367	1st A.D.	Ditch	1100
369	1st B.C.-4th A.D.	Ditch	782
370	Mostly 1st A.D.	Ditch	5379
377	1st B.C.	Quarry	739
378	1st B.C.	Quarry	1765
380	3rd B.C.	Ditch	1156
400	1st B.C.	Pit Complex	1527
593-596	3rd B.C.-4th A.D.	Ditch	930
608	2nd-4th A.D.	Gully	997
632	3rd-4th A.D.	Cess Pit	1072
633	1st-4th A.D.	Quarry	1111
634	4th A.D.	Ditch	3049
642	1st-4th A.D.	Ditch	11968
643-645	1st-4th A.D.	Gully	1171
646	4th A.D.	Cess Pit	977
650	4th A.D.	Cess Pit	2321
664	4th A.D.	Cess Pit	3270
679	3rd A.D.	Quarry	825
691	1st-4th A.D.	Ditch	1084
707	1st-4th A.D.	Pit Complex	1731
724	4th A.D.	Quarry	1399
TOTAL			83962

METHODS OF ANALYSIS

The major assemblages will be considered in numerical order. For each feature the analysis is summarised briefly in the text. This is supported by a large set of tabulations: these list the number of fragments represented in each layer (and section where appropriate); the number of fragments of each species represented in each layer; the types of element represented in the samples of the major domestic species in each layer; and a table of summary statistics designed mainly to give an indication of the state of preservation of the samples.

The Text

For each feature there is a brief discussion of the type of context involved and its date. The location and nature of any articulated groups (usually of five bones or more) are described in detail. This is followed by a general discussion of the findings concerning the species represented, the relative abundance of fragments of the major species and an assessment of the state of preservation of the bones in the different layers (where samples are of sufficient size).

Tables of Species Representation and Anatomical Elements

The tables of the number of fragments represented in each layer are largely self-explanatory. They consist of counts of all fragments including articulated bones and unidentifiable fragments. The tables of species representation are divided into blocks. The most important group is the one of the major identified species (cattle, sheep/goat, pig, horse, dog, red deer, roe deer, hare and cat). The second group consists of upto four categories of unidentifiable fragments (large mammal, sheep-sized mammal, unidentified mammal and unidentified bird). Finally, there is a list of the rarer species, usually consisting of bones of small mammals, amphibians and birds.

Many bones of sheep/goat cannot be assigned definitely to either species. In some cases, however, bones of sheep or goat could be distinguished (usually parts of the skull, distal scapula, distal humerus, proximal and distal radius, proximal femur, proximal tibia, calcaneus, proximal and distal metacarpus and metatarsus, third phalanx - cf Boessneck et al. 1964 for discussion of morphological differences in sheep and goat skeletons). The totals of such identifications are listed separately at the foot of the table. Any samples that included articulated bones are indicated by an asterisk.

The tables of element representation are counts of the number of fragments of the major domestic mammals (cattle, sheep/goat, pig, horse and dog) in each layer of a feature. The total number of fragments of each element in the feature is also given and, in samples of more than 100 fragments of a particular species, this total is also expressed as a percentage of the total number of fragments of that species in the feature. Articulated fragments are usually listed separately and are excluded from the percentage calculations. The fragments assigned to the unidentified large mammal and sheep-sized mammal categories are divided into broad classifications (skull and mandible including loose teeth fragments, ribs, vertebrae, longbone fragments and unidentifiable fragments). The totals for these are given at the end of the table.

Summary Statistics Tables

These tables consist of a number of indices and percentages derived from the faunal data in a feature and their method of calculation requires some explanation. They first list the total number of fragments in each layer (in some cases certain layers have been amalgamated into groups) and an overall total. If the samples from any layer include bones from rarer species (small mammals, amphibians, birds, fish) the total number of bones from these are subtracted and the remainder given as a total in the second line of the table. Unidentified bird bones are assumed to be from rarer species and are also excluded at this stage. Any articulated bones of the major species are also subtracted from the total.

The first of the calculations expresses the number of unidentifiable fragments (excluding unidentified bird) as a percentage of the total fragments excluding the rarer species and articulated bones. The proportion of unidentifiable fragments in a sample tends to vary because of differential recovery standards and, probably more significantly in this case, because of variability in preservation.

The erosion index was devised to assess the degree of surface erosion on the bones. Excluding loose teeth, articulated skeletons and the bones of the rarer species, each fragment was scored as follows; 0 = no erosion; 1 = slight erosion; 2 = moderate erosion; 3 = severe erosion. The total erosion score was divided by the total number of fragments (excluding loose teeth etc.) in a layer to obtain the erosion index. Consequently, if every fragment was severely eroded the index would obtain its maximum figure of 3.00. This method makes it possible to compare the degree of surface erosion between different layers and between different contexts. It also makes it possible to compare these figures with the figures obtained for the severity of abrasion on the pottery calculated by Pierpoint (n.d.).

The loose teeth index was also designed to give an indication of how well an assemblage has been preserved. Loose teeth were the most abundant anatomical element in the samples of the major species. These dense elements will survive the ravages of scavenging, weathering, trampling and chemical decay better than other parts of the skeleton. In general, therefore, the higher the number of loose teeth, the poorer the preservation of the assemblage has been. This, however, assumes that the standards of recovery were reasonably consistent. The small size of some loose teeth means that they can easily be overlooked if recovery standards decline (Maltby 1985a: 44). The index was derived by counting the number of loose teeth in the assemblages of the major identified species and dividing the total by the total number of fragments of these species.

The percentages of gnawed and butchered fragments were calculated on the assemblages of the identified major species only (i.e. excluding unidentifiable fragments and the bones of rarer species). Loose teeth and articulated bones were also excluded. Gnawing by carnivores, particularly dogs, is known to severely modify faunal assemblages. Such activity destroys many of the bones completely and biases the surviving assemblage towards the denser parts of the skeleton (Binford & Bertram 1977; Gifford 1981). Comparisons of gnawing and butchery observations between layers and features has to take into account the severity of surface erosion, since subsequent erosion of the bones tends to destroy gnawing and butchery marks.

The number of burnt bones was small (usually <1%) in most deposits and the percentage of burnt fragments are not listed in the summary statistics except in instances where the percentage of burnt bones was significantly higher in some layers. The percentage was obtained by dividing the number of burnt fragments by the total number of fragments (excluding articulated bones and bones of the rarer species). All these calculations were made mainly on samples of over 100 fragments. Results derived from smaller samples are given in parentheses.

The next section of the summary tables expresses the number of fragments of the major species as percentages in layers where the samples are of sufficient size. Again the minimum sample size was usually 100 fragments (including loose teeth). In some cases calculations were made on samples of less than 100 fragments. In those instances the percentages are shown in parentheses.

The final section concentrates on the assemblages of the most important species (cattle and sheep/goat). Calculations of their loose teeth indices were made in the same manner as the overall loose teeth indices described above (minimum sample usually 100 bones). This gives a rough guide to the comparative states of preservation of the assemblages of the two species in a particular layer or feature. The longbone fragmentation indices were derived by adapting the recorded data on fragment size. Scores of 1.0 (complete bone), 0.75, 0.50, and 0.25 were given corresponding to the amount of the bone present. For fragments recorded as <.25, a score of 0.10 was given. The analysis was restricted to the humerus, radius, femur and tibia. The scores for these bones were added together and divided by the total number of fragments of these bones (articulated bones were excluded). The indices are therefore a measure of the mean size of the longbone fragments and can be used to give an indication of how fragmented the samples were. Calculations were usually only made on samples of over 20 fragments. Similar calculations were made for the metapodia in the large sample from F133.

These analyses were designed to obtain a better understanding of the nature and preservation of the assemblages both within and between features. Although the tables include a great deal of statistical information, inevitably space precludes the presentation of all the detailed information. Further details are stored in archival form at the Faunal Remains Unit, Department of Archaeology, Southampton.

ANALYSIS OF THE MAJOR ASSEMBLAGES

The following pages describe the contents of the major assemblages in numerical order. Period by period assessment of the assemblages as a whole will be reserved for the discussion of the data in Section 4.

Feature 36

This ditch, which contained pottery dated to the 1st Century A.D. in its primary fills and material of 4th Century A.D. date in its upper layers, produced a poorly preserved faunal assemblage, principally from sections 1,4 and 3 and the top two layers (5-6; Table F36.1). Cattle fragments (42%) outnumbered those of sheep/goat (36%) with pig (10%) and horse (9%) fairly evenly represented (Tables F36.2; F36.4). There was little variation in the relative abundance of cattle and sheep/goat (only sheep were positively identified) in the various sections. Although the horse and dog percentages showed greater variations, the numbers involved were too small to merit further comment.

The high overall erosion index (.78) reflects the poor preservation of the bones, particularly in the upper layers (Table F36.4) and this is supported by the large numbers of loose teeth represented for all species (Tables F36.2; F36.3). In addition, the gnawing percentage (11%) was high considering the moderately high levels of erosion, showing that the assemblage had also been heavily modified by the scavenging of dogs. Apart from the high percentages of loose teeth, the assemblages of the major species were heavily biased towards denser elements of the skeleton. In addition, the cattle assemblage included relatively high percentages of skull and mandible fragments (Table F36.2).

Feature 42

1,526 fragments were examined from this track gully dated to the mid-late 1st Century A.D. The distribution of these fragments is shown in Tables F42.1 and F42.2. The faunal assemblage was very well preserved and consisted of a seemingly dense accumulation of material. All but section 1 contained over 100 fragments. The sample included several sets of articulated bones, mainly of dogs in F42-2-4. 155 bones belonged to the skeleton of a small adult male dog, which although it was articulated, displayed several cut marks on the tibia, fibula, calcaneus, astragalus, ulna and os coxae indicative of the skinning of the carcase prior to disposal. Apart from the absence of the skull and mandibles, most of the rest of the skeleton was represented. Other articulated dog bones in the same layer included a pair of mandibles; a skull and atlas and a set of five ribs, all possibly from the same animal discussed above; a pair of femora and a tibia, and partial sets of metapodials and phalanges from another animal. It is also possible that several more of the dog bones in this feature belonged to the same or other partial skeletons. This would explain the relatively high percentage of dog fragments in relation to the other major species (Tables F42.2; F42.4). The cattle assemblage included nine thoracic and lumbar vertebrae from one animal in F42-2-5. Excluding the above sets of bones, sheep/goat fragments (39%) outnumbered cattle (36%) overall, although the relative percentages varied somewhat between the different layers and sections. Pig (10%), horse (6%) and dog (10%) were the other major species represented. No goat bones were positively identified, but domestic fowl was represented.

The assemblage was only slightly eroded (Index = .07), indicative of the relatively deep burial of the material. Although the presence of partial skeletons may imply some primary dumping of carcases in the gully, the high incidence of gnawing (18%) amongst the remainder of the faunal assemblage in all layers and sections indicates the secondary nature of the disposal of many of the bones. This also explains the relatively high percentages of loose teeth, particularly of sheep/goat, and the usual bias towards denser elements of the skeleton.

Feature 55

2,891 fragments of animal bone were recorded from the 3rd Century B.C. banjo enclosure ditch from 43 of its sections (Table F55.1). 1,335 of these were recovered from section 9. Apart from this, only sections 5, 7, 10 and 11 contained over 100 fragments. This may imply that a greater amount of bone waste was produced near this area of the ditch when it was infilled. However, section 9 was considerably longer than the other sections through the ditch and the figures may simply reflect the amount of fill excavated. The analysis of horizontal variability in F55 is handicapped by the fact that much of the ditch was recut at a later date and the upper layers of F55 in most of the sections had been destroyed. The sections containing the most bone tended to be those that had not been recut Overall, the density of bones in F55 was low compared to many other ditches on the site.

Analysis of vertical variation was also constrained by the destruction of the upper layers of the ditch in many sections. Whereas the figures for layer 1 are derived from small accumulations of bones recovered from 24 sections of the ditch, all but 13 fragments of layer 6 came from section 9. The same section also provided the majority of the bones recorded in layers 5 and 7. Table F55.2 lists the number of fragments assigned to the various species categories for each layer. 1,637 fragments were identified to the major species with cattle and sheep/goat dominant (40% and 41% of the fragments identified to these species respectively - Table F55.4). In the various layers the percentage of cattle ranged from 30% to 47% and that of sheep/goat from 37% to 53%. Pig fragments decreased in relation to the other species in layers 6-7 but pig was consistently the third most common species represented in each layer (11% overall). Apart from layer 7 horse bones outnumbered dog bones (5% and 2% overall respectively). Red and roe deer and hare were also represented.

An unusual feature of the faunal assemblage in F55 was the number of goat bones identified in the lower layers. 18 bones were positively identified as goat and another two were recorded as probably belonging to goat. 12 of the bones belonged to the forelimbs of four animals. A humerus, radius, ulna and metacarpal of one animal were found together in F55-1-17; two carpals and a metacarpal were recovered from F55-3-5, one of the carpals bearing knife cuts where the foot had been disarticulated from the upper forelimb; a goat radius in F55-3-10 matched an ulna in F55-4-10, the radius bearing knife cuts near the proximal articulation made during the disarticulation of the cubital joint; finally a scapula, humerus and radius of one animal were found in F55-4-12. This was the only one of these four sets of forelimb bones that did not display some canid gnawing on them. The remaining identified goat bones consisted of two partial skulls in F55-3-5 and F55-4-12 respectively; a humerus in F55-1-44; a radius in F55-4-7 with similar butchery marks to the specimen described above; a metacarpal in F55-4-10 and a metatarsal in F55-3-10. It is tempting to postulate that the presence of these goat bones in the lower layers of the ditch represents evidence for the special treatment of goat carcases. The bias towards the forelimb may also be significant, although this observation must be tempered by the fact that the forelimb bones are generally easier to distinguish from those of sheep than some of the hindlimb bones.

Other articulated bones in F55 were restricted to groups of 2-4 bones of cattle (7 instances), sheep (2), pig (2), horse (4) and dog (1). 14 bones of a species of lark were recovered from F55-3-10. All of the amphibian, bird and rodent bones were found in the lower layers of the ditch. 1,164 fragments unidentifiable to species were recorded.

Various statistics relating to the preservation of the bones are shown in Table F55.4. Generally, preservation of bones in this feature was quite good apart from the topmost layer (7). The erosion index is very low apart from layer 7 where it rises to .39. However, the percentage of gnawed fragments is quite high, showing that much of the assemblage was subjected to scavenging probably prior to its incorporation into the ditch fills. Such activity would account for the relatively high percentage of loose teeth of all species. It would also account for the uneven representation of the different bones of the major species (Table F55.3). As usual, loose teeth and the sturdiest elements survived in the greatest numbers. The sheep/goat sample, in particular, is biased towards loose teeth, mandible, tibia, radius and metatarsal fragments at the expense of the more fragile elements. The cattle sample contains a relatively high percentage of skull and mandible fragments, which may indicate a preference to dispose of these elements in the ditch as well as the bias resulting from differential preservation. Both the pig and the horse assemblages were biased towards loose teeth, skull and mandible fragments, again probably indicative of the secondary and modified nature of their assemblages. The fragmentation index of the major upper limb bones showed an increase in the fragmentation of cattle bones in layers 6-7 and a marked increase in the fragmentation of sheep/goat bones in layer 7. In each case this corresponded with increases in the percentage of loose teeth in the same layers. The incidence of observed butchery marks also decreased noticeably in layers 6-7.

Feature 75

Excavation of this feature produced 2,579 fragments of animal bone for analysis. The assemblages in this ditch displayed complex vertical and horizontal variability. In general, sections 1-9 produced the most bones together with section 15 (Table F75.1). The variation in the densities of animal bones from the excavated sections broadly corresponded with those of the pottery (cf Pierpoint fig.27). Among the lowest fills (layers 1-4) dated to the middle or late 1st Century

A.D., layer 4 (1,062 fragments) produced by far the greatest number of fragments. The upper layers (5-9) were formed in the 3rd-4th Centuries A.D. but contained a substantial amount of earlier pottery and accordingly much of the animal bone may also have been redeposited.

The relative representation of the identified species within the different layers is shown in Tables F75.2 and F75.5. Sheep/goat fragments (43% overall of the major species represented) were more common than cattle (37%) in most layers. Similarly pig fragments (10%) were more common than horse (8%) in all but layer 6. Only one goat bone was identified compared to 58 that definitely belonged to sheep. Cat bones were found in layer 4, and domestic fowl bones were also present in small numbers. House mouse was identified amongst the rodent bones. No large groups of articulated or associated bones were recorded.

However, the species distribution was found to be extremely variable in different sections of the ditch. In general, sections 9-15, especially the upper layers, contained substantially more cattle than sheep/goat fragments, whereas the reverse was the case in most other sections of the ditch. Similarly horse was better represented in these sections, particularly in sections 14-15 (Table F75.3). The contrast is shown clearly in the relative percentages of the major species represented in the sections that produced the largest assemblages (Table F75.6).

At first sight this may imply that part of the ditch (sections 9-16) was used more commonly for the disposal of the waste from the butchery of large mammals. However, several anomalies were apparent in the analysis. In particular, very few unidentifiable fragments were recorded in sections 8-16 (Tables F75.3; F75.6). These sections were excavated in Site H, one of the earliest to be dug at Owslebury. It seems possible that animal bones may have been selectively recovered from this site, in contrast with others (sites L,S,T) through which F75 ran. As Table F75.6 shows, the largest assemblages from sections 8-15 also attained high ratios of loose teeth, gnawed bones and butchered fragments and a relatively low figure for the erosion index. The combination of such figures are atypical for the site, which in general produced a positive correlation between the erosion and loose teeth indices. If, however, there was a bias in the recovery or retention of identifiable bones from site H, the otherwise anomalous figures could be explained. Such a strategy would reduce drastically the number of unidentified fragments, many of which would have been eroded, whereas loose teeth, being clearly identifiable, would have been collected or retained. Such a strategy may also have favoured the retention of cattle and horse bones in comparison to sheep/goat and pig, although there was no significant difference in the size of the longbones of cattle and sheep/goat recorded from the different sections of the ditch. Nor were there great differences in the types of bones represented in the various sections, although sample sizes were generally too small for such comparisons to be meaningful. Given these statistics, the increase in the percentage of cattle and horse bones in sections 9-16 may largely be a factor of sampling bias.

Such horizontal variability also hindered the interpretation of vertical variability (Table F75.5). The figures are probably unreliable given the sampling bias in different sections of the ditch. Overall, the erosion index increased in the upper layers with corresponding decreases in the percentage of gnawing and butchery observations. Poorer preservation in the upper layers (5-8) was also indicated by the increase in the loose teeth and longbone fragmentation indices of cattle and sheep/goat. However, caution must be exerted in comparing these figures with those obtained from other features. The high level of gnawing is, nevertheless, indicative of the secondary nature of much of this assemblage and contributes towards the bias towards loose teeth and the denser elements of the skeleton of all the major species represented (Table F75.4).

Feature 132

2,541 fragments from 7 layers and 6 sections of the ditch were examined. Most of the bones were found in sections 25-27. The most productive layers were layers 2 and 6, each producing over 700 fragments. Layers 3-5 were restricted to one section each (Table F132.1). The ditch was probably dug in the 1st Century B.C. but most of the pottery ranged from 1st Century B.C. to 1st Century A.D. in date. In the top layer (7) most of the pottery was of 3rd-4th Century A.D. date, although earlier forms were still represented.

Cattle fragments outnumbered sheep/goat fragments, although the latter became relatively more common in the upper layers. Pig bones were comparatively well represented in all but layer 7, whereas horse and dog were poorly represented (Table F132.2). 14 of the dog bones in F132-6-1 belonged to the lower hindlimbs of an adult animal. No other large groups of articulated bones were observed, apart from the partial skeleton of a toad in F132-1-1. Only one bone of domestic fowl was identified. Three goat bones were identified but as usual sheep constituted the vast majority of the ovicaprine sample. Two fin rays of an unidentified species of fish were found in F132-1-1.

The types of bones represented showed the usual biases towards the denser elements, such as loose teeth and mandibles. Cattle skull fragments, however, were unusually well represented and outnumbered mandible fragments. Sheep/goat and pig skull fragments were also quite well represented in the lower layers where preservation conditions favoured their survival. Apart from layers 6-7, the bones were comparatively well preserved and low figures were obtained for the erosion and loose teeth indices (Table F132.4). Conversely, gnawing was observed on a relatively high percentage of the bones of the major species indicating that much of the assemblage had been scavenged.

Feature 133

This ditch produced 19,739 animal bone fragments for examination. Table F133.1 shows the distribution of the fragments throughout the 24 sections and 8 layers. The feature contained a comparatively dense concentration of bones. Layers 4 and 6 were the most productive, each containing over 5,000 fragments, and over 2,000 fragments came from both layers 2 and

7. Only two of the sections (7 and 8) produced under 100 fragments, whereas sections 14-21 all contained over 1,000 fragments and these may have been the closest to areas where bone waste was originally dumped.

Layers 1-2 of the ditch were dated to the mid-late 1st Century A.D. and produced 868 and 2,154 fragments respectively (Table 133.2). These included 174 bones from a dog skeleton in F133-1-13 and 61 bones (mostly vertebrae and ribs) of two horses in F133-2-9. 10 bones of a domestic fowl skeleton were recovered in F133-1-1. Tables F133-1.1 and F133-2.1 show the distribution of the fragments of the skeleton of the major species. The most interesting aspect of these assemblages is the relatively high percentages of skull fragments of cattle, sheep/goat and pig in both layers. Loose teeth and mandible fragments were also common.

Layers 3-4 accumulated during the late 1st and 2nd Centuries A.D. and contained 473 and 6,302 fragments respectively. These included several groups of articulated bones of horse and dog. 17 bones of an adult dog were recovered in F133-4-3; another 17 of a dog were found in F133-4-22; 24 ribs and vertebrae from a third animal were discovered in F133-4-21; and there were five phalanges from a dog's paw in F133-4-20. 30 ribs and vertebrae of a horse were recovered in F133-4-16; and six associated ribs of another horse were found in F133-4-17. There were changes in the percentages of the different skeletal elements of the major species compared to the earlier layers (Tables F133-3.1; F133-4.1). Loose teeth, particularly in the sheep/goat sample, became more abundant, whereas the percentages of skull fragments decreased, although they still formed a relatively high proportion of the cattle assemblage. Whereas fragments of the major limb bones of cattle were relatively evenly represented in layer 4, the sheep/goat sample had its familiar bias towards the tibia and other denser bones such as the radius and metapodia.

Layer 5 (Table F133-5.1) contained 1,293 fragments and formed during the 3rd Century A.D. Changes in the types of elements represented continued the same trend observed in the previous layers, with skull fragments decreasing and loose teeth increasing in relative abundance.

Layers 6-8 were dated to the 3rd and 4th Centuries A.D., but as usual contained significant amounts of earlier pottery. Most of the animal bones came from layer 6 (5,390 fragments); 2,487 fragments were recovered from layer 7 and 772 fragments from layer 8. Groups of articulated bones were found in several sections; 38 bones from the hindlimbs and the caudal portion of the spine of an immature sheep were recovered from F133-6-20. In the same layer 41 articulated horse bones, mainly consisting of vertebrae and ribs, were recovered. 137 bones of an adult male dog were found in F133-6-16; and 23 bones consisting of the os coxae and the caudal portion of the spine belonging to another male dog were recovered in F133-6-19. No large groups of articulated bones were reovered from layer 7 but F133-8-12 contained the skull, mandibles, hyoid and some cervical vertebrae of another dog. The relative abundance of the different skeletal elements represented of the major species showed even greater biases towards loose teeth in these layers indicative of the poor preservation of the assemblage in the upper part of the ditch

(Tables F133-6.1; F133-7.1; F133-8.1).

Overall, the summary statistics (Table F133.3) show how the condition of the faunal sample deteriorated in the upper layers. Whereas layers 1-4 had low erosion indices, the bones from layers 5-6 had been moderately eroded and those in layers 7-8 severely eroded. The loose teeth index shows a similar trend with a figure of over .45 for each of the top three layers. In addition, the percentage of gnawed bones was quite high throughout the deposit, indicating that much of the material was redeposited in the ditch after lying elsewhere and subjected to scavenging. Layers 3-4 produced a considerable proportion of burnt bones in sections 16-19.

Table F133.3 also shows the percentages of fragments of the major species in each layer. Cattle fragments were marginally the most common in layers 1-4, whereas sheep/goat fragments were more abundant in layers 5-8. Pig fragments were comparatively well represented in layers 1-4 (17-22%) but this figure fell to between 7-12% in layers 5-8. Apart from the articulated skeletons, horse and dog were relatively poorly represented. The vast majority of the ovicaprine sample belonged to sheep. Other potential food animals were as usual poorly represented. Domestic fowl was found in small numbers in most layers and the ditch did produce one of the few fish bones (belonging to a conger eel) found during the excavation. As usual, most of the small mammal and amphibian bones were found in the lower half of the ditch (Table F133.2).

The question remains of whether the increase in the proportion of sheep/goat and the decline in the proportion of pig in the upper layers represents a change in the meat diet in the later Roman period. In comparing such changes it must be remembered that the type of assemblage represented changed markedly throughout the layers. For example, the percentage of loose teeth in the sheep/goat samples increased from 24% in layer 1 to 62% in layer 8. In contrast, the percentage of sheep/goat skull fragments decreased from 22% to less than 1% in the same layers. Similar changes were observed in the samples of the other major species. These were mainly the result of the deterioration in the preservation conditions in the upper layers. Accordingly those layers produced poorly preserved assemblages much more heavily biased towards dense elements. In addition, the samples generally became more fragmentary in the upper layers, as indicated by the higher numbers of unidentifiable fragments and a small decrease in the average size of the limb bones of cattle and sheep/goat (Table F133.3).

A further problem in the interpretation of relative species abundance is the possible degree of residuality of bones in the upper layers. In additon, there was a fair degree of horizontal variability in species representation between sections, although no clear consistent pattern in this was detected. Given these problems, it is unclear whether the small changes in the relative abundance of cattle and sheep/goat were of any real significance. However, it is possible that the high level of pig in the lower layers may reflect the species' greater importance during that phase of occupation.

Feature 135

This gully produced 1,068 animal bone fragments. The earliest pottery in the feature was dated to the late 1st Century B.C. but its upper fills (layers 3-5) contained much pottery of 2nd-4th Century A.D. date and the feature was probably open for some considerable time. Most of the bones were recovered from layers 3-4 (Table F135.1). The percentage of fragments of the major species varied considerably in the different layers, although cattle fragments were the most common overall (41%) followed by sheep/goat (34%) and pig (15%). No goat bones were identified but two domestic fowl bones were found. Layers 1-3 had low levels of erosion but high levels of canid gnawing, the upper layers as usual contained a greater proportion of eroded bones and loose teeth (Table F135.3). The types of fragment recovered are given in Table F135.2). The assemblage was typical of many of those found in other ditches and gullies at Owslebury.

Feature 147

This gully was probably constructed during the 1st Century A.D. Although later forms of pottery occur from layer 2 upwards, the majority of pottery was of 1st Century A.D. throughout. A total of 2,718 fragments was recovered from 26 sections. Most of these were found in layers 1, 2 and 5. Layer 3 was restricted to sections 11-14 which produced 124 bones from two partial skeletons. The first belonged to a sheep or goat and consisted of 41 vertebrae and rib fragments from F147-3-14. The vertebral articulations were unfused. 83 bones belonged to a small, adult male dog deposited in F147-3-11. The skull and mandibles were absent but most of the rest of the skeleton was recovered. Layers 4, 6-7 were resticted to one or two sections only and produced little faunal data (Table F147.1). The quantity of fragments produced from the different sections was quite consistent. Most of sections 9-25 contributed 100-200 fragments, whereas none of sections 1-8 produced over 100 fragments, perhaps suggesting that these sections were further away from carcase processing.

Table F147.2 lists the number of fragments of the species represented. The relative abundance of the major species varied little in the major layers. Overall, sheep/goat fragments (45%) were the most common followed by cattle (32%) and pig (17%) (Table F147.4). Of the rarer species, cat and domestic fowl were both represented in layer 2. Raven was represented by 25 bones probably from the same skeleton in F147-1-25 and F147-2-25. 54 bones were positively identified as sheep compared to one of goat.

Table F147.3 shows the types of element represented for the major species. There were only relatively minor variations in content between the different layers. Loose teeth, mandible and skull fragments formed a major part of the assemblages of cattle, sheep/goat, pig and horse. Tibia and metatarsal fragments were also well represented in the sheep/goat sample, whereas the more fragile elements were underrepresented. The explanation for this can be seen in the relatively high proportion of gnawed fragments in all layers, further enhanced by the increase in the erosion index in layer 5 (Table F147.4). Such attrition would have biased the assemblage towards the densest elements.

Feature 150

3,589 fragments were recorded from the 25 sections of this trackway above F147. The fill contained large quantities of 3rd-4th Century A.D. pottery, although there was also some redeposited material of earlier date. The highest concentrations of pottery were recovered from sections at either end of the feature. The distribution of bone fragments was broadly similar, although the contrast was not so clear. Sections 1-7, 11, 13, and 20-23 all produced over 100 fragments. Only sections 1-5 and 21-23 produced over 150 fragments. 2,137 fragments were recorded from layer 1 and 1,448 from layer 3 (Tables F150.1; F150.2).

Two sets of articulated bones were recorded. The first consisted of 27 bones from a young, possibly newborn foal in F150-1-23. This was one of the few records of very immature horse in the deposits. The other group consisted of 12 bones of a dog in F150-1-8. The types of element represented are given in Table F150.3. Preservation of bones was poor in this feature. It produced very high erosion indices and high loose teeth indices, particularly for sheep/goat (Tables F150.3; F150.4). Observations of gnawing and butchery were infrequent because of the high erosion levels and the percentage of unidentifiable fragments was high. Sheep/goat fragments (50% overall) were better represented than cattle (35%). However, cattle fragments were found in roughly equal numbers to those of sheep/goat in sections 1-7. Elsewhere sheep/goat fragments were in the majority. Pig (7%), horse (5%) and dog (1%) were relatively poorly represented. Amongst the rarer species, the 15 rabbit bones were intrusive and bones of red deer, roe deer, cat, hare, fox, water vole, domestic fowl, domestic duck/mallard and an unidentified species of sparrow were found in small numbers (Table F150.2).

Feature 236

This was a quarry feature dating from the 2nd Century B.C. It contained 1,301 animal bone fragments, mostly from layers 14-18. Layer 17 produced the largest sample of 827 fragments (Table F236.1).

The assemblage included the partial skeleton of a goat in F236-18. 97 bones of an immature animal were recovered. The skull and mandibles were not found but, apart from the earliest-fusing epiphyses (distal scapula and humerus), none of the limb bone epiphyses had fused. The proximal epiphyses of the first phalanges were just fusing. The skeleton probably belonged to a goat under 18 months old. Apart from these bones only one other goat bone was positively identified. 11 bones definitely belonged to sheep and it is likely that the remainder of the sheep/goat assemblage was, as usual, comprised almost entirely of sheep.

F236-14 included a relatively large number of rodent bones, although only woodmouse was positively identified. Of the major species, sheep/goat (42%) contributed the most fragments with cattle (35%) and pig (18%). These figures largely reflect the contents of the large assemblage in F236-17. Horse and dog fragments were poorly represented throughout. Red deer fragments, although found rarely (1%) were nevertheless better represented than usual (Tables F236.1; F236.3).

Preservation of the bones was relatively good, particularly in the lower layers. Overall both the erosion and loose teeth indices stood at .33. There was a high proportion of gnawed bones (Table F236.3). The contents of the assemblages of the major species are given in Table F236.2.

Feature 290

This pit complex was divided into 28 layers. It was dated to the 3rd Century B.C., although the top layers (particularly layer 28) may have been disturbed. 713 bone fragments were recovered. The lower layers contained relatively little bone but layers 27 and 28 produced greater amounts of material and these were treated separately (Tables F290.1 ; F290.2).

F290-10 included 20 articulated dog bones, probably from one animal. The types of element represented for all species are shown in Table F290.3. The percentages of loose teeth were high especially in the upper layers and the preservation of the sample was poor. The erosion and loose teeth indices were high, with correspondingly low numbers of observations of gnawing and butchery (Table F290.4). The sample was too small for reliable indications of species representation to be made, especially as there was a wide divergence in the percentages of fragments of the major species between the different layers. Sheep/goat were better represented in layers 27-28 than in the lower layers. Overall sheep/goat fragments (46%) outnumbered cattle (32%) with pig quite well represented (14%). Horse was poorly represented but both red deer and roe deer bones were identified. The only two sheep/goat bones that could be differentiated belonged to goat. Amongst the bones classified as "dog" was a maxilla fragment from F290-27 that belonged to a very large animal indeed. Measurements indicated that it was within the size range of wolf but the bone was too fragmentary to determine whether it indeed belonged to a wolf or a very large dog.

Feature 367

This ditch was dated to the late 1st Century A.D. It produced 1,100 animal bone fragments, mainly from layer 2. Sections 1 and 2 contributed 460 and 640 fragments respectively (Table F367.1).

No articulated groups were observed. Among the bones of the major identified species, sheep/goat fragments were the most common in all three layers, contributing 47% of the fragments overall. Cattle (28%) and pig (17%) were the next best represented species. Pig fragments were particularly common in layer 1, albeit in a small sample. The very poor preservation of the bones in layer 3 may account for the low representation of pig fragments in that layer. Horse and dog fragments (4% each) were found in layers 1 and 2. Only sheep were identified amongst the sheep/goat assemblage (Tables F367.2; F367.4). Five species of bird were identified, including domestic fowl. A few bones of rodents and amphibians completed the identifiable assemblage.

Preservation of the bones in the small sample from layer 3 was particularly poor. In the lower layers the erosion indices were relatively low but there were relatively high frequencies of unidentifiable fragments throughout. 11% of the bones of the major species bore evidence of canid gnawing but butchery marks were infrequently observed (Table F367-4). The elements represented of the major species (Table F367.3) reflect the increasingly poor preservation of the bones in the upper layers, with decreases in the proportion of fragile bones, particularly skull fragments and marked increases in the percentages of loose teeth.

Feature 369

782 fragments were recorded from this ditch. Layers 1-2 contained pottery dated to the 1st Centuries B.C. and A.D. The upper layers contained primary dumps of 3rd-4th Century pottery, although earlier material was still present. Most of the bones were found in layer 2 (Table F369.1).

No large sets of articulated bones were recorded amongst the major species, althoughfiveofthe horse bones (a scapula, humerus, radius, ulna and a carpal) in F369-1-5 may have belonged to the same animal. Sheep/goat fragments were by far the most frequently identified, contributing 54% of the fragments of the major identified species in layer 2 and 51% overall. Cattle (26% in layer 2) were relatively poorly represented compared to other features, whereas pig (16%) were relatively well represented. Horse and dog fragments were rare and no goat bones were positively identified (Tables F369.2; F369.4).

Although many of the bones had been gnawed, the preservation of bones in this feature was quite good with relatively low erosion and loose teeth indices. This is also reflected in the relative frequency of the different elements recovered (Table F369.3). Skull fragments, especially of cattle, were common, and although there was a bias towards denser elements, it was not as marked as in features with poorer preservation of the assemblages.

Amongst the rarer species, raven was represented by 13 bones in F369-2-4. These belonged to at least two birds. A single bone of domestic fowl was recovered in layer 2.

Feature 370

This ditch replaced F369 and most of the pottery from it was dated to the 1st Century A.D. with large dumps of primary refuse in layers 4-5. 5,379 animal bone fragments were recovered from the 11 sections and 6 layers. The majority of the material was recovered from layers 3-6. All but section 1 contained over 100 fragments and sections 10 and 12 contained over 1,000 fragments including articulated bones (Table F370.1).

Six major groups of articulated bones were recorded (Table F370.2). The first consisted of 40 ribs and vertebrae of an ox in F370-2-2. In the same layer, 150 bones, representing the almost complete skeleton of an immature dog were recovered. None of the epiphyses had fused but the animal was not an neonatal mortality. It probably died under six months of age, however. 45 articulated bones of sheep were recorded in F370-6-10. Five of these belonged to a newborn (or possibly foetal) lamb. The remainder consisted of various parts of the limbs and trunk of an adult sheep (all epiphyses had fused). F370-3-12 included 191 articulated bones from at least three immature pigs. Once again none of the epiphyses had fused but unfortunately no tooth eruption evidence was obtained. The bones belonged to pigs under six months of age. The elements represented in the above groups of articulated bones are given in Table F370.3. In addition, two partial skeletons of birds were recovered - 7 bones of a rook/crow in F370-3-10 and 16 bones of a raven in F370-5-6.

The relative abundance of the fragments of the major species varied greatly in the different layers (Tables F370.2, F370.4). Excluding articulated bones, the most common fragments belonged to cattle in layers 1, 2 and 4, pig in layer 3, and sheep/goat in layers 5-6. Overall, sheep/goat fragments (37%) just outnumbered those of cattle (36%) with pig well represented (23%). Horse, dog (apart from the articulated skeleton) and red deer bones formed an insignificant part of the assemblage. No goat bones were positively identified.

The variability in species representation was also marked between the different sections (Table F370.5). Pig was exceptionally well represented in sections 11-12. Cattle fragments were best represented in section 2 but ranked third behind both pig and sheep/goat in sections 11-12. Sheep/goat fragments were better represented in sections 3 and 5 than elsewhere. The high percentages of cattle and pig in sections 2 and 12 respectively may perhaps be partially attributed to the presence of articulated bones in those sections. Although the recorded articulated bones were excluded from subsequent calculations, it is possible that other bones in those layers and sections belonged to the same animals. Some of the variability in species representation in the different layers can be attributed to variability between the sections. Cattle contributed 52% of the fragments in layer 2 but nearly all of these were found in section 2 - in the same context that the articulated cattle bones were recorded. Pig bones (38%) were most abundant in layer 3 because the majority of bones from that layer were found in sections 10-12, all of which produced high percentages of pig fragments. The figures for layer 4 were influenced greatly by the higher concentrations of cattle in F370-4-10 (49%). Cattle contributed only 38% of the fragments of the major species in other sections for this layer. Sheep/goat generally became more abundant than cattle in most sections in layers 5-6.

The evidence would suggest that there was differential disposal of bones of the three major species in the ditch with discrete dumps of material dominated by a particular species (sometimes containing articulated bones) in several of the sections. This implies that the feature included a relatively high proportion of primary refuse. This is supported by other characteristics of the assemblage. Apart from layer 6, the erosion and loose teeth indices were low, indicating good preservation of the material in all but the topmost layer. However, the percentage of gnawed bones was low given these low erosion indices, perhaps indicating that much of the material was dumped directly into the ditch without being scavenged(Table F370.4). The types of elements of the major species represented in each layer are given in Table F370.3. Skull fragments formed a high proportion of the assemblages of all the major species and of the unidentifiable categories. To a certain extent this reflects the good preservation of the material (loose teeth indices were low), but it may also reflect the deliberate disposal of such material in the ditch after butchery. No clear patterns emerged, however, of discrete concentrations of skull and mandible fragments.

Of the other species represented, bones of domestic fowl, snipe, peregrine and buzzard were found in small numbers.

Feature 377

This quarry dated to the 1st Century B.C. produced 704 fragments. 57 of these belonged to small mammals in F377-1. No major groups of articulated bones of the major species were recorded. Most of the 13 layers contained only small amounts of bone. Only layers 7 and 10 produced over 100 fragments (Table F377.1). Overall, both cattle and sheep/goat provided 37% of the identifiable fragments of the major species. Pig (21%), horse (4%) and dog (1%) completed the assemblage (Table F377.2). The cattle assemblage contained a high proportion of skull fragments (32%) and a correspondingly low loose teeth index (.18). The sheep/goat assemblage appears to have been less well preserved, having a loose teeth index of .50 (Table F377.3). The overall loose teeth index was .33 and the erosion index equalled .53, showing that the assemblage was moderately preserved. 9% of the fragments of the identified major species showed evidence of gnawing and 7% bore butchery marks.

Feature 378

1,765 fragments were recorded from this quarry dated to the 1st Century B.C. The pottery evidence suggested that the deposit was infilled rapidly with sherds of the same vessels occurring throughout the layers. The animal bone evidence supports this. The largest group of associated bones belonged to the skeleton of an immature cat, 51 bones of which were found in layers 1, 4 and 5. On the other hand, the articulated bones of rook/crow in F378-1 and F378-2 belonged to two different birds.

Layers 1, 4 and 5 contained the largest number of fragments (Table F378.1). The assemblage was dominated by sheep/goat fragments in all layers (66% overall) with cattle being poorly represented (15%). Pig fragments were almost as common as cattle, whereas horse and dog were poorly represented (Tables F378.1; F378.3). The assemblage was well preserved with low erosion and loose teeth indices. It also contained a relatively high proportion of ivoried bones. Many bones had, however, been subjected to canid scavenging, as the percentage of gnawed bones indicates (Table F378.3). As usual in well preserved assemblages, skull fragments of the major species were well represented (Table F378.2), although scavenging had favoured the survival of the denser bones, particularly in the sheep/goat sample.

In addition to the high levels of sheep/goat and correspondingly low percentages of cattle fragments, the assemblage was unusual in that it contained species not normally associated with Iron Age deposits. Cat bones were rarely found in deposits of this date at Owslebury; three vertebrae of flounder were identified, one of the rare occurrences of fish bones from the excavations. 10 bones (including one with butchery marks) of domestic fowl were recovered. Although these only formed a small proportion of the assemblage, they were unusually well represented in comparison to most features of this date.

Feature 380

This early recut of the 3rd Century B.C. enclosure ditch (F55) produced 1,156 fragments from 7 layers and 9 sections. A substantial number of these, however, belonged to skeletons of amphibians and small mammals, particularly from sections 5-7 and 9. A partial skeleton of a buzzard (18 bones) was also found in F380-2-7 and F380-3-7. In all, 219 (19%) bones of rarer species were counted. Most of the bones of the major species were recovered from layers 3 and 5 (Tables F380.1; F380.2). Fluctuating results were obtained for the relative percentages of the major species from the different layers. Such variations are not unusual in relatively small samples. Overall, sheep/goat fragments (42%) were the most common, followed by cattle (32%) and pig (19%) (Table F380.4). The higher percentage of cattle in layer 5 was due largely to a greater abundance of skull fragments, particularly in F380-5-4 (Table 380.3). The assemblage was reasonably well preserved with moderate erosion indices and low loose teeth indices. However, 16% of the bones of the identified major species bore some evidence of gnawing and the assemblage had been heavily modified by canid scavenging. Unusually, the cattle longbone fragmentation index (.34) was higher than that of sheep/goat (.29) (Table F380.4). In contrast to F55, no goat bones were positively identified. Three bones of cat were recorded, however, representing one of the earliest records for this species on the site.

Feature 400

This pit complex dated to the early 1st Century B.C. contained 1,527 fragments, of which 173 (11%) , mainly from the bottom layer, belonged to the rarer species. These consisted of the partial skeletons of birds of the thrush family, amphibians and rodents. The only group of articulated bones of the major species was found in F400-6 and consisted of 13 rib fragments of a dog. Layer 7 produced the greatest amount of material (652 fragments) and in general most of the remains of the major species were found in the upper layers of the complex (Table F400.1). Sheep/goat were the most common species identified (only sheep were definitely represented) in all layers and their fragments were particularly dominant in layers 7-8. Overall they provided 54% of the fragments, with cattle (20%) poorly represented. Fragments of pig (19%), horse (5%) and dog (2%) were also found in some numbers. Red deer and cat were each represented by a single fragment (Table F400.3).

The relative abundance of the different types of element represented was quite unusual (Table F400.2). The small cattle sample was dominated by skull fragments (45%) but it included only two fragments of mandible. The cattle loose teeth index was only .14. This low figure reflected both the good quality of preservation and probably also the deliberate dumping of a few cattle skulls in layers 4-7. In layer 7 in particular, skull fragments also provided an unusually high proportion of the horse assemblage and the unidentified large mammal category. In contrast, relatively few sheep/goat skull fragments were found. The sheep/goat loose teeth index was .32, which again mainly reflects the moderate level of preservation of the sheep/goat sample. As usual, there was a bias towards the denser elements but there was also a concentration of mandible fragments in layer 7, which may represent the deliberate disposal of such bones in addition to simple preservation bias.

A relatively large number of fragments had been burnt, mainly in layers 4 and 7 (Table F400.3). The erosion and loose teeth indices showed that the bones from the top layer (8) were badly preserved but the lower layers were not severely affected by surface erosion. A large proportion of the bones had been gnawed, however, indicating that much of this material had been accessible to dogs before burial in the pit. Three fish fin rays were recovered from the feature. Fish are very rare on Iron Age inland sites in southern England. Unfortunately these bones were not identifiable to species. A single bone of domestic fowl was found in layer 8.

Features 593-596

These features represented the four phases of development of the banjo enclosure ditch's entrance "handle". F593 was dated to the 3rd Century B.C. F594 was dated later in the Iron Age, possibly to the 2nd Century B.C. The majority of the bones belonged however to Phases 3 (F595) and 4 (F596) of the sequence. F595 was dated to the early 1st Century A.D. F596-1 had pottery of late 1st Century A.D. date. The upmost layer (F596-3) however, contained 3rd-4th Century A.D. material. Table F593T6.1 lists the number of fragments in each context. 930 fragments were recovered in total. 20 of these consisted of three groups of articulated bones of rook/crow in F596-2-2, F596-2-3 and F596-2-5.

Overall assessments of species representation are even more difficult to interpret than usual in these features because of the long timespan involved. It is interesting to note that F593-1-4 contained the radius and ulna of a goat. An unusually high number of goat forelimb bones were recovered from the contemporary major enclosure ditch F55. However, both F593 and F594 produced samples too small for detailed analysis (Table F593T6.2). F595 and all three layers of F596 each produced over

100 fragments. Sheep/goat fragments were the most commonly identified catagory in each layer. Cattle and pig fragments were also well represented. Dog bones were rare, and domestic fowl only occurred in deposits dated to the 1st Century A.D. or later.

Many of the bones displayed evidence of canid gnawing, indicating the secondary deposition of much of the material. The erosion indices varied markedly, from very low levels in F596-1 to high levels in F596-3 (Table F593T6.4). The elements represented of the major species are listed in Table F593T6.3. Skull fragments were well represented in all the samples, particularly amongst the cattle assemblage. The upper layers of F596 saw an increase in the proportion of sheep/goat looseteeth, indicative of the poorer preservation of the assemblage in those layers.

Feature 608

997 fragments were recovered from this gully. Layers 1-2 contained primary dumps of 2nd Century A.D. pottery. The upper layers contained mainly 3rd-4th Century A.D. material as well as some redeposited earlier pottery. Layers 3 and 7 and sections 4-5 produced the most fragments (Table F608.1). Sheep/goat fragments were consistently the most numerous in most layers and contributed 54% of the fragments of the identified major species overall. Cattle provided 31% of the fragments. Pig fragments (7%) were poorly represented. Horse, dog and red deer completed the list of the major species identified. Domestic fowl was represented in most layers (Tables F608.2; F608.4).

The cattle sample contained relatively few teeth (loose teeth index = .20). The sheep/goat sample contained an unusually high proportion of vertebrae, particularly in layer F608-3-4 (Table 608.3). It is possible that the sample included the fragmentary remains of a group of articulated vertebrae in this context.

Feature 632

1,072 fragments were recorded from this cess pit dated to the 4th Century A.D. 273 of these belonged to the skeletons of amphibians in layers 3-4. This death assemblage contained both frogs and toads but bones of the former were more abundant. Layer 1 contained 130 bones of two domestic fowl skeletons. The more complete belonged to a hen not in lay; the other belonged to a cock. Both birds had reached skeletal maturity. The other major groups of articulated bones belonged to two dogs in layers 6-8. Both were male; the more complete skeleton belonged to an adult animal; the second belonged to an immature animal with none of its epiphyses, apart from those of the first and second phalanges fused. This partial skeleton probably belonged to an animal aged between 6-12 months old.

Excluding the bones from these skeletons and those from other species of bird and small mammal, only 456 fragments were recorded, of which 234 (52%) could not be identified to species (Table F632.1). These bones were scattered throughout the pit but only layers 4 and 6 contained more than 50 fragments excluding the bones of rarer species and articulated bones. In the small sample of fragments identified to the major species, sheep/goat (44%) outnumbered cattle (31%) with horse (12%), pig (10%) and dog (4%) also represented. The horse assemblage included two sets of articulated humeri and radii. The skeletons in this pit were well preserved. Some fragments showed evidence of erosion (Index = .22) in the remainder of the assemblage, particularly in the upper layers. There was also a high percentage of gnawed bones (20%). 6% of the bones of the major species had butchery marks recorded on them. This suggests that much of the faunal assemblage had been the the subject of secondary disposal into the pit. This is also indicated by the relatively high overall loose teeth index (.31) and the usual bias towards loose teeth and the denser elements of the skeleton in the assemlages of the major species (Table F632.2).

Feature 633

This quarry had a complex fill containing pottery dating from the 1st Century A.D. to the 4th Century A.D. 25 of the layers produced a total of 1,111 fragments (Table F633.1). Only layers 17, 23, 41 and 45 produced over 100 fragments. Two groups of articulated bones were recorded. 20 bones from an immature dog, probably under six months of age were recovered from F633-17. Six of the cattle bones in F633-31 consisted of the metacarpus and five of the phalanges of one animal.

For the purposes of this analysis the layers without large quantities of bone were amalgamated into four groups (layers 1-16, 18-21, 24-40, 43-45). Layers 17, 23 and 41 were studied separately. The species represented in each of these subdivisions are enumerated in Table F633.2. Although there was a good deal of variability, sheep/goat emerged as the most common species represented (44% of the fragments). The list of the major species was completed by cattle (37%), pig (11%), horse (4%), dog (4%) and a single bone of a hare in F633-45, which looked suspiciously modern (Table F633.4). No goat or deer bones were identified and only one bone of domestic fowl was discovered.

Overall, the statistics calculated for the various indices of erosion, loose teeth and fragmentation produced similar results to those obtained from many of the linear features at Owslebury. Similarly, the anatomical parts represented of the major species showed familiar patterns to those represented in many other features. Cattle skull fragments were, however, well represented throughout the feature and there are some indications that the cattle assemblage was generally better preserved than the sheep/goat sample.

Feature 634

This rectangular ditch was dated to the 4th Century A.D. but at one point cut through quarry F633. Some contexts therefore contained large quantities of redeposited 1st Century A.D. pottery. 3,049 animal bone fragments were recovered, over 2,000 of which were from layer 2. The greatest concentration of bones lay between sections 46-49. Apart from these, the only sections containing over 100 bones were sections 3, 16, 19, 36 and 42 (Table F634.1)

Most of the sections with the largest counts of animal bones included groups of articulated bones. 11 such groups were recorded. Four sets of articulated vertebrae of cattle were noted. The largest group of 36 bones was found in F633-2-19. It consisted of six cervical vertebrae, 12 thoracic vertebrae and 18 rib fragments, all probably from the same adult animal. The adjacent section, F634-2-20, included 11 ribs, all seven cervical vertebrae and eight of the thoracic vertebrae of an immature animal. Four unfused cattle cervical vertebrae were found articulated in F634-2-23. Finally F634-1-42 contained four ribs, four thoracic and three lumbar vertebrae, the sacrum and both os coxae of an adult animal. Other vertebrae probably belonging to the same animal were found in F634-1-42. The only articulated sheep/goat bones consisted of a pair of maxillae and mandibles in F634-2-46. The same context produced 146 bones of an adult dog skeleton. Two other groups of articulated dog bones were recovered; the first was a group of six fused lumbar vertebrae in F634-1-20; the second consisted of 78 bones of the partial skeleton of an immature animal in F634-2-3. Two small groups of articulated horse bones were observed. The first consisted of pairs of humeri and radii and an ulna in F634-2-9; the second consisted of the metatarsals, first phalanx, and two of the tarsals from the hindlimb of an adult animal in F634-2-42. The bones represented in the above articulated groups are enumerated in Table F634.3. Finally, 52 bones of a domestic fowl were found in F634-1-48.

Apart from the articulated groups, the fragments of cattle and large mammal dominated the indentified and the unidentified portions of the assemblage respectively (Table F634.2). Cattle fragments accounted for 50% of the indentified fragments of the major species, with sheep/goat at 29% and pig poorly represented with only 5%. Horse was well represented (12%), and it is possible that some areas of the ditch were used for the primary disposal of the bones of large mammals (Table F634.4). Bones of dog, red deer, roe deer, hare, water vole and rook/crow were found in small numbers. No goat or cat bones were identified (Table F634.2).

Preservation of the bones was extremely poor, which may also account for the poor representstion of sheep/goat and in particular pig bones. The erosion and loose teeth indiceswere high and there were a fair number of gnawed fragments , despite the surface erosion. Very few butchery marks were visible, however. Unidentifiable fragments formed a high proportion of the assemblage. Despite the poor preservation, the identifiable longbones of sheep/goat and cattle tended to the large (Table F634.4).

Loose teeth dominated the assemblage of all the major species (Table F634.3). The cattle assemblage also included a relatively high number of vertebrae in addition to those recorded in the articulated groups. Some of these may have belonged to the same or other articulated groups.

Feature 642

This major ditch produced the second largest group of animal bones (11,968 fragments) from any feature. The pottery evidence showed that layers 1-3 produced primary dumps of middle 1st Century A.D. types. Layer 4 contained material dated to the late 1st Century A.D. and layers 5-6 were probably formed during the 2nd Century A.D. Layer 7 was dated to the 3rd Century A.D. and the upper layers (8-14) contained good quantities of 3rd-4th Century A.D. pottery admixed with redeposited pottery of earlier origin.

Layer 1

Layer 1 produced 856 fragments from 22 of the 32 sections of the ditch. Only section 8 produced over 100 fragments (Table F642.1). This was the result of the dumping of the carcases of a pig and a raven in this section. The pig skeleton was nearly complete (180 bones) and belonged to an immature animal. Its deciduous premolars were in wear but the first molar, although erupted, was not in wear. The skeleton probably belonged to an animal about six months old. None of its epiphyses had fused. The raven skeleton consisted of 50 bones. Other groups of articulated bones in this layer consisted of 5 cattle carpals and a metacarpus in F642-1-15; 29 bones of domestic fowl in F642-1-21; and 14 foot bones of a raven in F642-1-7 which may have belonged to the same skeleton as the one found in F642-1-8. Several bones of the domestic fowl skeleton had toothmarks on them, possibly made by a cat.

Excluding the articulated bones, cattle was the most common species identified (48% of the fragments of the major species) with sheep/goat (24%) comparatively poorly represented. Pig, horse, dog, domestic/grey lag goose, rook/crow and jackdaw completed the list of identified species (Table F642.2). The majority of the bones were well preserved, producing low erosion and loose teeth indices (Table F642.3). However, 18% of the fragments (excluding loose teeth) of the major species had evidence of gnawing on them, suggesting that a lot of the bones had been subjected to canid scavenging. The cattle fragmentation index (.37) was high and it possible that the bottom layer of the ditch in places included dumps of large bones. The good preservation of the bones is also indicated by the types of elements represented, particularly in the cattle sample, in which skull fragments outnumbered those of loose teeth (Table F642-1.1). Skull fragments also formed an unusually high proportion of the unidentified large mammal category.

Layer 3

2,725 fragments were recorded. Sections 2-8 and 15-17 all produced over 100 fragments (Table F642.1). These included substantial groups of articulated bones of dogs. The first group consisted of 57 bones of newborn puppies in F642-3-4. At least three animals were represented. In the same context, 8 phalanges of an adult dog were recovered. 93 bones of another adult dog were found in F642-3-15. In addition, F642-3-11 may have contained some articulated bones of another dog, since dog fragments outnumbered those of other identified species in that section. However, such associations were not observed during identification and recording. F642-3-17 also produced smaller groups of articulated bones of cattle and horse (Table F642-3.1).

Cattle were again the most common species identified but sheep/goat were much better represented than in layer 1 (Table F642.3). Apart from the major domestic species, small numbers of bones of red deer, hare, two species of vole, amphibians, domestic fowl, corvids, thrushes and house sparrow were identified. In addition, a cleithrum of a flounder was recovered from F642-3-17 (Table F642.2).

Although cattle fragments outnumbered those of sheep/goat overall in this layer, this was largely because section 17, which produced the largest number of bones, contained a much higher proportion of cattle bones than elsewhere. Excluding articulated bones, 177 cattle fragments (44%) were identified. Horse bones were also better represented in this context (9%) than in other sections. It is possible that this section was at times used for the primary disposal of the bones of large mammals. Sheep/goat fragments (30%) were comparatively poorly represented in section 17. In most other sections cattle and sheep/goat fragments were found in relatively equal numbers.

Preservation of bones in layer 3 was generally good apart from the high incidence of gnawed bones (Table F642.3). The cattle fragmentation index continued to be high. Cattle skull fragments were again well represented and there was a fairly even representation of the major limb bones and a relatively low percentage of loose teeth in the cattle sample (Table F642-3.1). The sheep/goat assemblage was as usual less well preserved, with the usual biases towards the more resiliant elements. However, such biases were not as marked as in many other features.

Layer 4
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781 fragments from sections 9-11 were recorded, mainly from section 9 (Table F642.1). F642-4-11 produced two partial skeletons. The first belonged to an immature dog (50 bones), which although it was older than the newborn puppies found in layer 3, nevertheless probably lived for only a few weeks. Five bones of a domestic fowl skeleton were also discovered, three of which showed evidence of gnawing, probably by a cat. Cattle fragments outnumbered sheep/goat fragments in this layer and in many respects the assemblage was similar in preservation and contents with those from the lower layers (Tables F642.2; F642.3; F642-4.1).

Layer 5

This layer produced the largest faunal sample from this feature (2,977 fragments). These included two partial skeletons of dogs The first in F642-5-18 consisted of 16 bones of an immature animal of under a year old. The second group consisted of 43 bones of an adult dog in F642-5-23. Other articulated groups consisted of 5 cattle carpals in F642-5-5 and 55 bones of a mouse in F642-5-13.

Excluding articulated bones, cattle and sheep/goat fragments were found in equal numbers (39%). Pig (11%), horse (6%) dog (5%), hare and cat completed the list of the major species of mammal (Table F642.3). The rarer species included the bones of hedgehog, weasel, amphibians, domestic fowl, woodcock, rook/crow and raven. There was also an unidentifiable fragment of fish. In most sections cattle fragments outnumbered those of sheep/goat but sections 2, 16, 27 and 28 all had substantially more sheep/goat fragments than cattle. Section 17 again contained unusually high numbers of horse bones.

The state of preservation of the bones was poorer than in layers 1-4 with moderate levels of erosion and loose teeth. The limb bones of cattle and sheep/goat were slightly more fragmentary than in the lower layers (Table F642.3). The more moderate preservation of this sample is reflected in the types of element represented (F642-5.1). Skull fragments here only contributed 10% of the cattle sample and loose teeth contributed 42% of the sheep/goat sample and 35% of the pig sample.

Layer 6

Only 63 fragments, mainly from section 8 were recorded from this layer (Tables F642.1). The species identified and the types of elements represented in the samples of the major species are shown in Tables F642.2 and F642-6.1 respectively.

Layer 7

1,535 fragments from sections 8-17 included 65 articulated bones. F642-7-9 contained at least 28 cattle ribs and vertebrae from a minimum of two animals. One was skeletally mature, the other had unfused vertebral epiphyses. 18 cattle ribs and vertebrae of an immature animal were found in F642-7-17. Six unfused sheep/goat cervical vertebrae were articulated in F642-7-12. In the same section, 13 bones of a short, bow-legged, immature dog were recovered.

Overall, excluding the above bones, sheep/goat fragments (47%) outnumbered cattle (38%) with pig (7%) poorly represented. However, section 9 in particular produced substantially more cattle fragments (56%) than sheep/goat (30%) in a sample of 190 fragments identified to the major species. In contrast, section 12 produced only 21% cattle fragments and 59% sheep/goat fragments in a sample of 184 fragments. Most of the other sections contained more sheep/goat fragments than cattle but not to the extent of section 12.

The various indicators of preservation (Table F642.3) suggested that overall the bones were better preserved in layer 7 than in layer 5. This is also indicated in Table F642-7.1, which shows that a greater proportion of the more fragile bones had survived in this layer, particularly in the cattle sample.

Layer 8

1,450 fragments were recorded from 15 sections (Table F642.1). No articulated groups of bones were recorded. Sheep/goat fragments narrowly outnumbered those of cattle. Apart from the major species, only domestic fowl and mallard/domestic duck were identified. The layer did contain one of only the three bones positively identified as goat in this feature (Table F642.2). The percentages of the major species identified and the various indices of preservation calculated for this layer were very similar to those obtained for layer 5 (Table F642.3), as indeed were the relative abundance of the elements represented of the major species (Table F642-8.1).

Layer 9

501 bones were recovered from 12 of the sections 1-17, the topmost layer in that part of the ditch's circuit. Sheep/goat fragments were the most common of the major species identified (Table F642.2). Preservation was very poor in this layer as indicated by the high erosion and loose teeth indices (Table F642.3). The samples of the major species were dominated by loose teeth with few other elements surviving (Table F642-9.1).

Layer 10

Only 39 fragments were recovered, details of which are shown in Tables F642.2 and F642-10.1.

Layers 11-12

These produced 783 and 67 fragments respectively from the upper fills of sections 18-23 (Table F642.1). Only the contents of layer 11 are worth detailed study. The total of fragments included 28 bones of an immature cat in F642-11-19. The identified fragments were as usual dominated by cattle and sheep/goat. Dog fragments, unusually, were the next most common category (Tables F642.2; F642-11-1). The preservation of the bones was poorer than in the lower layers in this part of the ditch, producing a moderately high erosion index of .80

Layer 14

This was the topmost layer in sections 24-32 and produced 191 fragments (Table F642.1). These were badly eroded and dominated by loose teeth fragments (Tables F642.3; F642-14.1).

Discussion

The density of bones in F642 was high and mirrored the density of pottery sherds. The faunal sample in this feature demonstrates well the typical variability in the contents of the linearfeatures at Owslebury. The lowest layers contained the best preserved material and included primary dumps of bone including several partial skeletons. Gnawed bones were very common, however, and most of the material seems to have been deposited in the ditch after scavengers had had access to the bones. The upper layers produced samples which were generally more eroded and more heavily biased towards loose teeth and more fragmentary. Cattle and sheep/goat were consistently the most common species identified but sheep/goat were generally better represented in the upper layers. Pig consistently contributed between 10-20% of the fragments of the major species, with horse and dog usually around the 5% mark (Table F642.3). There was also some horizontal variability, particularly in the relative abundance of each species, with some sections having unusual accumulations of bones of a particular species. Various layers in section 17, for example, had high proportions of cattle and horse bones. However, such horizontal variability was generally less marked than the vertical variability. The large sample from this ditch again demonstrated that the sheep/goat sample was dominated by sheep throughout. Of the bones that could be specifically identified, 168 belonged to sheep against three of goat (Table F642.2). Apart from the major domestic mammals, very few bones of other species were represented. No roe deer bones were recovered; red deer and hare were only represented by two and seven fragments respectively. Cat was only present in three of the layers. The majority of the bones of the rarer species were as usual found in the lower layers of the ditch, where they may have been deliberately dumped or died in situ. Domestic fowl bones were found in small numbers in most of the layers but it is probable that none of the other species provided any supplement to the meat diet.

Features 643, 644, 645

These three features represent different phases of an enclosure gully. F643 is dated to the 4th Century A.D., F644 to the 2nd Century A.D. and F645 to the late 1st Century A.D. The majority of the bones came from F643 (974 fragments). Sections 5-9 contained slightly the greater concentration of bones but only sections 6-7 produced over 100 fragments. F644 only produced 191 fragments and only six came from F645 (Table F643.1).

No articulated bones were found in these features. Apart from fragments of the major species of domestic mammal, only a few bones of domestic fowl were identified. Sheep/goat fragments dominated in both layers of F643 and to a lesser extent in F644 (only sheep was positively identified). Cattle and pig were relatively poorly represented, whereas horse was the third most common species identifed in the relatively small sample from F644. A single bone of a cat was recovered from F643 (Tables F643.2; F643.4).

The assemblages, particularly from F643, were poorly preserved, with very high erosion and loose teeth indices and a high percentage of unidentifiable fragments. Observations of gnawing and, particularly, butchery were limited because of the severity of surface erosion on the bones. Fragmentation of the boneswas also quite high (Table F643.4). The assemblages of all the major species were dominated by loose teeth (F643.3).

Feature 646

Excavation of this 4th Century A.D. cess pit produced 977 fragments of bone from layers 2-9. The contents were in marked contrast to the majority of the samples recovered from other feature types. They were dominated by partial or complete skeletons of several species, particularly in the lower layers. Only in layers 7-9 did the material bear any similarities with the more ususal type of faunal assemblage recovered from Owslebury.

The species represented in each layer are shown in Table F646.1. There was a very low proportion of unidentified fragments. Of the identifiable material, only 44 cattle fragments were recovered and no articulated bones of this species were recorded. Layer 5 did include, however, four substantially complete skulls.

Sheep/goat was represented by 266 bones, 210 of which definitely belonged to sheep, mostly in articulated groups. These consisted of several dumps of sheep skulls and mandibles and, in particular, bones from the limb extremities in layers 3-6. Both adult and immature sheep were represented and it is clear that the pit was sometimes used as a depository for these elements. A few of the carpals, tarsals and the proximal articulations of the metapodia bore knife cuts made during the disarticulation of the feet from the rest of the carcase. At least six animals were represented by the metacarpi and five by the metatarsi in these layers. The bias towards the bones of the limb extremities in the sheep/goat sample is shown in Table F646. 2. The major meat-bearing bones were either absent or represented only by the occasional fragment. The assemblage was dominated by carpals, tarsals, metapodia, phalanges and sesamoids. One horned and one hornless skull were represented.

Pig was represented by a single fragment of scapula in F646-8. Eight horse bones were recovered, including an almost complete skull in F646-5. 66 dog bones were identified. All but seven of these belonged to newborn puppies, whose bodies had been dumped in the pit. The elements represented are shown in Table F646.2. A minimum of four dogs were represented. The other dog bones included a large fragment of a skull in F646-7.

Two cat skeletons were recorded. The first was found in F646-2 and consisted of 112 bones of an immature animal. The second, more complete skeleton in F646-3 contributed 194 bones and belonged to a skeletally mature animal.

85 bones of common buzzard were recorded. These belonged to at least two birds. F646-3 produced the skull, mandible and most of the vertebrae of one bird. The exceptionally good preservation of bones in this feature enabled the recovery of several of the scleral rings of this bird to be made. These are cartilaginous components of the eye and their presence indicates that the buzzard was buried with its eyes intact. Several bones of the left wing of a buzzard, probably from the same specimen, were recovered in this layer. 61 bones of another buzzard were found in F646-4. Its skull was not found but the vertebrae, ribs and most of the wing and leg bones were represented. Four other bones of this bird were found in F646-5. F646-6 produced an isolated tibiotarsus of another buzzard.

The skull, mandibles and most of the vertebrae of a raven were found in F646-3. The other birds represented consisted of single identifications of bones of domestic fowl, rook/crow and a species of the thrush family. Two fish bones were recorded in F646-3. One was unidentifiable but the other was identified as a skull fragment of a common eel (Table F646.1).

The preservation of bones in this feature was superb. Because of the abundance of partial or complete skeletons in the pit, calculations of preservation indices comparable to those encountered in other features are not possible. However, the fact that only 41 fragments were recorded as eroded (none severely) and only 10 showed evidence of canid gnawing indicates the quality of preservation and shows that most of the material was dumped directly into the pit without prior access to dogs. The dumping of puppies, cats, skulls of most domestic species and, in particular the limb extremities of sheep in this pit is a pattern that is typical of the other cess pits excavated at Owslebury.

Feature 650

This 4th Century A.D. cess pit produced a similar type of faunal assemblage as F646. The lower layers were dominated by the partial or complete skeletons of domestic animals and small mammals. Only in the upper layers did the assemblage revert to the more typical faunal assemblage recovered from the majority of the features at Owslebury.

2,321 fragments were recorded in the 19 layers of the pit but the upper layers did not produce many animal bones with only layer 16 containing over 100 fragments. Most of the articulated bones were recovered from layers 2-3, although others were also found in layers 4-6 and 8 (Table F650.1).

104 cattle bones were identified, mostly scattered in small numbers throughout the layers. The only articulated groups were found in layers 6 and 8. F650-6 produced 15 bones from the hindlimbs of an immature animal. These may have belonged to the same animal as the 13 vertebrae also recorded in that layer. F650-8 included six bones of the lower hindlimb of another animal.

Sheep/goat bones (881 fragments) were again the most abundant category in this pit. The majority of these belonged to articulated groups of bones of sheep in layers 2-3 and 5-6. The bones represented in the sheep/goat sample (and in the samples of the other major domestic mammals) are listed in Table F650.2. As in F646, most of the articulated groups consisted of the bones of the limb extremities (particularly phalanges and sesamoids) and the skull and mandibles. However, there were also groups of bones from other parts of the carcase. F650-2 included three partial sets of vertebral columns and ribs. There were also pairs of scapulae and humeri, os coxae and femora possibly belonging to the same immature sheep. F650-3 contained most of the forelimbs of another immature animal and three incomplete sets of ribs and vertebrae, again all belonging to immature sheep. F650-6 produced the skull and all the cervical vertebrae of another animal. All the bones in this group bore chopmarks. At least nine sheep were represented by complete or substantial portions of skulls in layers 2-6. These were usually associated with their mandibles and hyoids and occasionally with some of their cervical vertebrae. Seven of the skulls were naturally polled, whereas only one possessed horncores, again indicating the presence of hornless sheep in some numbers in these later deposits. Of the limb extremities, 11 sheep were represented by the metatarsi and ten each by the metacarpi and 1st phalanges. It seems that the heads and feet of at least a dozen sheep were dumped in the lower layers of this pit. Both adult animals and immature animals, mostly killed between 1-3 years of age, were represented. Only one bone of a goat was identified, a skull fragment in F650-6. Other sheep/goat fragments were scattered throughout the top layers of the pit but no articulated groups were found.

76 of the 86 pig bones belonged to the skeleton of a very young piglet in F650-3. Apart from a metapodial and tibia fragment in F650-16, all the dog bones belonged to newborn puppies deposited in some numbers in layers 2-3, 6 and 8. At least nine dogs were represented by the humeri. All but one of the cat bones belonged to the skeleton of an adult animal in F650-3. The 53 bones of a domestic fowl in F650-2 belonged to an adult hen not in lay. Excellent preservation conditions and fine recovery standards enabled the recovery of hundreds of small mammal bones in this pit. The species identified included water shrew and harvest mouse, neither of which were represented in the collections from other features on the site. The majority of the small mammal bones were recovered from layer 3. They probably represent the remains of animals which fell in while the pit lay open. Both frog and toad bones were represented in some numbers in layers 2-3. Apart from the domestic fowl skeleton, few bird bones were recovered and none of the scavenging species of corvid were present. One fish bone was found; a vertebra of a herring in F650-3.

Unidentifiable fragments were poorly represented, particularly in the lower layers, in which the majority of the bones belonged either to carcases deliberately dumped into the pit (primary disposal) or to pitfall victims.

Preservation of the bones was, in general, exceptionally good. 31 of the bones of the major identified species were gnawed. 21 of these were found in layers 8 and above and, apart from a sheep/goat radius in layer 1, the only gnawed bones in the lower layers belonged to cattle and horse. 85 bones bore evidence of surface erosion, with only 20 being severely affected. These badly eroded fragments were confined to the top four layers (16-19). Preservation indices etc. were not calculated for this feature because the high proportion of articulated bones would make direct comparisons with other features misleading.

Feature 664

The faunal assemblage from this 4th Century A.D. cess pit had many similarities with those from F632, F646 and F650. It consisted mainly of articulated groups of bone, in this case mainly of dogs. All 11 layers produced bones and all but layers 4, 8, and 12 contained over 100 fragments. The largest samples were obtained from layers 1-3 and 5-6. Most of the skeletons and other articulated bones were recovered from the lower layers but even layers 9-10 produced partial skeletons (Table F644.1).

20 of the 119 cattle fragments consisted of vertebrae and ribs in F664-9, which probably belonged to one animal. The vertebral epiphyses were just fusing. No other articulated groups of cattle bones were noted. The assemblage did include five substantial portion of skulls and most of the rest of the cattle sample consisted of large fragments or complete bones. This is reflected in the longbone fragmentation index (.57),

which was substantially higher than in most features at Owslebury.

The sheep/goat sample again consisted principally of articulated bones of the feet and, to a lesser extent, the heads of sheep. Articulated groups were recovered in layers 3-7. The bias towards bones of the feet (particularly phalanges and sesamoids) is clearly demonstrated in Table F664-2. The percentages of the different elements given in that table are again not compatible with the figures obtained from other feature types because articulated bones are included in these calculations. Only a few bones from the trunk and forelimbs were identified and the major meat-bearing bones were not dumped in this pit. At least four sheep were represented. One horned and one hornless skull were recorded.

Only six fragments of pig were identified. The horse assemblage (25 fragments) bore similarities with that of cattle. Although no articulated groups were recorded, several layers contained large fragments of horse bones that had been thrown into the pit.

The feature was remarkable for the number of dog skeletons it produced. The species contributed 2,670 of the 3,270 fragments analysed. The assemblage consisted of a large number of bones of newborn puppies and the substantially complete skeletons of several older dogs. The puppy bones were confined almost exclusively to layers 1-6. 1,567 such bones were recovered from these layers. It was impossible to sort out individual skeletons from the jumble of bones but a minimum of 42 animals were represented by the humerus and femur. The bones must represent the remains of several litters which were destroyed at birth.

Older dog skeletons were found in layers 2-3, 6-7 and 9-10. F664-2 produced 205 bones from an adult female and 161 bones from an immature, but almost fully grown male. Both skeletons were substantially complete. 150 bones of an adult female were recovered from F664-3. In F664-6 two more largely complete skeletons of adult animals were found together with another immature one. It is possible that some of the articulatedbones of the adult dog in F664-7 may have belonged to one of these animals. A baculum was found in F664-7, so one of the dogs was a male. Two less complete skeletons were recovered from the upper layers of the pit. F664-9 produced 85 bones of another adult. Most of the forelimbs and one of the hindlimbs of this specimen were not recovered. F664-10 contained 70 bones of another adult dog. Most of the bones of the trunk of the animal were recovered but many of the limb bones were missing. Both these animals were probably females. The bone elements represented in the dog sample are listed in Table F664-2.

Layers 2 and 10 both produced articulated bones of immature hares. Quantities of small mammal and amphibian bones were retrieved from layers 2 and 6 and at least ten short-tailed voles were represented. No bones of deer, domestic fowl or goat were identified. The only species of bird identified were the meadow pipit, dunnock and robin. Three bones of badger were found in F664-9 (Table F664.1).

The preservation of the bones was again excellent, particularly in the lower and middle layers of the pit. Summary statistics comparable to other feature types are not feasible because of the high proportion of skeletons in F664. However, only 33 bones of the major identified species bore canid gnawing marks. These mainly belonged to cattle (17 fragments) and horse (12 fragments). Most of the bones, however, appear to have been dumped directly into the pit. 82 bones had some surface erosion. These predominantly were recovered from the layers nearest the ground surface. Few unidentifiable fragments were recovered from the lower layers but their numbers increased in the upper layers.

Feature 679

This feature was a quarry provisionally dated to the 3rd Century A.D. It produced 825 animal bone fragments from tenof its 16 layers. 502 fragments were recovered from F679-15. None of the other layers produced over 100 fragments (Table F679.1).

No articulated groups of bones were recovered, and apart from two bones of rook/crow, only fragments of the major domestic mammals were identified. Cattle fragments were the most common catagory (46% of the major identified species), with sheep/goat poorly represented (29%). Pig (12%), horse (6%), dog (6%), and cat (.5%) completed the species list. These figures largely reflect the relative representation of fragments of these species in F679-15 (Tables F679.1; F679.3). Only bones diagnostic of sheep were identified in the sheep/goat sample.

48% of the fragments could not be identified to species. Those of large mammals were the mostcommon, supporting the dominance of cattle amongst the identified portion of the assemblage. Preservation was generally poor, with an overall erosion index of .81, and a relatively high loose teeth index (.36). Butchery marks were rare, but 8% of the bones of the major species bore evidence of canid gnawing. Considering the poor preservation, the fragmentation indices for both cattle and sheep/goat were quite high (Table F679.3).

The fragments represented in the assemblages of the major species are shown in Table F679.2. Loose teeth were, as expected, dominant in all samples.

Feature 691

The lowest layers of this ditch were dated to the 1st-2nd Centuries A.D. The upper three layers were formed during the 3rd-4th Centuries A.D. However, some of the sections were contaminated by material from intrusive features. 1,546 fragments were recovered, mainly from layers 2-4 (layer 3 was restricted to section 1). Only sections 1-2 and 5-6 produced over 100 frgaments (Table F691.1).

Apart from a few rodent and amphibian bones, only the bones of the major domestic species were identified. Overall, sheep/goat (45%) outnumbered the fragments of other species. Pig (24%) was unusually well represented but this was due mainly to its abundance in F691-3-1, in which pig fragments outnumbered those of all the other identified species. Fragments of cattle, horse and dog were all relatively poorly represented compared to other features (Tables F691.2; F691.4). Unusually, identifications of goat outnumbered those of sheep in F691. Three skull fragments of goat were identified in layers 1-2. In addition, one of the sheep/goat mandibles had a deciduous fourth premolar that displayed the characteristics of goat (Payne 1985).

Preservation of the bones was very poor, obtaining one of the highest erosion indices calculated for any of the features in the excavations. This accounts for the high percentage of unidentifiable fragments. The proportion of loose teeth in the samples was, however, not as high as would be expected given the poor preservation of the assemblage. 5% of the bones were charred and 9% of the bones of the major species bore gnawing marks, a reasonably high figure considering the degree of surface erosion. Most butchery marks, however, appear to have been obliterated (Table F691.4). The types of skeletal element represented of the major species are shown in Table F691.3.

Feature 707

This was a pit complex whose earliest layers were dated to the early 1st Century A.D. Layer 3 produced pottery dating to the late 1st Century A.D. but layers 4-9 appear to have been formed during the 3rd-4th Centuries A.D. 1,731 fragments were recorded. All the layers apart from layers 4 and 6 produced over 100 fragments. No articulated groups of bones of the major species were found, but the lower layers (particularly 1-3), contained a relatively large number of small mammal and amphibian bones, belonging to animals that had fallen in while the pit lay open.

Amongst the identified bone, sheep/goat fragments were by far the most abundant, particularly in layers 1-5. Overall they accounted for 50% of the identified fragments of the major species, followed by cattle (33%) and pig (13%). Horse and dog were poorly represented, particularly in the lower layers (Tables F707.1; F707.3). No goat bones were identified and the only two domestic fowl bones were found in the upper layers. Three bones of a falcon were recorded in layers 2-3.

An unusually high proportion of burnt bones were recorded in the lower layers. Many of these had shattered into small fragments, and this accounts for the unusually high number of unidentifiable bones in the assemblage, given the low erosion figures in these layers (Table F707.3). Significantly, the great majority of these fragments belonged to sheep-sized mammals, supporting the observed dominance of sheep/goat fragments amongst the identifiable portion of the assemblage. Unidentifiable large mammal fragments were predominant in the upper layers (Table F707.1). In the upper layers much greater surface erosion was present on the bones. This resulted in high erosion and loose teeth induces in layers 8-9 in particular. Butchery marks were rarely observed on bones in these layers, but gnawed specimens were recorded in some numbers (Table F707.3).

The types of elements represented of the major species varied markedly in the different layers (Table F707.2). The cattle assemblage contained an unusually high proportion of vertebrae in F707-8, perhaps indicating the presence of some articulated bones. Loose teeth formed 50% of the sheep/goat assemblage but the preservation of the sheep/goat sample was much poorer in layers 6-9 than in the lower layers. Loose teeth only formed 28% of their assemblage in layers 1-4, and sheep/goat skull fragments were also well represented in those layers. The pig assemblage contained an unusually high number of foot bones, particularly in layers 1-5. Metapodials and phalanges usually were grossly underrepresented in the pig samples from most features.

Feature 724

This 4th Century A.D. quarry did not produce as beautifully preserved an assemblage of animal bones as the cess pits of this date. However, it did produce a number of large groups of articulated bones. Six layers produced 1,399 fragments, over half of these from layer 5 (726 fragments). Layers 2 and 3 also produced over 200 fragments each (Table F724.1).

Cattle articulated bones were found in some numbers in layers 3 and 5. In F724-3, 36 vertebrae and ribs of an immature animal were recovered. There were also some bones of the upper hindlimbs and forelimbs, which may have belonged to the same animal. In addition, a pair of mandibles and two phalanges were articulated. These groups accounted for 56 of the cattle bones in this layer, and it is possible that other bones in the layer may have belonged to the same animal or animals. 21 cattle bones in F724-5 were articulated. These consisted mainly of bones of the hindlimbs of at least two animals, one of which was immature. Again many of the other cattle bones dumped in this layer may also have belonged to other articulated groups. The bones represented are shown in Table F724.2. The high proportion of vertebrae suggest that there may have been articulated groups which were not noted during recording. This layer produced 33 cattle mandible fragments. Most of these were small and several were burnt. Several of the fragments could have belonged to the same mandible. These factors combined to make cattle by far the most commonly identified species in this pit. Excluding bones recorded as articulated, cattle fragments contributed 63% of the assemblage. The longbone fragmentation index was very high (.45), suggesting that large fragments or complete bones were commonly dumped in the pit.

The sheep/goat assemblage was dominated by the articulated groups of skull and mandible and bones of the feet in F724-2. The skulls and mandibles of at least three sheep were found. All belonged to immature animals. No hornless sheep were represented in contrast with the 4th Century A.D. cess pits described previously. Three immature animals were also represented by the 1st phalanges, and it is possible that the sheep feet represented belonged to the same animals as the skull and mandibles. The major meat-bearing bones were uncommon in the sheep/goat sample (Table F724.2).

Only eight pig fragments were recorded. The 21 horse fragments included eight articulated thoracic vertebrae in F724-3. 170 of the dog bones belonged to the skeleton of an adult female in F724-2. The skeleton was complete apart from the absence of mandibles, one or two vertebrae and ribs and the bones of one of the hind feet (Table F724.2).

Bones of the other species were rarely identified in the pit, although red deer, domestic fowl, pigeon, house sparrow, short-tailed vole and frog were present. Unidentifiable fragments formed a high proportion of the assemblage (Tables F724.1; F724.3). Large mammal fragments were by far the most common catagory, supporting the dominance of cattle bones in the identifiable portion of the assemblage. Layers 4-6 included a

large proportion of burnt bone fragments, which also accounted for the unusually high levels of unidentifiable bones. Very few bones in layers 1-3 were eroded but the upper layers included a fair number of such bones (overall erosion index = .44). A large number of the unarticulated bones were gnawed but few butchery marks were observed (Table F724.3).

TABLE F36.1

Feature 36 Animal Bone Fragments in All Layers and Sections

Section	Layer 1	2	3	4	5	6	Total
1	93		1	22	116	175	407
2	19	20	39	13	48	6	145
3			4		35		39
4		79	5	3	184	4	275
5	2			13		4	19
6			4	45		2	51
8			1	1			2
TOTAL	114	99	54	97	383	191	938

TABLE F36.2

Species Represented in Feature 36 (Fragments)

Species	Layer 1	2	3	4	5	6	Total
Cattle	29	43	6	20	66	33	197
Sheep/Goat	14	20	12	24	76	25	171
Pig	11	11	1	4	16	3	46
Horse	7	13	3	3	8	8	42
Dog	-	-	1	1	2	9	13
Red Deer	-	2	-	-	-	-	2
Roe Deer	-	-	-	-	1	-	1
Unid. Large Mammal	37	7	21	22	144	71	302
Sheep-sized Mammal	13	2	9	16	51	34	125
Unid. Mammal	3	1	1	6	7	5	23
Unidentified Bird	-	-	-	-	2	-	2
Unid. Rodent	-	-	-	-	6	2	8
Dom. Duck/Mallard	-	-	-	-	1	-	1
Raven	-	-	-	-	-	1	1
House Sparrow	-	-	-	-	1	-	1
Rabbit(Intrusive)	-	-	-	1	2	-	3
TOTAL	114	99	54	97	383	191	938
Sheep	1	2	-	3	1	1	8

TABLE F36.3

Fragments of Major Species Represented in Feature 36 (by Layer)

	Layer							
Cattle	F36-1	2	3	4	5	6	Total	%
Skull fragments	4	2	-	5	7	1	19	10
Mandible	5	8	-	8	17	2	40	20
Loose teeth	6	22	2	4	30	14	78	40
Scapula	1	1	-	-	-	1	3	2
Humerus	3	1	-	-	-	-	4	2
Radius	2	1	-	-	2	2	7	4
Ulna	-	-	-	1	-	1	2	1
Os Coxae	2	-	1	-	2	1	6	3
Femur	-	-	1	-	-	1	2	1
Tibia	-	4	-	1	2	-	7	4
Carpals	-	-	-	-	1	-	1	.5
Calcaneus	-	-	1	-	-	1	2	1
Astragalus	1	-	-	-	1	1	3	2
Centroquartal	-	-	-	-	-	1	1	.5
Other tarsals	-	-	-	-	1	-	1	.5
Metacarpal	-	2	-	-	-	1	3	2
Metatarsal	-	1	-	1	2	3	7	4
Metapodial	-	-	-	-	-	-	-	-
1st Phalanx	2	-	-	-	-	2	4	2
2nd Phalanx	1	-	-	-	-	1	2	.5
Sesamoids	-	-	-	-	1	-	1	.5
Cervical verts.	2	1	-	-	-	-	3	2
Thoracic verts.	-	-	-	-	-	-	-	-
Caudal verts.	-	-	1	-	-	-	1	.5
TOTAL	29	43	6	20	66	33	197	

Sheep/Goat	F36-1	2	3	4	5	6	Total	%
Skull fragments	2	1	-	-	2	-	5	3
Mandible	2	-	1	4	3	2	12	7
Loose teeth	3	14	10	6	48	13	94	55
Scapula	-	-	-	-	-	-	-	-
Humerus	1	-	-	2	-	-	3	2
Radius	2	1	-	1	4	1	9	5
Tibia	2	1	-	3	8	4	18	11
Carpals	-	-	-	-	-	1	1	.6
Calcaneus	-	-	1	-	-	-	1	.6
Metacarpal	-	1	-	3	2	1	7	4
Metatarsal	2	-	-	3	3	2	10	6
Metapodial	-	-	-	1	1	-	2	1
1st Phalanx	-	1	-	-	4	1	6	4
Cervical verts.	-	1	-	1	-	-	2	1
Thoracic verts.	-	-	-	-	1	-	1	.6
TOTAL	14	20	12	24	76	25	171	

Pig	F36-1	2	3	4	5	6	Total
Skull fragments	1	3	-	1	2	-	7
Mandible	3	2	-	-	-	-	5
Loose teeth	2	5	1	1	8	3	20
Scapula	1	-	-	-	-	-	1
Humerus	-	-	-	1	3	-	4
Os Coxae	2	-	-	-	-	-	2
Femur	2	-	-	-	1	-	3
Tibia	-	-	-	1	1	-	2
Metacarpal	-	1	-	-	-	-	1
1st Phalanx	-	-	-	-	1	-	1
TOTAL	11	11	1	4	16	3	46

Horse	F36-1	2	3	4	5	6	Total
Skull fragments	1	1	-	1	-	-	3
Mandible	1	-	-	-	1	1	3
Loose teeth	1	4	3	2	4	3	17
Humerus	-	-	-	-	1	-	1
Radius	1	1	-	-	1	1	4
Ulna	-	1	-	-	-	-	1
Os Coxae	-	-	-	-	-	1	1
Lat. Metapodial	1	-	-	-	-	-	1
Metapodial	-	1	-	-	-	-	1
1st Phalanx	-	1	-	-	-	-	1
2nd Phalanx	-	-	-	-	-	1	1
Ribs	-	1	-	-	-	-	1
Cervical verts.	-	2	-	-	1	-	3
Thoracic verts.	1	1	-	-	-	1	3
Lumbar verts.	1	-	-	-	-	-	1
TOTAL	7	13	3	3	8	8	42

Dog	F36-1	2	3	4	5	6	Total
Loose teeth	-	-	-	-	1	4	5
Ulna	-	-	1	-	-	1	2
Calcaneus	-	-	-	-	-	2	2
Metacarpal	-	-	-	-	1	1	2
1st Phalanx	-	-	-	-	-	1	1
Ribs	-	-	-	1	-	-	1
TOTAL	-	-	1	1	2	9	13

Unid. Large Mammal	Total
Skull + Mandible frags.	20
Ribs	23
Vertebrae	14
Longbone fragments	70
Unid. fragments	175
Total	302

Sheep-Sized Mammal	Total
Skull + Mandible frags.	2
Ribs	8
Vertebrae	1
Longbone fragments	88
Unid. fragments	26
Total	125

TABLE F36.4

Feature 36 Summary Statistics

	Layer 1	2	3	4	5	6	Total
Total Fragments	114	99	54	97	383	191	938
ex.rarer species	114	99	54	96	373	188	924
% Unid. Framents	46	(10)	(57)	(46)	55	59	49
Erosion Index	.42	(.20)	(1.11)	(.49)	.90	1.10	.78
Loose Teeth Index	(.20)	(.51)	(.70)	(.25)	.54	(.47)	.45
% Gnawed Fragments	(16)	(20)	(14)	(8)	(4)	(12)	11
% Butchered Frags.	(2)	(5)	(-)	(-)	(4)	(-)	2

% Fragments of Major Species	Section 1	Section 4	Total
Cattle	43	43	42
Sheep/Goat	30	33	36
Pig	8	11	10
Horse	7	12	9
Dog	7	-	3
Red Deer	-	1	.4
Roe Deer	-	1	.2

TABLE F42.1

Feature 42 Animal bone Fragments in All Layers and Sections

Section	Layer 1	2	3	Total
1	86			86
2	15	43	64	122
3	108	88	43	239
4	21	378	144	543
5	129	276	24	429
6	48	40	19	107
TOTAL	407	825	294	1526

TABLE F42.2

Species Represented in Feature 42

Species	Layer 1	2	3	Section 1	2	3	4	5	6	Total
Cattle	75	143*	73	23	35	21	75	107*	30	291
Sheep/Goat	80	161	66	19	31	55	74	107	21	307
Pig	33	34	13	6	11	8	21	15	19	80
Horse	13	18	16	5	6	3	20	10	3	47
Dog	33	205*	16	-	3	20	194*	34	3	254
Large Mammal	91	136	66	16	15	79	79	85	19	293
Sheep-sized M.	65	105	36	16	18	40	65	57	10	206
Unid. Mammal	12	13	5	-	3	9	6	11	1	30
Unid. Bird	1	3	2	-	-	2	3	-	1	6
Unid.Rodent	2	1	-	1	-	1	-	1	-	3
Toad	-	6	-	-	-	-	5	1	-	6
Dom. Fowl	2	-	-	-	-	1	-	1	-	2
Starling	-	-	1	-	-	-	1	-	-	1
TOTAL	407	825	294	86	122	239	543	429	107	1526
Sheep	8	10	6	1	3	10	4	5	1	24

* Cattle assemblage includes 9 articulated bones from one animal; dog assemblage includes 177 articulated bones.

TABLE F42.3

Fragments of Major Species Represented in Feature 42 (by Layers)

Cattle	F42-1	Layer 2	3	Total	%
Skull frags.	7	9	2	18	6
Mandible	9	22	9	40	14
Loose teeth	11	31	16	58	20
Scapula	6	18	12	36	12
Humerus	7	7	8	22	8
Radius	4	3	3	10	3
Ulna	3	3	2	8	3
Os Coxae	2	3	4	9	3
Femur	1	7	2	10	3
Tibia	6	2	2	10	3
Carpals	1	5	1	7	2
Calcaneus	3	1	-	4	1
Astragalus	-	-	2	2	1
Centroquartal	-	1	-	1	.3
Metacarpal	4	3	3	10	3
Metatarsal	5	3	2	10	3
Metapodial	1	2	-	3	1
1st Phalanx	1	3	-	4	1
2nd Phalanx	1	-	1	2	1
3rd Phalanx	-	1	1	2	1
Sesamoids	-	-	1	1	.3
Sternebrae	1	-	-	1	.3
Cervical verts.	-	4	-	4	1
Thoracic verts.	1	6*	1	7	2
Lumbar verts.	1	7*	2	10	3
Sacrum	-	2	-	2	1
TOTAL	75	143	73	291	

* includes 5 thoracic and 4 lumbar vertebrae from the same animal.

Sheep/Goat	F42-1	Layer 2	3	Total	%
Skull frags.	4	14	2	20	7
Mandible	6	19	10	35	11
Loose teeth	27	74	27	128	42
Scapula	2	2	1	5	2
Humerus	2	8	1	11	4
Radius	2	6	1	9	3
Ulna	-	1	1	2	1
Os Coxae	1	3	2	6	2
Femur	2	4	3	9	3
Patella	3	1	-	4	1
Tibia	8	9	4	21	7
Carpals	2	-	-	2	1
Calcaneus	-	1	1	2	1
Astragalus	1	-	1	2	1
Centroquartal	1	-	1	2	1
Metacarpal	3	5	4	12	4
Metatarsal	7	6	4	17	6
Metapodial	1	-	-	1	.3
1st Phalanx	3	2	1	6	2
2nd Phalanx	1	3	-	4	1
Sesamoids	-	1	-	1	.3
Ribs	3	1	1	5	2
Cervical verts.	1	-	1	2	1
Thoracic verts.	-	1	-	1	.3
TOTAL	80	161	66	307	

Pig	F42-1	2	3	Total	Horse	F42-1	2	3	Total
Skull frags.	7	-	2	9	Skull frags.	-	-	-	-
Mandible	3	6	2	11	Mandible	-	2	3	5
Loose teeth	6	5	3	14	Loose teeth	3	4	3	10
Scapula	-	2	-	2	Scapula	1	-	2	3
Humerus	1	4	2	7	Humerus	2	1	-	3
Radius	2	2	-	4	Radius	3	4	1	8
Ulna	2	4	-	6	Ulna	1	1	2	4
Os Coxae	-	2	-	2	Os Coxae	-	-	1	1
Femur	-	1	1	2	Femur	1	1	1	3
Tibia	-	2	1	3	Tibia	-	-	-	-
Fibula	1	-	-	1	Fibula	-	-	-	-
Carpals	-	1	-	1	Carpals	-	1	-	1
Calcaneus	2	-	-	2	Calcaneus	1	-	-	1
Astragalus	-	-	1	1	Astragalus	-	-	-	-
Metacarpal	-	-	-	-	Metacarpal	-	-	1	1
Metatarsal	-	-	-	-	Metatarsal	-	1	-	1
Lat.Metapodial	-	1	-	1	Lat. Metapodial	-	-	-	-
Metapodial	-	-	-	-	Metapodial	-	1	-	1
1st Phalanx	3	1	-	4	1st Phalanx	1	-	1	2
2nd Phalanx	1	1	-	2	2nd Phalanx	-	1	-	1
3rd Phalanx	-	1	-	1	3rd Phalanx	-	-	-	-
Ribs	5*	1	1	7	Ribs	-	1	-	1
Cervical verts.	-	-	-	-	Cervical verts.	-	-	1	1
TOTAL	33	34	13	80	TOTAL	13	18	16	47

* includes 5 ribs from the same animal

Dog	F42-1	Arts. 2	Oth. 2	3	Total
Skull frags.	3	1	4	1	9
Mandible	3	2	2	-	7
Hyoid	1	-	1	-	2
Loose teeth	5	-	1	1	7
Scapula	1	2	-	1	4
Humerus	-	2	4	2	8
Radius	-	2	1	2	5
Ulna	-	2	-	-	2
Os Coxae	1	2	-	4	7
Femur	2	4	1	1	8
Patella	-	1	-	-	1
Tibia	-	3	-	1	4
Fibula	-	2	-	-	2
Carpals	-	10	-	-	10
Calcaneus	-	2	-	-	2
Astragalus	-	2	-	-	2
Other tarsals	-	7	-	-	7
Metacarpal	4	13	1	-	18
Metatarsal	-	8	-	-	8
Metapodial	-	1	2	-	3
1st Phalanx	-	18	1	-	19
2nd Phalanx	-	15	-	-	15
3rd Phalanx	-	10	-	-	10
Sesamoids	-	16	-	-	16
Ribs	7	30	2	-	39
Sternebrae	-	1	-	-	1
Cervical verts.	5	1	4	1	11
Thoracic verts.	-	9	2	-	11
Lumbar verts.	-	6	-	-	6
Sacrum	-	1	-	-	1
Caudal verts.	1	3	1	2	7
Baculum	-	1	1	-	2
TOTAL	33	177	28	16	254

Unid. Large Mammal	Total
Skull & mandible	45
Ribs	41
Vertebrae	13
Longbone fragments	46
Unid. fragments	148
Total	293

Sheep-sized Mammal	Total
Skull & mandible	6
Ribs	38
Vertebrae	15
Longbone fragments	104
Unid. fragments	43
Total	206

TABLE F42.4

Feature 42 Summary Statistics

	Layer 1	Layer 2	Layer 3	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Total
Total Fragments	407	825	294	86	122	239	543	429	107	1526
ex. rarer sp.	403	818	293	85		237	537	426		1514
and ex.articulated		632					366	417		1328
% Unidentified	42	41	37	(37)	30	55	42	37	30	40
Erosion Index	.04	.06	.16	(.01)	.01	.13	.07	.08	(.08)	.07
Loose Teeth Index	.22	.31	.27	(.26)	(.20)	.27	.26	.32	.25	.27
% Gnawed	21	15	22	(28)	(39)	(17)	14	15	(11)	18
% Butchered	6	10	5	(8)	(13)	(3)	11	3	(12)	7
% Fragments of Major Species										
Cattle	32	36	40	(43)	(41)	(20)	36	37	(39)	36
Sheep/Goat	34	43	36	(36)	(36)	(51)	36	41	(28)	39
Pig	14	9	7	(11)	(13)	(7)	10	6	(25)	10
Horse	6	5	9	(9)	(7)	(3)	10	4	(4)	6
Dog	14	7	9	(-)	(3)	(19)	8	13	(4)	10

	Total
Cattle Loose Teeth Index	.20
Cattle Longbone Fragmentation Index	.26
Sheep/Goat Loose Teeth Index	.42
Sheep/Goat Longbone Fragment Index	.29

* excluding the 8 butchered bones of the dog skeleton

TABLE F55.1

Feature 55 Animal Bone Fragments in all Layers and Sections

	Layer						
Section	1	3	4	5	6	7	Total
2			12	2			14
3	2			4			6
4		16		5		21	42
5		32		16	13	81	142
6		2				22	24
7			126				126
8				12		1	13
9		59	1	290	668	317	1335
10		40	189			38	267
11			27	91		1	119
12			19	48		31	98
13		2	66			8	76
14	2						2
15			4				4
16	6		3				9
17	17		23				40
18	1		1				2
19	15		22				37
20	2	17					19
21				7			7
25	8		27				35
28	5			5			10
29		5					5
30	41						41
33	80						80
34		17	12				29
35			10				10
36	5			26			31
37	7						7
38	27						27
39	15						15
40	6						6
42	11						11
43		12					12
44	8		4	9			21
45	30						30
46	38		6				44
47				20			20
48	1						1
49	5		9				14
50		2	8				10
51	24						24
53	1		25				26
TOTAL	357	204	594	535	681	520	2891

TABLE F55.2

Species represented in Feature 55 (Fragments)

Species	Layer 1	3	4	5	6	7	Total
Cattle	78	34	127	120	198	89	646
Sheep/Goat	71	59	131	122	157	134	674
Pig	23	14	53	45	32	19	186
Horse	10	3	28	14	21	9	85
Dog	1	2	9	4	7	15	38
Red Deer	1	-	-	-	3	-	4
Roe Deer	-	-	3	-	-	-	3
Hare	-	-	-	-	-	1	1
Unid. Large Mammal	30	20	113	119	206	170	658
Sheep-sized Mammal	63	41	105	90	54	75	428
Unid. Mammal	19	3	14	17	3	8	64
Unid. Bird	13	1	-	-	-	-	14
Hedgehog	-	1	-	-	-	-	1
Fox	-	-	-	1	-	-	1
Dog/Fox	-	-	-	3	-	-	3
Short-tailed Vole	2	-	-	-	-	-	2
Unid. Rodent	1	-	-	-	-	-	1
Frog	-	6	-	-	-	-	6
Toad	32	5	6	-	-	-	43
Amphibian	13	1	-	-	-	-	14
Rook/Crow	-	-	1	-	-	-	1
Jay	-	-	2	-	-	-	2
Buzzard	-	-	1	-	-	-	1
Lark species	-	14	-	-	-	-	14
Rabbit (Intrusive)	-	-	1	-	-	-	1
TOTAL	357	204	594	535	681	520	2891
Sheep	5	3	15	7	10	6	46
Goat	5	6	7	-	-	-	18

TABLE F55.3

Fragments of Major Species Represented in Feature 55

Cattle	F55-1	3	4	5	6	7	Total	%
				Layer				
Skull frags.	6	2	17	16	27	6	74	11
Mandible	14	7	17	20	49	17	124	12
Loose teeth	20	1	19	22	65	31	158	25
Scapula	5	4	13	9	4	2	37	6
Humerus	3	4	7	14	5	2	35	5
Radius	3	4	8	-	2	3	20	3
Ulna	1	-	5	1	4	1	12	2
Os Coxae	1	2	6	2	2	5	18	3
Femur	5	4	8	6	3	-	26	4
Patella	-	-	-	-	1	-	1	.2
Tibia	3	3	5	7	6	7	31	5
Calcaneus	-	-	2	6	4	1	13	2
Astragalus	1	-	1	-	1	2	5	.8
Centroquartal	-	-	-	2	1	1	4	.6
Other tarsals	-	-	-	-	-	1	1	.2
Metacarpal	4	-	5	5	3	3	20	3
Metatarsal	2	2	7	3	2	4	20	3
Metapodial	1	-	-	-	-	-	1	.2
1st Phalanx	3	-	-	-	7	1	11	2
2nd Phalanx	1	-	-	-	-	-	1	.2
Sesamoids	-	-	-	-	1	-	1	.2
Ribs	-	-	2	-	-	-	2	.3
Sternebrae	-	-	-	-	1	-	1	.2
Cervical verts.	4	1	1	2	1	1	10	2
Thoracic verts.	-	-	-	1	1	-	2	.3
Lumbar verts.	-	-	3	4	7	1	15	2
Sacrum	-	-	1	-	1	-	2	.3
Caudal verts.	1	-	-	-	-	-	1	.2
TOTAL	78	34	127	120	198	89	646	

Sheep/Goat	F55-1	3	Layer 4	5	6	7	Total	%
Skull frags.	5	7	14	13	6	4	49	7
Mandible	8	3	18	17	24	11	81	12
Hyoid	1	-	-	-	-	-	1	.1
Loose teeth	22	13	34	45	53	77	244	36
Scapula	2	-	2	3	2	1	10	2
Humerus	2	1	8	4	6	1	22	3
Radius	9	3	14	5	12	9	52	8
Ulna	1	1	3	1	5	-	11	2
Os Coxae	-	-	3	1	2	2	8	1
Femur	2	3	4	1	9	7	26	4
Tibia	6	8	14	14	17	4	63	9
Carpals	-	2	1	-	-	-	3	.4
Calcaneus	1	-	1	1	-	1	4	.6
Astragalus	-	2	-	-	1	-	3	.4
Metacarpal	1	3	4	3	1	2	14	2
Metatarsal	4	4	7	10	13	8	46	7
Metapodial	1	-	1	1	-	2	5	.7
1st Phalanx	3	3	1	2	2	3	14	2
2nd Phalanx	1	1	-	1	-	2	5	.7
Ribs	2	1	-	-	-	-	3	.4
Cervical verts.	-	1	1	-	1	-	3	.4
Thoracic verts.	-	1	1	-	2	-	4	.6
Lumbar verts.	-	2	-	-	1	-	3	.4
TOTAL	71	59	131	122	157	134	674	

Pig	F55-1	3	4	5	6	7	Total	%
Skull frags.	3	5	16	14	2	1	41	22
Mandible	4	2	11	11	9	2	39	21
Loose teeth	3	1	2	11	9	6	32	17
Scapula	2	3	3	1	1	4	14	8
Humerus	2	-	1	3	4	2	12	6
Radius	-	-	3	-	-	1	4	2
Ulna	-	2	1	-	-	1	4	2
Os Coxae	2	-	1	1	1	-	5	3
Femur	-	1	8	1	-	1	11	6
Tibia	1	-	4	1	-	-	6	3
Fibula	-	-	-	-	2	-	2	1
Calcaneus	-	-	-	-	-	1	1	.5
Astragalus	2	-	-	-	2	-	4	2
Other tarsals	-	-	-	-	1	-	1	.5
Metacarpal	1	-	-	-	-	-	1	.5
Lat.Metapodial	-	-	-	-	1	-	1	.5
1st Phalanx	2	-	1	1	-	-	4	2
Ribs	-	-	-	1	-	-	1	.5
Cervical verts.	-	-	1	-	-	-	1	.5
Lumbar verts.	1	-	1	-	-	-	2	1
TOTAL	23	14	53	45	32	19	186	

Horse	F55-1	3	Layer 4	5	6	7	Total
Skull frags.	1	-	2	-	-	-	3
Mandible	-	-	3	1	-	1	5
Loose teeth	3	1	2	1	9	3	19
Scapula	-	-	3	1	-	-	4
Humerus	1	-	1	1	-	-	3
Radius	-	1	1	2	-	1	5
Ulna	-	-	-	2	-	-	2
Os Coxae	1	-	1	2	2	1	7
Femur	-	-	2	-	-	-	2
Patella	-	-	-	1	-	-	1
Tibia	1	1	2	1	2	-	7
Carpals	-	-	3	-	-	-	3
Calcaneus	-	-	1	-	-	-	1
Astragalus	-	-	-	-	-	1	1
Other tarsals	-	-	2	-	-	-	2
Metacarpal	1	-	-	1	2	1	5
Metatarsal	-	-	2	-	1	-	3
Lat.Metapodial	1	-	1	-	-	-	2
1st Phalanx	1	-	-	-	1	-	2
2nd Phalanx	-	-	-	1	-	-	1
Ribs	-	-	1	-	2	-	3
Cervical verts.	-	-	-	-	2	-	2
Thoracic verts.	-	-	1	-	-	1	2
TOTAL	10	3	28	14	21	9	85

Dog	F55-1	3	4	5	6	7	Total
Skull frags.	-	-	2	-	-	4	6
Mandible	-	-	3	-	2	1	6
Loose teeth	-	1	-	-	1	7	9
Scapula	-	-	1	-	-	1	2
Humerus	-	-	2	-	-	-	2
Radius	-	-	-	1	-	-	1
Ulna	-	-	1	-	-	-	1
Os Coxae	-	-	-	2	-	-	2
Metacarpal	-	-	-	-	1	-	1
1st Phalanx	-	-	-	1	-	1	2
Ribs	-	-	-	-	2	1	3
Cervical verts.	-	-	-	-	1	-	1
Lumbar verts.	-	1	-	-	-	-	1
Caudal verts.	1	-	-	-	-	-	1
TOTAL	1	2	9	4	7	15	38

Unid. Large Mammal	Total
Skull and mandible frags.	116
Ribs	76
Vertebrae	34
Longbone frags.	105
Unid. frags.	327
Total	658

Sheep-sized Mammal	Total
Skull and mandible frags.	17
Ribs	84
Vertebrae	16
Longbone frags.	245
Unid. frags.	66
Total	428

TABLE F55.4

Summary Statistics

	Layer 1	3	4	5	6	7	Total
Total Fragments	357	204	594	535	681	520	2891
excluding rarer species	309	177	583	531	681	520	2801
% Unidentified Fragments	41	37	40	43	39	49	42
Overall Erosion Index	.13	.10	.08	.11	.02	.39	
Loose Teeth Index - major sp.	.26	.15	.16	.26	.33	.46	.28
% Gnawed Fragments	20	22	20	14	11	15	17
% Butchered Fragments	9	4	6	4	2	2	4
% Fragments of Major Species							
Cattle	42	30	36	39	47	34	40
Sheep/Goat	39	53	37	40	38	50	41
Pig	13	13	15	15	8	7	11
Horse	5	3	8	4	5	3	5
Dog	1	2	3	1	2	6	2
Red Deer	1	-	-	-	1	-	.2
Roe Deer	-	-	1	-	-	-	.2
Hare	-	-	-	-	-	.4	.1
Cattle Loose Teeth Index	.26	(.03)	.15	.18	.33	.35	.25
Cattle Longbone Frag. Index	.33	.27	.37	.31	.24	.18	.30
Sheep/Goat Loose Teeth Index	.31	.22	.26	.37	.34	.57	.36
S/G Longbone Frag. Index	.41	.52	.45	.41	.43	.23	.41

TABLE F75.1

Feature 75 Animal Bone Fragments in All Layers and Sections

Section	1	2	3	4	5	6	7	8	9	Total
1	18	29		85	83	50		110		375
2		9		87		4				100
3			2	29		41		10		82
4	35			14	1	8		40		98
5		10		102		22		86		220
6		33		180		107		20		340
8	11	2		226	137	123				499
9	2	17	32	18		40	11			120
10						2				2
11				32		7				39
12		11		7		3				21
14			8		17	70				95
15			52	47		104	18			221
16			17	11		26				54
17			9	10				14		33
18				32		8		31		71
19			7	26						33
20				19					1	20
21				33						33
22			3	28						31
23	3			40						43
24			8	32						40
25			5	4						9
TOTAL	69	111	143	1062	238	615	29	311	1	2579

TABLE F75.2

Species Represented in F75 by Layer (Fragments)

Species	Layer 1	2	3	4	5	6	7	8	9	Total
Cattle	14	19	45	223	47	206	10	37	–	601
Sheep/Goat	12	10	51	300	75	165	6	82	–	701
Pig	4	15	14	77	11	21	9	10	–	161
Horse	1	4	8	41	7	55	2	6	–	124
Dog	1	1	5	12	1	12	1	1	–	34
Red Deer	–	–	–	–	–	2	–	–	–	2
Roe Deer	–	–	–	–	–	1	–	–	–	1
Hare	–	–	–	1	–	–	–	1	–	2
Cat	–	–	–	2	–	–	–	–	–	2
Large Mammal	5	21	8	164	62	69	1	66	–	396
Sheep-sized M.	9	33	11	164	23	68	–	101	1	410
Unid. Mammal	2	2	1	22	4	14	–	7	–	52
Unid. Bird	1	–	–	–	–	–	–	–	–	1
Woodmouse	18	–	–	–	–	–	–	–	–	18
House Mouse	–	–	–	3	–	–	–	–	–	3
Common Shrew	–	–	–	1	–	–	–	–	–	1
Unid. Rodent	–	–	–	46	3	–	–	–	–	49
Toad	–	6	–	1	–	–	–	–	–	7
Amphibian	–	–	–	1	3	–	–	–	–	4
Dom. Fowl	2	–	–	3	2	–	–	–	–	7
Dom.Duck/Mallard		–	–	–	–	1	–	–	–	1
Raven	–	–	–	–	–	1	–	–	–	1
Rabbit (Intrusive)		–	–	1	–	–	–	–	–	1
TOTAL	69	111	143	1062	238	615	29	311	1	2579
Sheep	2	–	4	37	4	6	–	5	–	58
Goat	–	–	–	–	–	1	–	–	–	1

TABLE F75.3

Species Represented in F75 by Section (Fragments)

Species	Section 1	2	3	4	5	6	8	9	10	11	12	14
Cattle	40	8	9	13	24	24	148	61	2	16	7	41
Sheep/Goat	74	9	35	11	66	115	189	25	-	7	6	27
Pig	15	6	3	3	10	19	37	14	-	7	4	4
Horse	14	2	2	-	4	2	20	8	-	3	-	15
Dog	4	-	-	3	1	1	8	3	-	-	1	2
Red Deer	-	-	-	-	-	1	-	-	-	-	-	-
Roe Deer	-	-	-	-	-	-	-	-	-	-	-	-
Hare	1	-	-	-	-	1	-	-	-	-	-	-
Cat	-	-	-	-	-	-	2	-	-	-	-	-
Large Mammal	101	7	7	21	37	57	71	8	-	2	2	6
Sheep-sized M.	103	15	25	23	66	109	19	1	-	3	1	-
Unid. Mammal	13	6	1	3	4	11	2	-	-	-	-	-
Unid. Bird	-	-	-	1	-	-	-	-	-	-	-	-
Woodmouse	-	-	-	18	-	-	-	-	-	-	-	-
House Mouse	-	3	-	-	-	-	-	-	-	-	-	-
Common Shrew	1	-	-	-	-	-	-	-	-	-	-	-
Unid. Rodent	4	43	-	-	-	-	-	-	-	-	-	-
Toad	1	-	-	-	6	-	-	-	-	-	-	-
Amphibian	3	-	-	-	-	-	-	-	-	-	-	-
Domestic Fowl	-	-	-	2	2	-	3	-	-	-	-	-
Dom. Duck/Mallard	1	-	-	-	-	-	-	-	-	-	-	-
Raven	-	1	-	-	-	-	-	-	-	-	-	-
Rabbit(Intrusive)	-	-	-	-	-	-	-	-	-	1	-	-
TOTAL	375	100	82	98	220	340	499	120	2	39	21	95
Sheep	1	-	5	3	13	8	15	1	-	1	-	1
Goat	-	-	-	-	-	-	-	-	-	-	-	1

Species	15	16	17	18	19	20	21	22	23	24	25	Total
					Section							
Cattle	113	14	4	23	4	8	12	7	14	6	3	601
Sheep/Goat	46	27	8	18	7	3	5	8	8	6	1	701
Pig	14	3	2	2	5	-	3	3	6	1	-	161
Horse	33	3	1	1	-	-	3	2	3	7	1	124
Dog	2	4	-	3	1	-	-	1	-	-	-	34
Red Deer	-	1	-	-	-	-	-	-	-	-	-	2
Roe Deer	-	1	-	-	-	-	-	-	-	-	-	1
Hare	-	-	-	-	-	-	-	-	-	-	-	2
Cat	-	-	-	-	-	-	-	-	-	-	-	2
Large Mammal	11	-	12	10	6	6	2	8	7	14	1	396
Sheep-sized M.	2	1	2	11	9	3	6	-	8	6	1	410
Unid. Mammal	-	-	3	3	1	-	-	2	1	-	2	52
Unid. Bird	-	-	-	-	-	-	-	-	-	-	-	1
Woodmouse	-	-	-	-	-	-	-	-	-	-	-	18
House Mouse	-	-	-	-	-	-	-	-	-	-	-	3
Common Shrew	-	-	-	-	-	-	-	-	-	-	-	1
Unid. Rodent	-	-	1	-	-	-	1	-	-	-	-	49
Toad	-	-	-	-	-	-	-	-	-	-	-	7
Amphibian	-	-	-	-	-	-	1	-	-	-	-	4
Domestic Fowl	-	-	-	-	-	-	-	-	-	-	-	7
Dom. Duck/Mallard	-	-	-	-	-	-	-	-	-	-	-	1
Raven	-	-	-	-	-	-	-	-	-	-	-	1
Rabbit (Intrusive)	-	-	-	-	-	-	-	-	-	-	-	1
TOTAL	221	54	33	71	33	20	33	31	43	40	9	2579
Sheep	1	3	-	2	1	-	-	-	2	1	-	58
Goat	-	-	-	-	-	-	-	-	-	-	-	1

TABLE F75.4

Fragments of Major Species Represented in F75 (by Layer)

Cattle	F75-1	2	3	Layer 4	5	6	7	8	Total	%
Skull frags.	1	2	1	29	7	4	-	2	46	7
Mandible	3	6	4	27	2	20	1	3	66	11
Hyoid	-	-	-	-	1	-	-	-	1	.2
Loose teeth	4	2	11	37	13	71	3	11	152	25
Scapula	1	1	2	17	3	17	1	4	46	7
Humerus	-	1	4	6	5	11	-	1	28	5
Radius	-	-	2	11	-	6	1	1	21	3
Ulna	-	-	1	8	3	7	-	-	19	3
Os Coxae	1	3	4	5	2	2	-	1	18	3
Femur	-	1	1	9	1	7	-	3	22	4
Patella	-	-	-	1	-	1	-	-	2	.3
Tibia	1	-	3	13	-	14	1	1	33	5
Carpals	-	-	1	-	-	1	-	-	2	.3
Calcaneus	-	1	2	4	-	8	-	1	16	3
Astragalus	-	-	-	6	-	5	-	-	11	2
Centroquartal	-	-	1	1	1	4	-	-	7	1
Other tarsals	-	-	-	1	-	1	-	-	2	.3
Metacarpal	-	2	1	8	1	3	-	1	16	3
Metatarsal	1	-	2	15	2	7	-	4	31	5
Metapodial	-	-	-	1	-	1	-	-	2	.3
1st Phalanx	2	-	1	6	1	10	2	-	22	4
2nd Phalanx	-	-	-	-	-	1	-	1	2	.3
3rd Phalanx	-	-	-	-	-	1	-	1	2	.3
Ribs	-	-	1	-	-	-	-	1	2	.3
Cervical verts.	-	-	1	8	-	2	1	-	12	2
Thoracic verts.	-	-	-	3	2	1	-	-	6	1
Lumbar verts.	-	-	2	5	2	1	-	1	11	2
Sacrum	-	-	-	2	1	-	-	-	3	.5
TOTAL	14	19	45	223	47	206	10	37	601	

Sheep/Goat	F75-1	2	3	4	5	6	7	8	Total	%
Skull frags.	-	1	1	28	1	4	-	1	36	5
Mandible	3	-	7	38	10	12	-	4	74	11
Hyoid	1	1	-	-	1	-	-	-	3	.4
Loose teeth	4	5	27	102	37	94	6	38	313	45
Scapula	-	-	-	5	-	-	-	1	6	1
Humerus	-	-	3	14	3	1	-	5	26	4
Radius	-	1	2	13	4	9	-	6	35	5
Ulna	-	-	-	5	-	3	-	1	9	1
Os Coxae	1	-	2	5	1	5	-	1	15	2
Femur	-	-	-	13	1	1	-	1	16	2
Patella	-	-	-	-	-	1	-	-	1	.1
Tibia	1	-	3	28	5	12	-	5	54	8
Carpals	-	-	-	-	1	1	-	-	2	.3
Calcaneus	1	-	-	2	-	3	-	1	7	1
Astragalus	-	-	2	1	1	1	-	1	6	1
Centroquartal	-	-	-	-	-	-	-	1	1	.1
Metacarpal	-	1	-	10	1	3	-	4	19	3
Metatarsal	-	-	1	11	4	7	-	3	26	4
Metapodial	-	-	-	1	-	-	-	-	1	.1
1st Phalanx	-	1	-	1	-	3	-	1	6	1
2nd Phalanx	-	-	1	2	-	-	-	1	4	.6
Sesamoids	-	-	-	1	-	-	-	-	1	.1
Ribs	-	-	1	4	1	2	-	3	11	2
Cervical verts.	-	-	1	11	3	2	-	2	19	3
Thoracic verts.	1	-	-	3	-	1	-	1	6	1
Lumbar verts.	-	-	-	2	-	-	-	1	3	.4
Sacrum	-	-	-	-	1	-	-	-	1	.1
TOTAL	12	10	51	300	75	165	6	82	701	

Pig	F75-1	2	3	4	5	6	7	8	Total	%
Skull frags.	1	6	-	1	1	2	-	-	11	7
Mandible	1	1	1	12	2	6	1	1	25	16
Loose teeth	1	1	7	17	1	7	6	3	43	27
Scapula	-	-	1	2	-	-	-	-	3	2
Humerus	-	-	1	9	1	2	1	-	14	9
Radius	-	-	-	2	-	-	-	-	2	1
Ulna	-	1	1	2	1	1	1	-	7	4
Os Coxae	-	1	-	3	-	-	-	-	4	2
Femur	-	-	-	3	1	-	-	-	4	2
Tibia	-	1	1	4	1	-	-	1	8	5
Fibula	-	-	-	1	-	-	-	1	2	1
Carpals	1	-	-	-	-	-	-	-	1	.6
Calcaneus	-	2	-	1	1	-	-	1	5	3
Astragalus	-	-	-	1	-	1	-	-	2	.6
Metacarpal	-	-	-	4	-	-	-	-	4	2
Metatarsal	-	-	1	3	-	-	-	-	4	2
Lat.Metapodial	-	-	-	4	-	-	-	1	5	3
1st Phalanx	-	-	-	2	2	1	-	2	7	4
2nd Phalanx	-	-	1	2	-	-	-	-	3	2
3rd Phalanx	-	-	-	1	-	-	-	-	1	.6
Ribs	-	-	-	1	-	-	-	-	1	.6
Cervical verts.	-	-	-	-	-	1	-	-	1	.6
Thoracic verts.	-	1	-	1	-	-	-	-	2	1
Lumbar verts.	-	1	-	1	-	-	-	-	2	1
TOTAL	4	15	14	77	11	21	9	10	161	

Horse	F75-1	2	3	4	5	6	7	8	Total	%
Skull frags.	1	-	-	5	1	1	-	-	8	6
Mandible	-	1	-	1	-	1	-	1	4	3
Loose teeth	-	-	1	12	-	9	-	1	23	19
Scapula	-	-	1	1	-	-	-	-	2	2
Humerus	-	-	1	2	-	5	-	1	9	7
Radius	-	-	2	2	1	3	1	-	9	7
Ulna	-	-	-	1	1	1	-	-	3	2
Os Coxae	-	1	1	3	1	1	-	-	7	6
Femur	-	-	-	-	-	3	-	-	3	2
Tibia	-	1	-	2	-	5	-	-	8	6
Calcaneus	-	-	-	-	-	3	-	-	3	2
Astragalus	-	-	-	2	-	1	-	-	3	2
Other tarsals	-	-	-	-	1	4	-	-	5	4
Metacarpal	-	-	-	-	1	4	-	-	5	4
Metatarsal	-	1	-	7	-	2	-	1	11	9
Lat.Metapodial	-	-	-	1	-	2	-	2	5	4
Metapodial	-	-	-	-	-	1	-	-	1	1
1st Phalanx	-	-	1	2	-	3	1	-	7	6
2nd Phalanx	-	-	-	-	-	2	-	-	2	2
Cervical verts.	-	-	-	-	-	3	-	-	3	2
Thoracic verts.	-	-	-	-	1	1	-	-	2	2
Sacrum	-	-	1	-	-	-	-	-	1	1
TOTAL	1	4	8	41	7	55	2	6	124	

Dog	F75-1	2	3	4	5	6	7	8	Total
Skull frags.	-	-	-	1	-	1	-	-	2
Mandible	-	-	-	2	-	5	-	-	7
Loose teeth	-	1	1	2	-	2	-	-	6
Radius	-	-	-	1	-	1	-	1	3
Os Coxae	-	-	-	-	-	1	-	-	1
Femur	-	-	-	1	-	-	-	-	1
Tibia	-	-	-	1	-	-	1	-	2
Calcaneus	-	-	1	-	-	-	-	-	1
Astragalus	1	-	-	-	-	-	-	-	1
Metacarpal	-	-	-	1	-	-	-	-	1
Metatarsal	-	-	3	1	-	-	-	-	4
Metapodial	-	-	-	1	1	-	-	-	2
1st Phalanx	-	-	-	1	-	-	-	-	1
Ribs	-	-	-	-	-	2	-	-	2
TOTAL	1	1	5	12	1	12	1	1	34

Unid. Large Mammal	Total
Skull and mandible frags.	40
Ribs	48
Vertebrae	41
Longbone frags.	73
Unid. frags.	194
Total	396

Sheep-sized Mammal	Total
Skull and mandible frags.	3
Ribs	86
Vertebrae	36
Longbone frags.	236
Unid frags.	49
Total	410

TABLE F75.5

F75 Summary Statistics (by Layer)

	Layer 1	2	3	4	5	6	7	8	9	Total
Total Fragments	69	111	143	1062	238	615	29	311	1	2579
ex.rarer species	49	105	143	1006	230	613	29	311	1	2487
% Unid. Fragments	(35)	53	14	35	39	25	(3)	55	(100)	35
Erosion Index	(.09)	(.44)	(.06)	.37	.31	.84	(.57)	1.32		
Loose Teeth Index	(.28)	(.18)	.38	.26	.36	.40	(.59)	.39		.32
% Gnawed Fragments	(17)	(15)	(29)	18	21	16	(29)	8		18
% Butchered Frags.	(13)	(10)	(9)	7	7	5	(7)	5		7
% Fragments of Major Species										
Cattle	(44)	(39)	36	34	33	45	(34)	27		37
Sheep/Goat	(36)	(20)	41	46	53	36	(21)	60		43
Pig	(13)	(31)	11	12	8	5	(31)	7		10
Horse	(3)	(8)	6	6	5	12	7	4		8
Dog	(3)	(2)	4	2	1	3	(3)	1		2
Red Deer	-	-	-	-	-	.4	-	-		.1
Roe Deer	-	-	-	-	-	.2	-	-		.1
Hare	-	-	-	.2	-	-	-	-		.1
Cat	-	-	-	.3	-	-	-	-		.1

	Layers 1-4	Layers 5-8	Total
Cattle Loose Teeth Index	.18	.33	.25
Cattle Longbone Frag. Index	.40	.32	.36
Sheep/Goat Loose Teeth Index	.37	.53	.45
S/G Longbone Frag. Index	.38	.25	.32

TABLE F75.6

F75 Summary Statistics (by Sections)

	Section 1	5	6	8	9	15
Total Fragments	375	220	340	499	120	221
ex. rarer species	365	212	340	496	120	221
% Unid. Fragments	59	50	52	19	8	6
Erosion Index	.66	.98	.86	.06	.21	.44
Loose Teeth Index	.31	.19	.25	.37	.47	.42
% Gnawed Fragments	7	11	11	22	24	24
% Butchered Fragments	5	6	4	13	14	4
% Fragments of Major Species						
Cattle	27	23	15	37	55	54
Sheep/Goat	50	63	71	47	23	22
Pig	10	10	12	9	13	7
Horse	9	4	1	5	7	16
Dog	3	1	1	2	3	1
Red Deer	-	-	1	-	-	-
Hare	1	-	1	-	-	-
Cat	-	-	-	1	-	-

TABLE F132.1

Feature 132 Animal Bone Fragments in all Layers and Sections

Section	Layer 1	2	3	4	5	6	7	Total
1	26					34		60
18	16							16
23						24		24
25	17	152	159			241	55	624
26		347			24	333	142	846
27	35	373		285		146	132	971
TOTAL	94	872	159	285	24	778	329	2541

TABLE F132.2

Species represented in Feature 132 (Fragments)

Species	Layer 1	2	3	4	5	6	7	Total
Cattle	14	248	45	50	8	179	61	605
Sheep/Goat	27	170	25	55	1	198	64	540
Pig	6	102	19	33	7	62	10	239
Horse	-	17	4	5	2	21	11	60
Dog	1	11	1	2	-	20*	-	35
Red Deer	-	-	-	-	-	-	1	1
Hare	-	-	-	-	-	-	1	1
Unid. Large Mammal	14	154	46	72	3	162	104	555
Sheep-sized Mamm.	19	131	19	57	2	116	70	414
Unid. Mammal	2	12	-	7	1	14	6	42
Unid. Bird	-	2	-	1	-	-	1	4
Fox	-	1	-	-	-	-	-	1
Dog/Fox	-	1	-	-	-	-	-	1
Mole	-	-	-	-	-	1	-	1
Unid. Rodent	-	5	-	2	-	3	-	10
Toad	9	16	-	-	-	-	-	25
Amphibian	-	-	-	-	-	1	-	1
Unid. Fish	2	-	-	-	-	-	-	2
Domestic Fowl	-	-	-	1	-	-	-	1
Rook/Crow	-	1	-	-	-	1	-	2
Raven	-	1	-	-	-	-	-	1
TOTAL	94	872	159	285	24	778	329	2541
Sheep	8	18	1	8	-	7	3	45
Goat	-	2	-	-	-	1	-	3

* includes 14 articulated bones.

TABLE F132.3

Fragments of Major Species Represented in F132 (by Layer)

Cattle	F132-1	2	3	Layer 4	5	6	7	Total	%
Skull frags.	5	65	9	14	1	40	6	140	23
Mandible	-	33	10	4	3	28	14	92	15
Hyoid	-	-	-	-	-	1	-	1	.2
Loose teeth	2	47	10	8	1	50	17	135	22
Scapula	-	17	1	1	1	3	1	24	4
Humerus	-	10	2	6	-	4	3	25	4
Radius	1	5	2	1	-	3	1	13	2
Ulna	-	3	2	1	-	5	1	12	2
Os Coxae	1	7	1	2	2	5	3	21	3
Femur	1	6	2	1	-	1	-	11	2
Patella	-	-	-	-	-	-	1	1	.2
Tibia	-	6	-	1	-	6	-	13	2
Carpals	1	4	-	1	-	2	2	10	2
Calcaneus	-	3	-	-	-	-	-	3	.5
Astragalus	-	1	-	-	-	1	1	3	.5
Centroquartal	-	2	-	-	-	2	-	4	1
Other tarsals	-	1	-	-	-	-	-	1	.2
Metacarpal	-	6	2	-	-	4	4	16	3
Metatarsal	2	8	2	5	-	8	1	26	4
Metapodial	-	3	-	1	-	2	-	6	1
1st Phalanx	-	6	-	2	-	4	2	14	2
2nd Phalanx	-	-	-	-	-	1	1	2	.3
3rd Phalanx	-	-	-	-	-	-	-	-	-
Sesamoids	-	1	-	-	-	1	-	2	.3
Ribs	-	1	-	-	-	-	-	1	.2
Cervical verts.	1	3	-	2	-	6	2	14	2
Thoracic verts.	-	7	2	-	-	2	-	11	2
Lumbar verts.	-	2	-	-	-	-	-	2	.3
Sacrum	-	-	-	-	-	-	1	1	.2
Caudal verts.	-	1	-	-	-	-	-	1	.2
TOTAL	14	248	45	50	8	179	61	605	

Sheep/Goat F132-1	1	2	3	Layer 4	5	6	7	Total	%
Skull frags.	4	21	1	4	-	9	1	40	7
Mandible	3	28	5	2	1	42	6	87	16
Hyoid	-	-	-	-	-	2	-	2	.4
Loose teeth	4	49	6	8	-	88	42	197	36
Scapula	-	3	-	2	-	-	2	7	1
Humerus	1	5	1	1	-	5	2	15	3
Radius	1	10	2	3	-	7	-	23	4
Ulna	1	4	1	1	-	1	1	9	2
Os Coxae	-	2	-	-	-	2	1	5	1
Femur	1	4	1	2	-	9	-	17	3
Patella	1	1	-	1	-	-	-	3	.5
Tibia	2	18	3	2	-	13	2	40	7
Carpals	1	1	-	1	-	-	-	3	.5
Calcaneus	-	-	-	1	-	-	1	2	.4
Astragalus	1	3	-	3	-	-	-	7	1
Centroquartal	-	1	-	1	-	-	-	2	.4
Metacarpal	2	3	1	1	-	9	2	18	3
Metatarsal	2	9	2	3	-	5	3	24	4
Metapodial	-	-	-	-	-	1	-	1	.2
1st Phalanx	1	2	-	7	-	2	1	13	2
2nd Phalanx	-	1	-	3	-	1	-	5	1
3rd Phalanx	-	-	-	3	-	-	-	3	1
Ribs	-	1	-	1	-	1	-	3	1
Cervical verts.	2	-	1	4	-	-	-	7	1
Thoracic verts.	-	2	1	-	-	-	-	3	1
Lumbar verts.	-	2	-	1	-	-	-	3	1
Sacrum	-	-	-	-	-	1	-	1	.2
TOTAL	27	170	25	55	1	198	64	540	

				Layer					
Pig	F132-1	2	3	4	5	6	7	Total	%
Skull frags.	-	13	2	7	-	3	-	25	10
Mandible	-	22	5	3	4	11	-	45	19
Loose teeth	3	24	3	4	-	19	5	58	24
Scapula	-	2	1	2	-	5	-	10	4
Humerus	-	5	1	2	-	4	-	12	5
Radius	-	1	-	1	-	-	-	2	1
Ulna	-	7	-	2	-	4	2	15	6
Os Coxae	-	1	-	-	-	-	-	1	.4
Femur	-	2	3	2	-	2	1	10	4
Tibia	2	3	1	1	1	5	-	13	5
Fibula	-	3	-	1	-	-	-	4	2
Calcaneus	-	2	-	-	-	1	-	3	1
Astragalus	-	2	-	-	-	-	-	2	1
Metacarpal	-	1	-	-	-	1	-	2	1
Metatarsal	1	1	-	-	-	2	-	4	2
Lat. Metapodial	-	2	-	-	-	-	-	2	1
Metapodial	-	2	-	1	-	-	-	3	1
1st Phalanx	-	-	1	4	1	2	2	10	4
2nd Phalanx	-	2	-	2	-	2	-	6	3
3rd Phalanx	-	-	1	-	-	-	-	1	.4
Ribs	-	4	-	1	-	1	-	6	3
Cervical verts.	-	1	1	-	-	-	-	2	1
Lumbar verts.	-	2	-	-	1	-	-	3	1
TOTAL	6	102	19	33	7	62	10	239	

Horse	F132-2	3	4	5	6	7	Total
Skull frags.	1	-	1	-	-	-	2
Mandible	1	-	-	-	1	-	2
Loose teeth	2	-	1	1	1	1	6
Humerus	1	-	-	-	-	-	1
Os Coxae	-	-	1	-	-	-	1
Patella	-	-	-	-	2	-	2
Tibia	1	-	-	-	3	-	4
Carpals	-	2	1	-	1	-	4
Calcaneus	1	-	1	-	2	1	5
Astragalus	1	1	-	-	1	1	4
Other tarsals	2	-	-	-	3	2	7
Metacarpal	-	-	-	1	-	-	1
Metatarsal	2	-	-	-	-	1	3
Lat. Metapodial	1	-	-	-	2	2	5
Metapodial	1	-	-	-	-	-	1
1st Phalanx	1	-	-	-	1	1	3
2nd Phalanx	-	1	-	-	1	2	4
Ribs	1	-	-	-	1	-	2
Cervical verts.	1	-	-	-	2	-	3
TOTAL	17	4	5	2	21	11	60

Dog	F132-1	2	3	4	6	Total
Skull frags.	-	3	-	1	-	4
Mandible	-	3	-	-	-	3
Loose teeth	1	2	-	-	1	4
Humerus	-	-	1	-	-	1
Os Coxae	-	-	-	-	1*	1
Femur	-	-	-	-	1*	1
Tibia	-	-	-	-	3*	3
Carpals	-	1	-	-	-	1
Calcaneus	-	-	-	-	2*	2
Other tarsals	-	-	-	1	-	1
Metacarpal	-	-	-	-	1	1
Metatarsal	-	-	-	-	7*	7
1st Phalanx	-	-	-	-	3*	3
Ribs	-	1	-	-	1	2
Lumbar verts.	-	1	-	-	-	1
TOTAL	1	11	1	2	20	35

* includes articulated bones.

Unid. Large Mammal	Total
Skull & mandible frags.	94
Ribs	87
Vertebrae	39
Longbone fragments	110
Unid. fragments	225
Total	555

Sheep-sized Mammal	Total
Skull & mandible frags.	16
Ribs	74
Vertebrae	19
Longbone fragments	216
Unid. fragments	89
Total	414

TABLE F132.4

F132 Summary Statistics (by Layer)

	Layer 1	2	3	4	5	6	7	Total
Total Fragments	94	872	159	285	24	778	329	2541
ex.rarer species	83	847	159	282	24	772	329	2496
+ ex.articulated bones						758		2482
% Unid. Fragments	(40)	35	41	49		39	55	41
Erosion Index	(.10)	.12	.10	.37		.60	1.39	.44
Loose Teeth Index		.23	(.20)	.14		.34	.45	.27
% Gnawed Fragments		16	(20)	15		7	(9)	13
% Butchered Frags.		13	(4)	12		4	(1)	9
% Fragments of Major Species								
Cattle		45	(48)	34		39	41	41
Sheep/Goat		31	(27)	38		43	43	37
Pig		19	(20)	23		13	7	16
Horse		3	(4)	3		5	7	4
Dog		2	(1)	1		1	-	2
Red Deer		-	(-)	-		-	1	.1
Hare		-	(-)	-		-	1	.1
Cattle Loose Teeth Index		.19				.27		.22
Cattle Longbone Frag. Index		.21				.20		.26
Sheep/Goat Loose Teeth Index		.29				.44		.36
S/G Longbone Frag. Index		.36				.35		.37

TABLE F133.1

Feature 133 Animal Bone Fragments in all Layers and Sections

	Layer								
Section	1	2	3	4	5	6	7	8	Total
1	19	111	50						180
2		160		70				150	380
3		362		292				37	691
2/3		183							183
4	33	290		52				26	401
5			11	206			425	6	648
6	1	37		178			11		227
7	1	35		32				19	87
8				20				30	50
9	100	162		63	457		12	55	849
10	26	20		610	139	103	56		954
11		63	6	83	49		274	38	513
12	90	6		19	293		143	66	617
13	263	82		235		239	77	45	941
14	100	182		190		453	152	35	1112
15	216	214		156		390	79	20	1075
16		24	193	113		790	70	3	1193
17	10	55		590		313	106	22	1096
18			117	956		531	25	41	1670
19			38	597		752	122	25	1534
20			27	432		1205	264	12	1940
21	4	22		669		369	176	3	1243
22	5	146		473		245	70	48	987
23			31	252	331		73	51	738
24				14	24		352	40	430
TOTAL	868	2154	473	6302	1293	5390	2487	772	19739

TABLE F133.2

Species represented in Feature 133 (Fragments)

Species	Layer 1	2	3	4	5	6	7	8	Total
Cattle	154	489	82	1112	189	699	374	115	3214
Sheep/Goat	137	458	76	1033	200	858*	457	173	3392
Pig	89	219	41	475	53	132	92	42	1143
Horse	14	118*	13	161*	25	188*	55	14	588
Dog	192*	39	11	134*	23	241*	50	20*	710
Red Deer	-	-	-	2	1	-	1	-	4
Roe Deer	-	-	-	1	3	-	-	3	7
Hare	1	-	-	1	2	1	1	-	6
Unid.Large Mammal	103	419	120	1984	398	1706	741	200	5671
Sheep-sized Mam.	100	316	84	1047	276	1302	595	163	3883
Unid. Mammal	41	64	13	261	104	223	105	38	849
Unid. Bird	1	2	1	14	4	9	3	1	35
Dog/Fox	-	2	-	-	-	-	-	-	2
Badger	-	-	-	-	1	-	1	-	2
Hedgehog				1					1
Weasel	3	-	-	-	-	1	-	-	4
Mole	-	-	-	-	-	-	1	-	1
Common Shrew	-	-	-	1	-	-	-	-	1
Short-tailed Vole	1	-	2	2	-	1	1	1	8
Mouse sp.	-	-	-	-	-	1	-	-	1
Unid. Rodent	17	15	2	36	5	10	4	1	90
Frog	-	-	-	8	-	2	1	-	11
Toad	-	2	27*	-	2	2	-	1	34
Amphibian	1	-	1	3	-	-	1	-	6
Common Eel	-	-	-	1	-	-	-	-	1
Domestic Fowl	10*	3	-	9	4	9	-	-	35
Goose sp.	-	-	-	1	-	-	1	-	2
Teal	1	-	-	-	-	-	-	-	1
Woodcock	2	-	-	-	-	-	-	-	2
Pigeon sp.	-	-	-	-	-	-	2	-	2
Thrushes	1	1	-	5	2	1	-	-	10
Redwing	-	1	-	-	-	-	-	-	1
Starling	-	-	-	-	-	1	-	-	1
House Sparrow	-	3	-	-	-	1	-	-	4
Bunting	-	2	-	-	-	-	-	-	2
Raven	-	-	-	1	-	-	1	-	2
Rook/Crow	-	1	-	9	1	1	-	-	12
Rabbit(Intrusive)	-	-	-	-	-	1	-	-	1
TOTAL	868	2154	473	6302	1293	5390	2487	772	19739
Sheep	15	53	3	59	6	56*	13	6	211
Goat	-	-	-	5	-	1	-	-	6

* includes large groups of articulated bones.

TABLE F133.3

F133 Summary Statistics (By Layer)

	Layer 1	2	3	4	5	6	7	8	Total
Total Fragments	868	2154	473	6302	1293	5390	2487	772	19739
ex.rarer species	832	2124	441	6225	1278	5359	2474	769	19515
+ ex.articulated bones	658	2063	441	6126	1278	5120	2474	762	18922
% Unid. Fragments	37	39	49	54	61	63	58	53	55
Erosion Index	.06	.08	.03	.24	.56	.59	1.04	1.42	.47
Loose Teeth Index	.26	.27	.24	.32	.34	.45	.48	.51	.37
% Gnawed Fragments	18	22	19	15	8	11	12	8	15
% Butchered Frags.	6	9	8	6	2	2	3	3	5
% Burnt Fragments	1	1	14	11	2	1	1	.4	5
% Fragments of Major Species									
Cattle	37	39	37	39	38	37	36	32	38
Sheep/Goat	33	36	34	37	40	44	44	48	39
Pig	22	17	18	17	11	7	9	12	13
Horse	3	4	6	4	5	8	5	4	5
Dog	4	3	5	3	5	4	5	4	4
Red Deer	-	-	-	.1	.2	-	.1	-	.
Roe Deer	-	-	-	.1	1	-	-	1	.
Hare	.2	-	-	.1	.4	.1	.1	-	.

	Layers 1-2	3-4	5-6	7-8	Tota
Cattle Loose Teeth Index	.25	.27	.33	.42	.30
Cattle Longbone Fragmentation I.	.27	.23	.22	.22	.24
Cattle Metapodial Frag. Index	.26	.24	.21	.31	.25
Sheep/Goat Loose Teeth Index	.28	.39	.57	.60	.47
S/G Longbone Fragmentation Index	.30	.29	.28	.25	.28
S/G Metapodial Frag. Index	.40	.29	.27	.30	.31

TABLE F133-1.1

Fragments of Major Species Represented in Feature 133-1

	Cattle	%	Sheep/G	%	Pig	Horse	Artic. Dog	Other Dog
Skull frags.	44	28	30	22	16	1	1	4
Mandible	17	11	22	16	14	1	2	-
Hyoid	-	-	-	-	-	-	2	-
Loose teeth	31	20	33	24	30	1	2	11
Scapula	9	6	2	1	1	-	2	-
Humerus	3	2	2	1	3	1	2	-
Radius	4	3	4	3	1	-	2	-
Ulna	-	-	1	1	3	-	2	-
Os Coxae	5	3	2	1	2	-	2	-
Femur	2	1	2	1	1	1	1	-
Patella	-	-	2	1	-	-	1	-
Tibia	1	1	6	4	3	1	2	2
Fibula	-	-	-	-	-	-	1	-
Carpals	2	1	2	1	3	-	6	-
Calcaneus	1	1	2	1	1	1	2	-
Astragalus	2	1	5	4	1	-	2	-
Centroquartal	4	3	-	-	-	-	-	-
Other tarsals	1	1	-	-	1	-	12	-
Metacarpal	3	2	2	1	-	3	10	-
Metatarsal	4	3	7	5	-	-	8	-
Lat. Metapodial	-	-	-	-	-	2	-	-
1st Phalanx	2	1	7	5	2	-	16	-
2nd Phalanx	2	1	2	1	2	1	12	-
3rd Phalanx	1	1	-	-	2	-	11	-
Sesamoids	-	-	-	-	-	-	12	-
Ribs	2	1	-	-	-	1	26	-
Costal carts.	-	-	-	-	-	-	13	-
Cervical verts.	9	6	1	1	2	-	6	1
Thoracic verts.	2	1	-	-	1	-	13	-
Lumbar verts.	3	2	2	1	-	-	2	-
Caudal verts.	-	-	1	1	-	-	2	-
Sternum	-	-	-	-	-	-	1	-
TOTAL	154		137		89	14	174	18

Unid.Large Mammal	Total
Skull and mandible	19
Ribs	12
Vertebrae	10
Longbone fragments	18
Unid. fragments	44
TOTAL	103

Sheep-sized Mammal	Total
Skull and mandible	14
Ribs	18
Vertebrae	8
Longbone fragments	37
Unid. fragments	23
TOTAL	100

TABLE F133-2.1

Fragments of Major Species Represented in Feature 133-2

	Cattle	%	Sheep/G	%	Pig	%	Artic. Horse	Other Horse	Dog
Skull frags.	85	17	67	15	22	10	-	1	-
Mandible	99	20	54	12	48	22	-	4	4
Loose teeth	128	26	136	30	55	25	-	15	7
Scapula	16	3	1	.2	6	3	-	3	-
Humerus	18	4	16	3	14	6	-	1	-
Radius	15	3	23	5	4	2	-	1	3
Ulna	6	1	1	.2	5	2	-	-	2
Os Coxae	14	3	7	2	7	3	-	1	2
Femur	15	3	14	3	10	5	-	1	3
Patella	1	.2	-	-	1	.4	-	-	1
Tibia	11	2	41	9	15	7	-	3	3
Carpals	1	.2	1	.2	2	1	-	1	-
Calcaneus	2	.4	2	.4	1	.4	-	1	-
Astragalus	6	1	4	1	2	1	-	1	-
Centroquartal	3	1	3	1	-	-	-	-	-
Other tarsals	1	.2	-	-	-	-	2	-	-
Metacarpal	19	4	14	3	2	1	-	4	-
Metatarsal	18	4	26	6	1	.4	-	1	7
Lat. Metapodial	-	-	-	-	2	1	2	3	-
Metapodial	1	.2	4	1	1	.4	-	1	1
1st Phalanx	9	2	15	3	8	4	1	3	3
2nd Phalanx	2	.4	7	2	6	3	1	2	-
3rd Phalanx	-	-	5	1	1	.4	1	1	-
Sesamoids	1	.2	-	-	-	-	-	1	-
Ribs	3	1	7	2	1	.4	14	2	1
Cervical verts.	6	1	1	.2	2	1	-	6	-
Thoracic verts.	2	.4	3	.6	2	1	30	-	1
Lumbar verts.	3	1	5	1	1	.4	9	-	1
Sacrum	2	.4	1	.2	-	-	1	-	-
Caudal verts.	2	.4	-	-	-	-	-	-	-
TOTAL	489		458		219		61	57	39

Unid. Large Mammal	Total
Skull and Mandible	86
Ribs	53
Vertebrae	29
Longbone fragments	51
Unid. fragments	200
TOTAL	419

Sheep-sized Mammal	Total
Skull and Mandible	16
Ribs	47
Vertebrae	28
Longbone fragments	137
Unid. fragments	88
TOTAL	316

TABLE F133-3.1

Fragments of Major Species Represented in Feature 133-3

	Cattle	Sheep/G	Pig	Horse	Dog
Skull frags.	17	9	8	-	-
Mandible	10	9	11	1	1
Loose teeth	14	26	6	7	-
Scapula	7	2	1	-	-
Humerus	4	4	1	-	-
Radius	5	3	1	1	1
Ulna	1	1	2	-	-
Os Coxae	2	1	-	-	-
Femur	2	1	-	1	-
Tibia	1	4	-	-	1
Carpals	-	2	-	-	-
Astragalus	2	-	-	-	-
Other tarsals	-	1	-	1	-
Metacarpal	5	4	1	-	2
Metatarsal	4	3	-	-	2
Lat. Metapodial	-	-	1	-	-
Metapodial	-	1	-	-	-
1st Phalanx	-	3	7	-	1
2nd Phalanx	1	-	2	-	-
3rd Phalanx	1	-	-	-	-
Ribs	-	-	-	-	2
Cervical verts.	-	1	-	-	-
Thoracic verts.	1	1	-	2	-
Lumbar verts.	4	-	-	-	-
Sacrum	1	-	-	-	-
Sternum	-	-	-	-	1
TOTAL	82	76	41	13	11

Unid. Large Mammal	Total	Sheep-Sized Mammal	Total
Skull and Mandible	20	Skull and Mandible	4
Ribs	14	Ribs	13
Vertebrae	4	Vertebrae	3
Longbone fragments	26	Longbone fragments	37
Unid. fragments	56	Unid. fragments	27
TOTAL	120	TOTAL	84

TABLE F133-4.1

Fragments of Major Species Represented in Feature 133-4

	Cattle	%	Sheep/G	%	Pig	%	Art. Horse	Other Horse	%	Art. Dog	Oth. Dog
Skull frags.	171	15	81	7	71	15	-	5	4	-	3
Mandible	172	15	153	14	79	17	-	11	9	-	3
Hyoid	1	.1	3	.3	-	-	-	-	-	-	-
Loose teeth	310	28	406	39	131	28	-	30	24	-	23
Scapula	48	4	8	1	26	5	-	5	4	-	1
Humerus	33	3	36	3	29	6	-	2	2	1	2
Radius	28	3	52	5	10	2	-	4	3	2	4
Ulna	14	1	5	.5	9	2	-	2	2	-	4
Os Coxae	21	2	11	1	12	3	-	2	2	-	2
Femur	35	3	21	2	21	4	-	5	4	-	2
Patella	3	.3	1	.1	1	.2	-	1	1	-	-
Tibia	31	3	88	9	24	5	-	4	3	-	5
Fibula	-	-	-	-	4	1	-	-	-	-	-
Carpals	16	1	4	.4	2	.4	-	7	6	-	-
Calcaneus	9	1	11	1	5	1	-	1	1	1	-
Astragalus	7	1	14	1	3	1	-	5	4	-	-
Centroquartal	11	1	-	-	-	-	-	-	-	-	-
Other tarsals	4	.4	-	-	2	.4	-	1	1	-	-
Metacarpal	32	3	35	3	4	1	-	4	3	3	5
Metatarsal	55	5	36	3	3	1	-	2	2	3	1
Lat. Metapodial	-	-	-	-	2	.4	-	2	2	-	-
Metapodial	14	1	4	.4	4	1	-	-	-	-	-
1st Phalanx	37	3	25	2	6	1	-	8	6	6	-
2nd Phalanx	19	2	8	1	8	2	-	2	2	2	-
3rd Phalanx	12	1	2	.2	4	1	-	-	-	-	-
Sesamoids	3	.3	1	.1	-	-	-	-	-	-	1
Ribs	5	.4	4	.4	3	1	17	8	6	21	6
Cervical verts	6	.5	6	1	8	2	-	5	4	7	4
Thoracic verts	7	1	6	1	3	1	13	6	5	10	2
Lumbar verts.	5	.4	9	1	1	.2	5	3	2	6	1
Sacrum	3	.3	1	.1	-	-	1	-	-	-	-
Caudal verts.	-	-	2	.2	-	-	-	-	-	1	2
TOTAL	1112		1033		475		36	125		63	71

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull & Mandible	310	Skull & Mandible	90
Ribs	240	Ribs	156
Vertebrae	98	Vertebrae	48
Longbone fragments	277	Longbone fragments	496
Unidentified frags.	1059	Unidentified frags.	257
TOTAL	1984	TOTAL	1047

TABLE F133-5.1

Fragments of Major Species Represented in Feature 133-5

	Cattle	%	Sheep/G	%	Pig	Horse	Dog
Skull frags.	7	4	7	4	5	1	4
Mandible	25	13	26	13	12	4	3
Hyoid	1	.5	-	-	-	-	-
Loose teeth	46	24	91	46	16	13	2
Scapula	6	3	1	.5	2	-	1
Humerus	9	5	6	3	2	-	2
Radius	5	3	12	6	-	-	1
Ulna	10	5	4	2	1	1	1
Os Coxae	5	3	6	3	2	2	1
Femur	6	3	6	3	-	-	-
Patella	2	1	-	-	-	-	-
Tibia	6	3	21	11	3	-	-
Fibula	-	-	-	-	1	-	-
Carpals	12	6	-	-	1	-	-
Calcaneus	2	1	-	-	-	-	-
Astragalus	-	-	1	.5	-	-	-
Centroquartal	3	2	-	-	-	-	-
Other tarsals	2	1	-	-	2	2	-
Metacarpal	7	4	5	3	-	-	1
Metatarsal	6	3	9	5	-	1	-
Metapodial	1	.5	-	-	1	-	2
1st Phalanx	8	4	1	.5	3	1	-
2nd Phalanx	3	2	-	-	-	-	-
3rd Phalanx	1	.5	1	.5	2	-	-
Sesamoids	2	1	-	-	-	-	-
Ribs	-	-	-	-	-	-	3
Cervical verts.	8	4	1	.5	-	-	2
Thoracic verts.	5	3	1	.5	-	-	-
Lumbar verts.	1	.5	1	.5	-	-	-
TOTAL	189		200		53	25	23

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull & Mandible	31	Skull & Mandible	5
Ribs	60	Ribs	8
Vertebrae	20	Vertebrae	20
Longbone fragments	68	Longbone fragments	164
Unidentified frags.	219	Unidentified frags.	79
TOTAL	398	TOTAL	276

TABLE F133-6.1

Fragments of Major Species Represented in Feature 133-6

	Cattle	%	Art. S/G	Other S/G	%	Pig	%	Art. Horse	Other Horse	%	Art. Dog	Oth Dog
Skull frags.	63	9	-	21	3	12	9	-	4	3	1	6
Mandible	93	13	-	89	11	15	11	-	9	6	1	8
Hyoid	4	1	-	1	.1	-	-	-	-	-	1	-
Loose teeth	247	35	-	491	60	59	45	-	36	24	-	21
Scapula	28	4	-	5	1	7	5	-	4	3	2	1
Humerus	17	2	-	23	3	7	5	-	8	5	2	3
Radius	23	3	-	28	3	3	2	-	7	5	2	3
Ulna	22	3	-	4	.5	1	1	-	4	3	2	-
Os Coxae	17	2	2	11	1	2	2	-	7	5	4	3
Femur	17	2	2	9	1	4	3	-	4	3	2	-
Patella	-	-	2	4	.5	1	1	-	2	2	1	-
Tibia	13	2	2	47	6	5	4	-	7	5	2	2
Fibula	-	-	-	-	-	1	1	-	-	-	2	1
Carpals	10	1	-	2	.2	-	-	-	6	4	7	2
Calcaneus	15	2	2	4	.5	1	1	-	-	-	2	1
Astragalus	15	2	2	4	.5	1	1	-	4	3	2	-
Centroquartal	8	1	2	-	-	-	-	-	-	-	-	-
Other tarsals	6	1	4	-	-	1	1	-	1	1	3	1
Metacarpal	17	2	-	15	2	1	1	-	4	3	8	1
Metatarsal	24	3	2	27	3	-	-	-	1	1	8	1
Lat. Metapodial	-	-	-	-	-	1	1	-	9	6	-	-
Metapodial	1	.1	-	1	.1	-	-	-	2	1	-	8
1st Phalanx	23	3	-	9	1	6	5	-	4	3	11	5
2nd Phalanx	7	1	-	10	1	1	1	-	6	4	11	1
3rd Phalanx	1	.1	-	2	.2	2	2	-	-	-	8	1
Sesamoids	2	.3	3	-	-	-	-	-	-	-	-	-
Ribs	-	-	4	2	.2	-	-	11	3	2	30	8
Costal carts.	-	-	-	-	-	-	-	-	-	-	2	-
Sternebrae	-	-	-	-	-	-	-	-	-	-	1	-
Cervical verts.	12	2	-	5	1	1	1	5	4	3	7	2
Thoracic verts.	9	1	3	3	.4	-	-	19	9	6	14	-
Lumbar verts.	4	1	7	3	.4	-	-	6	1	1	11	1
Sacrum	1	.1	1	-	-	-	-	-	1	1	2	-
Caudal verts.	-	-	-	-	-	-	-	-	-	-	9	1
Baculum	-	-	-	-	-	-	-	-	-	-	2	-
TOTAL	699		38	820		132		41	147		160	81

Unid. Large Mammal	Total
Skull & Mandible	139
Ribs	336
Vertebrae	143
Longbone fragments	187
Unidentified frags.	901
TOTAL	1706

Sheep-sized Mammal	Total
Skull & Mandible	40
Ribs	80
Vertebrae	49
Longbone fragments	788
Unidentified frags.	345
TOTAL	1302

TABLE F133-8.1

Fragments of Major Species Represented in Feature 133-8

	Cattle	%	Sheep/G	%	Pig	Horse	Art. Dog	Other Dog
Skull frags.	5	4	1	.6	3	-	1	-
Mandible	20	17	14	8	4	2	2	2
Hyoid	-	-	-	-	-	-	1	-
Loose teeth	54	47	107	62	18	3	-	1
Scapula	3	3	2	1	1	-	-	-
Humerus	4	3	2	1	3	-	-	-
Radius	5	4	12	7	1	1	-	-
Ulna	2	2	1	.6	-	1	-	1
Os Coxae	3	3	1	.6	-	1	-	1
Femur	2	2	1	.6	1	-	-	-
Patella	1	1	-	-	1	1	-	-
Tibia	4	3	13	7	3	-	-	1
Carpals	1	1	1	.6	-	-	-	-
Calcaneus	1	1	2	1	-	-	-	-
Astragalus	4	3	2	1	-	1	-	-
Metacarpal	4	3	6	3	1	-	-	1
Metatarsal	1	1	4	2	-	-	-	1
Lat. Metapodial	-	-	-	-	1	1	-	-
Metapodial	-	-	1	.6	2	-	-	-
1st Phalanx	1	1	2	1	1	1	-	-
2nd Phalanx	-	-	-	-	2	1	-	-
3rd Phalanx	-	-	-1	.6	-	-	-	-
Ribs	-	-	-	-	-	-	-	3
Cervical verts.	-	-	-	-	-	-	3	1
Thoracic verts.	-	-	-	-	-	1	-	1
TOTAL	115		173		42	14	7	13

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull & Mandible	9	Skull & Mandible	2
Ribs	10	Ribs	10
Vertebrae	5	Vertebrae	6
Longbone fragments	39	Longbone fragments	106
Unidentified frags.	137	Unidentified frags.	39
TOTAL	200	TOTAL	163

TABLE F135.1

Species represented in Feature 135 (Fragments)

Species	Layer 1	2	3	4	5	Total
Cattle	6	35	105	90	29	265
Sheep/Goat	2	21	90	59	47	219
Pig	3	9	53	22	8	95
Horse	4	3	26	14	6	53
Dog	1	1	2	1	4	9
Roe Deer	-	-	-	1	-	1
Unid. Large Mammal	1	25	116	68	52	262
Sheep-sized Mammal	4	18	56	28	31	137
Unid. Mammal	-	2	5	4	8	19
Unid. Bird	-	-	3	-	-	3
Domestic Fowl	-	-	1	1	-	2
Rook/Crow	-	1	-	-	-	1
Rabbit (Intrusive)	-	-	-	-	2	2
TOTAL	21	115	457	288	187	1068
Sheep	-	1	9	3	1	14
Goat	-	-	-	-	-	-

Pig	F135-1	2	3	4	5	Total
Skull frags.	-	5	9	4	1	19
Mandible	-	1	9	5	1	16
Loose teeth	1	2	16	4	6	29
Scapula	-	-	-	1	-	1
Humerus	-	1	5	2	-	8
Radius	-	-	1	1	-	2
Ulna	-	-	1	1	-	2
Os Coxae	-	-	1	-	-	1
Femur	1	-	3	2	-	6
Tibia	1	-	2	-	-	3
Calcaneus	-	-	-	1	-	1
Metacarpal	-	-	1	-	-	1
Lat. Metapodial	-	-	1	-	-	1
Metapodial	-	-	-	1	-	1
1st Phalanx	-	-	1	-	-	1
2nd Phalanx	-	-	2	-	-	2
Cervical verts.	-	-	1	-	-	1
TOTAL	3	9	53	22	8	95

Horse	F135-1	2	3	4	5	Total
Skull frags.	-	1	2	1	2	6
Mandible	-	1	4	1	-	6
Loose teeth	3	-	4	4	-	11
Humerus	-	-	-	1	-	1
Radius	-	1	-	1	-	2
Ulna	-	-	-	1	1	2
Os Coxae	-	-	4	-	1	5
Femur	1	-	1	1	-	3
Tibia	-	-	1	1	-	2
Carpals	-	-	1	-	1	2
Calcaneus	-	-	2	-	-	2
Astragalus	-	-	-	1	-	1
Other tarsals	-	-	2	-	1	3
Metatarsal	-	-	-	1	-	1
Lat. Metapodial	-	-	3	-	-	3
Metapodial	-	-	2	-	-	2
Thoracic verts.	-	-	-	1	-	1
TOTAL	4	3	26	14	6	53

Dog	F135-1	2	3	4	5	Total
Mandible	-	-	-	-	1	1
Skull frags.	1	-	-	-	-	1
Tibia	-	-	1	-	-	1
Metapodial	-	-	-	1	-	1
2nd Phalanx	-	1	-	-	1	2
3rd Phalanx	-	-	-	-	2	2
Cervical verts.	-	-	1	-	-	1
TOTAL	1	1	2	1	4	9

TABLE F135.2

Fragments of Major Species Represented in F135 (by layer)

Cattle	F135-1	2	Layer 3	4	5	Total	%
Skull frags.	2	4	12	6	6	30	11
Mandible	2	7	23	19	3	54	20
Loose teeth	2	13	23	16	8	62	23
Scapula	-	2	6	6	1	15	6
Humerus	-	-	3	2	-	5	2
Radius	-	1	5	5	1	12	5
Ulna	-	-	2	6	-	8	3
Os Coxae	-	-	7	11	1	19	7
Femur	-	-	5	3	3	11	4
Tibia	-	1	4	2	-	7	3
Carpals	-	-	1	1	-	2	1
Calcaneus	-	-	2	-	-	2	1
Astragalus	-	1	1	-	1	3	1
Centroquartal	-	-	1	-	-	1	.4
Metacarpal	-	2	4	3	1	10	4
Metatarsal	-	3	5	3	2	13	5
Metapodial	-	-	1	-	1	2	1
1st Phalanx	-	-	-	4	1	5	2
2nd Phalanx	-	1	-	1	-	2	1
Cervical verts.	-	-	-	2	-	2	1
TOTAL	6	35	105	90	29	265	

Sheep/Goat	F135-1	2	3	4	5	Total	%
Skull frags.	-	2	4	5	2	13	6
Mandible	-	1	16	4	8	29	13
Loose teeth	-	7	28	26	24	85	39
Scapula	-	-	1	-	-	1	.5
Humerus	-	2	3	2	1	8	4
Radius	-	1	4	6	2	13	6
Ulna	-	-	2	2	-	4	2
Os Coxae	-	-	-	-	1	1	.5
Femur	-	1	-	-	2	3	1
Tibia	1	2	9	3	4	19	9
Carpals	-	-	3	-	-	3	1
Astragalus	-	-	1	-	-	1	.5
Metacarpal	-	2	4	3	-	9	4
Metatarsal	-	2	10	5	2	19	9
Metapodial	-	-	-	2	-	2	1
1st Phalanx	-	1	2	-	-	3	1
2nd Phalanx	-	-	1	-	-	1	.5
Cervical verts.	1	-	1	1	1	4	2
Thoracic verts.	-	-	1	-	-	1	.5
TOTAL	2	21	90	59	47	219	

TABLE F135.3

F135 Summary Statistics

	Layer 1	2	3	4	5	Total
Total Fragments	21	115	457	288	187	1068
ex.rarer species	21	114	456	287	185	1063
% Unid. Fragments		39	33	35	49	40
Erosion Index		(.07)	.11	.52	.60	.30
Loose Teeth Index		(.32)	.26	.27	(.40)	.29
% Gnawed Fragments		(26)	16	9	(7)	14
% Butchered Frags.		(4)	7	7	(2)	6
% Fragments of Major Species						
Cattle		(51)	38	48	(31)	41
Sheep/Goat		(30)	33	32	(50)	34
Pig		(13)	19	12	(9)	15
Horse		(4)	9	7	(6)	8
Dog		(1)	1	.5	(4)	1
Roe Deer		(-)	-	.5	(-)	.2

	Layer 1	2	3	4	5	Total
Cattle Loose Teeth Index			.22	(.18)		.23
Cattle Longbone Fragmentation I.						.24
Sheep/Goat Loose Teeth Index			(.31)	(.44)	(.51)	.39
S/G Longbone Fragmentation Index						.27

Unid. Large Mammal	Total
Skull and mandible frags.	40
Ribs	19
Vertebrae	11
Longbone fragments	71
Unid. fragments	121
Total	262

Sheep-sized Mammal	Total
Skull and mandible frags.	16
Ribs	17
Vertebrae	7
Longbone fragments	77
Unid. fragments	20
Total	137

TABLE F147.1

Feature 147 Animal Bone Fragments in all Layers and Sections

Section	Layer 1	2	3	4	5	6	7	Total
1	43	32			8			83
2	17							17
3	1	38						39
4					3			3
5	10	47						57
6	10	21						31
7	84	14						98
8	47							47
9	44	75			77			196
10	29	50			70			149
11	27	75	152		22			276
12			30					30
13	23	107			7			137
14	12	80	54		5			151
15	35	71		3				109
16	17	20		12	76			125
17	3	96			17			116
18	47	84			14			145
19	6				70			76
20	5	101						106
21	50	66			31			147
22	18	47						65
23		119			13			132
24	2	146			3			151
25	76	112			4			192
26	2					35	3	40
TOTAL	608	1401	236	15	420	35	3	2718

TABLE F147.2

Species represented in Feature 147 (Fragments)

Species	Layer 1	2	3	4	5	6	7	Total
Cattle	99	244	23	4	68	2	1	441
Sheep/Goat	151	238	69*	3	98	15	1	675
Pig	47	146	10	-	37	3	-	243
Horse	7	26	-	-	12	1	-	46
Dog	3	15	84*	-	2	-	-	104
Hare	-	1	-	-	1	-	-	2
Cat	-	2	-	-	-	-	-	2
Unid. Large Mammal	127	269	20	1	82	4	1	504
Sheep-sized Mammal	118	287	26	6	91	7	-	535
Unid. Mammal	25	50	4	1	21	2	-	103
Unid. Bird	-	-	-	-	1	-	-	1
Weasel	-	-	-	-	1	-	-	1
Unid. Rodent	4	2	-	-	2	1	-	9
Toad	-	2	-	-	1	-	-	3
Amphibian	1	-	-	-	-	-	-	1
Domestic Fowl	-	3	-	-	-	-	-	3
Thrushes	1	1	-	-	-	-	-	2
Buzzard	-	4	-	-	-	-	-	4
Rook/Crow	5	3	-	-	2	-	-	10
Raven	20*	5*	-	-	-	-	-	25
Unid. Corvid	-	-	-	-	1	-	-	1
Rabbit (Intrusive)	-	3	-	-	-	-	-	3
TOTAL	608	1401	236	15	420	35	3	2718
Sheep	12	32	1	-	8	1	-	54
Goat	-	1	-	-	-	-	-	1

* includes large groups of articulated bones

TABLE F147.3

Fragments of Major Species Represented in F147 (by layer)

	Layer								
Cattle	F147-1	2	3	4	5	6	7	Total	%
Skull frags.	9	28	3	-	8	2	-	50	11
Mandible	7	34	3	1	13	-	-	58	13
Loose teeth	21	44	6	1	12	-	1	85	19
Scapula	5	15	1	-	4	-	-	25	6
Humerus	3	19	1	-	6	-	-	29	7
Radius	2	8	1	-	4	-	-	15	3
Ulna	5	5	-	-	-	-	-	10	2
Os Coxae	8	11	2	-	1	-	-	22	5
Femur	5	12	-	-	3	-	-	20	5
Tibia	7	10	2	1	-	-	-	20	5
Carpals	1	5	-	-	-	-	-	6	1
Calcaneus	2	1	1	1	1	-	-	6	1
Astragalus	2	5	-	-	1	-	-	8	2
Centroquartal	1	-	-	-	-	-	-	1	.2
Other tarsals	2	-	-	-	-	-	-	2	.5
Metacarpal	6	9	2	-	4	-	-	21	5
Metatarsal	5	10	-	-	1	-	-	16	4
Metapodial	-	1	-	-	-	-	-	1	.2
1st Phalanx	4	8	-	-	1	-	-	13	3
2nd Phalanx	-	5	-	-	2	-	-	7	2
3rd Phalanx	1	1	1	-	-	-	-	3	1
Sesamoids	1	-	-	-	-	-	-	1	.2
Cervical verts.	1	5	-	-	5	-	-	11	2
Thoracic verts.	-	4	-	-	1	-	-	5	1
Lumbar verts.	-	3	-	-	-	-	-	3	1
Sacrum	1	1	-	-	1	-	-	3	1
TOTAL	99	244	23	4	68	2	1	441	

Sheep/Goat F147-1	Layer 2	3	4	5	6	7	Total	%
Skull frags. 14	37	–	–	6	2	–	59	9
Mandible 20	45	1	–	12	2	–	80	13
Hyoid –	–	1	–	–	–	–	1	.2
Loose teeth 47	99	10	1	22	4	1	184	29
Scapula 1	11	–	–	2	–	–	14	2
Humerus 3	15	2	–	–	–	–	20	3
Radius 10	21	2	–	6	2	–	41	6
Ulna –	5	–	–	–	–	–	5	1
Os Coxae 3	13	1	–	3	1	–	21	3
Femur 4	9	1	–	2	–	–	16	3
Patella –	2	–	–	–	–	–	2	.3
Tibia 15	33	2	1	18	1	–	70	11
Carpals 2	1	–	–	–	–	–	3	.5
Calcaneus 1	–	–	–	2	1	–	4	.6
Astragalus 1	1	–	–	–	1	–	3	.5
Centroquartal 1	–	–	–	1	–	–	2	.3
Metacarpal 6	5	2	–	5	–	–	18	3
Metatarsal 9	21	3	–	9	–	–	42	7
Metapodial 1	–	1	1	1	–	–	4	.6
1st Phalanx 4	4	1	–	1	–	–	10	2
2nd Phalanx 2	3	–	–	3	–	–	8	1
3rd Phalanx 2	–	–	–	–	–	–	2	.3
Ribs –	4	23*	–	1	–	–	(28)5	1
Cervical verts. –	6	4*	–	2	1	–	(13)10	2
Thoracic verts. 2	1	12*	–	2	–	–	(17)5	1
Lumbar verts. 2	2	3*	–	–	–	–	(7)4	.6
Caudal verts. 1	–	–	–	–	–	–	1	.2
TOTAL 151	338	69*	3	98	14	1	(675)634	

* includes articulated bones
() total includes articulated bones

Pig	F147-1	2	3	5	6	Total	%
Skull frags.	3	19	2	6	1	31	13
Mandible	9	36	-	6	-	51	21
Loose teeth	4	27	2	10	-	43	18
Scapula	3	5	-	-	-	8	3
Humerus	4	10	-	3	1	18	7
Radius	2	3	-	-	1	6	2
Ulna	1	4	2	3	-	10	4
Os Coxae	3	6	-	1	-	10	4
Femur	2	7	1	2	-	12	5
Patella	-	1	-	-	-	1	.4
Tibia	4	9	-	1	-	14	6
Fibula	2	2	-	-	-	4	2
Carpals	-	1	1	1	-	3	1
Calcaneus	-	1	-	-	-	1	.4
Astragalus	1	1	-	1	-	3	1
Metacarpal	-	-	-	1	-	1	.4
Metatarsal	2	1	-	-	-	3	1
Lat. Metapodial	-	1	1	1	-	3	1
Metapodial	1	1	-	-	-	2	1
1st Phalanx	3	3	-	-	-	6	2
2nd Phalanx	1	-	-	-	-	1	.4
3rd Phalanx	1	-	-	1	-	2	1
Ribs	-	3	-	-	-	3	1
Cervical verts.	-	1	1	-	-	2	1
Thoracic verts.	1	-	-	-	-	1	.4
Lumbar verts.	-	4	-	-	-	4	2
TOTAL	47	146	10	37	3	243	

Horse	F147-1	2	5	6	Total
Skull frags.	1	3	-	-	4
Mandible	-	2	-	-	2
Loose teeth	1	7	3	1	12
Scapula	-	-	1	-	1
Humerus	-	-	2	-	2
Radius	-	1	2	-	3
Ulna	-	2	-	-	2
Femur	1	-	-	-	1
Tibia	1	1	-	-	2
Calcaneus	1	-	-	-	1
Astragalus	-	3	1	-	4
Metacarpal	1	1	1	-	3
Metatarsal	-	2	-	-	2
Lat. Metapodial	-	1	-	-	1
1st Phalanx	-	1	1	-	2
Cervical verts.	1	1	-	-	2
Thoracic verts.	-	-	1	-	1
Lumbar verts.	-	1	-	-	1
TOTAL	7	26	12	1	46

Dog	F147-1	2	3	5	Total
Skull frags.	-	1	-	-	1
Hyoid	-	-	1	-	1
Loose teeth	-	-	-	1	1
Scapula	-	2	2	-	4
Humerus	1	-	2	-	3
Radius	-	1	2	-	3
Ulna	-	-	2	-	2
Os Coxae	-	-	1	-	1
Femur	-	2	1	-	3
Patella	-	-	1	-	1
Tibia	-	-	1	-	1
Fibula	-	-	1	-	1
Carpals	-	-	4	-	4
Calcaneus	-	-	2	-	2
Astragalus	-	-	1	-	1
Metacarpal	-	-	5	-	5
Metatarsal	-	-	8	-	8
1st Phalanx	1	-	8	-	9
2nd Phalanx	-	-	1	-	1
3rd Phalanx	-	-	4	-	4
Ribs	1	8	15+	1	25
Costal carts.	-	-	1	-	1
Sternebrae	-	-	1	-	1
Cervical verts.	-	1	6	-	7
Thoracic verts.	-	-	8	-	8
Lumbar verts.	-	-	3	-	3
Caudal verts.	-	-	2	-	2
Baculum	-	-	1	-	1
TOTAL	3	15	84	2	104

+ includes 1 rib not in articulated skeleton; the other dog bones in layer 3 are from one articulated skeleton.

Unid. Large Mammal	Total
Skull and mandible frags.	62
Ribs	70
Vertebrae	36
Longbone fragments	91
Unid. fragments	245
Total	504

Sheep-sized Mammal	Total
Skull and mandible frags.	34
Ribs	70
Vertebrae	24
Longbone fragments	276
Unid. fragments	131
Total	535

TABLE F147.4

F147 Summary Statistics

	Layer 1	2	3	4	5	6	7	Total
Total Fragments	608	1401	236	15	420	35	3	2718
ex.rarer species	577	1378	236	15	413	34	3	2656
+ ex.articulated bones			112					2532
% Unid. Fragments	47	44	45		47			45
Erosion Index	.32	.42			.76			.50
Loose Teeth Index	.24	.23			.22			.23
% Gnawed Fragments	15	18			12			16
% Butchered Frags.	2	6			6			5
% Fragments of Major Species								
Cattle	32	32			31			32
Sheep/Goat	49	44			45			45
Pig	15	19			17			17
Horse	2	3			6			3
Dog	1	2			1			2
Hare	-	.1			.5			.1
Cat	-	.3			-			.1
Cattle Loose Teeth I.	.21	.18						.19
Cattle Longbone Frag.I	.17	.21						.20
S/G Loose Teeth Index	.31	.29						.29
S/G Longbone Frag. I.	.31	.34						.32

TABLE F150.1

Feature 150 Animal Bone Fragments in all Layers and Sections

Section	Layer 1	Layer 2	Layer 3	Total
1	83		114	197
2	221		10	231
3	227		179	406
4	68		107	175
5	193		28	221
6	58		62	120
7	82		57	139
8	73		23	96
9			78	78
10	17		37	54
11	99		23	122
12	69			69
13	75		56	131
14	47		6	53
15			20	20
16			25	25
17			11	11
18	20		19	39
19	65		24	89
20	118		5	123
21	98		61	159
22	95		372	467
23	380		84	464
24	30		19	49
25	19	4	28	51
TOTAL	2137	4	1448	3589

TABLE F150.2

Species represented in Feature 150 (Fragments)

Species	Layer 1	2	3	Total
Cattle	328	4	159	491
Sheep/Goat	422	-	281	703
Pig	68	-	34	102
Horse	74*	-	28	102
Dog	27*	-	4	31
Red Deer	1	-	2	3
Roe Deer	1	-	-	1
Cat	1	-	-	1
Hare	1	-	-	1
Unid. Large Mammal	614	-	493	1107
Sheep-sized Mammal	508	-	364	872
Unid. Mammal	74	-	61	135
Unid. Bird	1	-	2	3
Fox	1	-	-	1
Water Vole	3	-	-	3
Unid. Rodent	6	-	1	7
Amphibian	1	-	1	2
Domestic Fowl	4	-	3	7
Dom. Duck/Mallard	-	-	1	1
Sparrow sp.	1	-	-	1
Rabbit (Intrusive)	1	-	14	15
TOTAL	2137	4	1448	3589
Sheep	7	-	2	9

* horse includes 27 articulated bones
dog includes 12 articulated bones.

TABLE F150.3

Fragments of Major Species Represented in F150 (by layer)

Cattle	F150-1	Layer 2	3	Total	%
Skull frags.	33	-	6	39	8
Mandible	39	-	15	54	11
Loose teeth	96	-	66	162	33
Scapula	18	2	9	29	6
Humerus	9	-	3	12	2
Radius	12	-	8	20	4
Ulna	10	-	2	12	2
Os Coxae	12	-	8	20	4
Femur	12	-	3	15	3
Patella	1	-	-	1	.2
Tibia	17	1	1	19	4
Carpals	2	-	3	5	1
Calcaneus	2	-	2	4	1
Astragalus	8	-	2	10	2
Centroquartal	1	-	2	3	.6
Other tarsals	1	-	-	1	.2
Metacarpal	8	-	5	13	3
Metatarsal	20	1	8	29	6
Metapodial	3	-	2	5	1
1st Phalanx	8	-	8	16	3
2nd Phalanx	4	-	2	6	1
Ribs	3	-	-	3	.6
Cervical verts.	6	-	3	9	2
Thoracic verts.	1	-	-	1	.2
Lumbar verts.	2	-	1	3	.6
TOTAL	328	4	159	491	

Sheep/Gt	F150-1	Layer 3	Total	%
Skull frags.	10	3	13	2
Mandible	29	16	45	6
Loose teeth	257	187	444	63
Scapula	4	1	5	1
Humerus	8	6	14	2
Radius	27	10	37	5
Ulna	1	2	3	.
Os Coxae	9	2	11	2
Femur	9	5	14	2
Patella	-	1	1	.
Tibia	27	29	56	8
Carpals	1	-	1	.
Calcaneus	-	1	1	.
Astragalus	2	-	2	.
Centroquartal	-	-	-	-
Other tarsals	-	-	-	-
Metacarpal	12	3	15	2
Metatarsal	13	13	26	4
Metapodial	1	-	1	.
1st Phalanx	3	1	4	.
2nd Phalanx	2	-	2	.
Ribs	3	-	3	.
Cervical verts.	2	1	3	.
Thoracic verts.	-	-	-	-
Lumbar verts.	2	-	2	.
TOTAL	422	281	703	

Pig	F150-1	3	Total	%
Skull frags.	7	2	9	9
Mandible	14	11	25	25
Loose teeth	18	14	32	31
Scapula	4	1	5	5
Humerus	5	1	6	6
Radius	-	1	1	1
Ulna	1	-	1	1
Os Coxae	1	1	2	2
Femur	2	-	2	2
Patella	-	-	-	-
Tibia	6	2	8	8
Fibula	3	-	3	3
Carpals	-	-	-	-
Calcaneus	-	-	-	-
Astragalus	1	-	1	1
Other tarsals	-	-	-	-
Metatarsal	2	-	2	2
Lat. Metapodial	1	-	1	1
Metapodial	-	-	-	-
1st Phalanx	2	-	2	2
2nd Phalanx	-	1	1	1
3rd Phalanx	-	-	-	-
Ribs	-	-	-	-
Cervical verts.	1	-	1	1
Thoracic verts.	-	-	-	-
Unid. verts.	-	-	-	-
TOTAL	68	34	102	

	Art.	Other		
Horse	F150-1	1	3	Total
Skull frags.	2	7	1	10
Mandible	2	-	-	2
Loose teeth	-	23	18	41
Scapula	1	1	-	2
Humerus	-	4	-	4
Radius	1	1	-	2
Ulna	1	1	-	2
Os Coxae	2	-	1	3
Femur	-	-	-	-
Patella	-	-	1	1
Tibia	-	4	-	4
Fibula	-	-	-	-
Carpals	-	1	1	2
Calcaneus	1	-	-	1
Astragalus	1	-	-	1
Other tarsals	1	-	-	1
Metatarsal	-	2	-	2
Lat.Metapodial	1	-	-	1
Metapodial	-	1	3	4
1st Phalanx	1	1	1	3
2nd Phalanx	1	-	-	1
3rd Phalanx	-	-	2	2
Ribs	3	-	-	3
Cervical verts.	2	1	-	3
Thoracic verts.	3	-	-	3
Unid. verts.	4	-	-	4
TOTAL	27	47	28	102

	Art.	Other		
Dog	F150-1	1	3	Total
Skull frags.	-	2	-	2
Loose teeth	-	4	1	5
Radius	-	1	1	2
Tibia	1	2	-	3
Fibula	-	2	-	2
Calcaneus	-	1	-	1
Metacarpal	2	-	-	2
Metatarsal	-	-	1	1
Metapodial	1	-	-	1
1st Phalanx	1	1	-	2
2nd Phalanx	1	-	-	1
Ribs	1	1	-	2
Thoracic verts.	-	1	-	1
Lumbar verts.	4	-	1	5
Caudal Verts.	1	-	-	1
TOTAL	12	15	4	31

Unid. Large Mammal	Total
Skull and mandible frags.	54
Ribs	54
Vertebrae	45
Longbone fragments	308
Unid. fragments	645
Total	1106

Sheep-sized Mammal	Total
Skull and mandible frags.	14
Ribs	60
Vertebrae	13
Lonbone fragments	604
Unid. fragments	181
Total	872

TABLE F150.4

F150 Summary Statistics

	Layer 1	Layer 2	Layer 3	Total
Total Fragments	2137	4	1448	3589
ex.rarer species	2119		1426	3549
+ ex.articulated bones	2090			3520
% Unid. Fragments	57		64	60
Erosion Index	1.09		1.83	1.38
Loose Teeth Index	.45		.56	.48
% Gnawed Fragments	6		4	6
% Butchered Frags.	3		2	3
% Fragments of Major Species				
Cattle	37		31	35
Sheep/Goat	48		55	50
Pig	8		7	7
Horse	5		6	5
Dog	2		1	1
Red Deer	.1		.4	.2
Roe Deer	.1		-	.1
Hare	.1		-	.1
Cat	.1		-	.1
Cattle Loose Teeth Index	.29		.42	.33
Cattle Longbone Frag. Index	.23		(.31)	.25
Sheep/Goat Loose Teeth Index	.61		.67	.63
S/G Longbone Frag. Index	.32		.30	.31

TABLE F236.1

Species represented in Feature 236 (Fragments)

Species	Layer 1	3	4	5	14	15	16	17	18	19	Total
Cattle	3	2	6	6	24	1	11	115	5	5	178
Sheep/Goat	-	1	-	7	26	12	4	154	103*	8	315
Pig	1	2	-	3	12	2	1	65	4	2	92
Horse	-	1	-	-	5	1	1	4	-	-	12
Dog	-	-	-	-	2	-	-	5	-	-	7
Red Deer	1	-	-	2	1	-	-	1	-	-	5
Roe Deer	-	-	-	-	-	1	-	-	-	-	1
Unid. Large Mammal	4	1	1	2	24	6	19	292	6	8	363
Sheep-sized Mammal	1	-	10	6	37	12	7	173	2	3	251
Unid. Mammal	-	-	2	-	-	5	1	16	-	-	24
Mouse sp.	-	-	-	-	5	-	-	-	-	-	5
Unid. Rodent	-	-	-	1	43	-	-	2	-	-	46
Amphibian	1	-	-	1	-	-	-	-	-	-	2
TOTAL	11	7	19	27	180	40	44	827	120	26	1301
Sheep	-	-	-	-	1	5	-	5	-	-	11
Goat	-	-	-	-	1	-	-	-	97*	-	98

* includes articulated bones

TABLE F236.2

Fragments of Major Species Represented in F236

	Layer											
Cattle	F236-1	3	4	5	14	15	16	17	18	19	Total	%
Skull frags.	-	-	-	-	3	-	1	14	-	-	18	10
Mandible	-	-	1	2	5	1	-	9	-	1	19	11
Loose teeth	-	-	1	2	1	-	1	31	2	2	40	22
Scapula	1	-	-	1	1	-	1	9	-	-	13	7
Humerus	-	1	3	-	-	-	-	4	1	-	9	5
Radius	-	1	-	1	2	-	1	3	-	-	8	4
Ulna	-	-	-	-	2	-	1	3	-	-	6	3
Os Coxae	-	-	-	-	-	-	-	3	-	-	3	2
Femur	-	-	-	-	3	-	1	4	-	-	8	4
Patella	-	-	-	-	-	-	-	1	-	-	1	.6
Tibia	1	-	1	-	4	-	-	4	-	-	10	6
Carpals	-	-	-	-	-	-	-	-	1	-	1	.6
Calcaneus	-	-	-	-	1	-	2	5	-	1	9	5
Astragalus	-	-	-	-	-	-	-	1	-	1	2	1
Metacarpal	-	-	-	-	-	-	1	7	-	-	8	4
Metatarsal	-	-	-	-	-	-	-	3	-	-	3	2
1st Phalanx	-	-	-	-	-	-	-	2	-	-	2	1
2nd Phalanx	-	-	-	-	-	-	-	2	-	-	2	1
Cervical verts.	1	-	-	-	1	-	-	6	-	-	8	4
Thoracic verts.	-	-	-	-	-	-	2	2	-	-	4	2
Lumbar verts.	-	-	-	-	1	-	1	2	-	-	4	2
TOTAL	3	2	6	6	24	1	11	115	5	5	178	

Sheep/Gt.	F236-3	5	14	15	16	17	Art. 18	Oth. 18	19	Total	%*
Skull frags.	-	-	1	2	1	9	-	1	-	14	6
Mandible	-	-	4	2	3	8	-	-	-	17	8
Loose teeth	1	3	5	6	-	72	-	3	7	97	45
Scapula	-	-	1	-	-	-	2	-	-	3	.5
Humerus	-	-	-	1	-	1	2	-	-	4	.9
Radius	-	1	4	-	-	6	2	1	-	14	6
Ulna	-	-	1	-	-	3	2	-	-	6	2
Os Coxae	-	1	1	-	-	1	2	-	-	5	1
Femur	-	1	1	-	-	5	1	-	-	8	3
Patella	-	-	-	-	-	2	-	-	-	2	.9
Tibia	-	-	3	-	-	11	1	1	1	17	7
Carpals	-	-	-	-	-	1	8	-	-	9	.5
Astragalus	-	-	-	-	-	1	1	-	-	2	.5
Centroquartal	-	-	-	-	-	1	-	-	-	1	.5
Metacarpal	-	-	1	-	-	6	2	-	-	9	3
Metatarsal	-	1	3	-	-	5	2	-	-	11	4
Metapodial	-	-	-	-	-	4	-	-	-	4	2
1st Phalanx	-	-	1	-	-	7	8	-	-	16	4
2nd Phalanx	-	-	-	-	-	3	7	-	-	10	1
3rd Phalanx	-	-	-	-	-	1	5	-	-	6	5
Sesamoids	-	-	-	-	-	-	3	-	-	3	-
Ribs	-	-	-	-	-	-	21	-	-	21	-
Costal carts.	-	-	-	-	-	-	1	-	-	1	-
Sternebrae	-	-	-	-	-	-	1	-	-	1	-
Cervical verts.	-	-	-	1	-	2	7	-	-	10	1
Thoracic verts.	-	-	-	-	-	3	12	-	-	15	1
Lumbar verts.	-	-	-	-	-	2	6	-	-	8	.9
Sacrum	-	-	-	-	-	-	1	-	-	1	-
TOTAL	1	7	26	12	4	154	97	6	8	315	

* excluding articulated goat bones in F236-18

Pig	F236-1	3	5	14	15	16	17	18	19	Total
Skull frags.	-	-	1	3	-	-	7	-	-	11
Mandible	-	-	2	-	-	-	16	-	-	18
Loose teeth	-	2	-	3	1	-	21	2	2	31
Scapula	-	-	-	-	1	1	5	-	-	7
Humerus	1	-	-	2	-	-	3	-	-	6
Radius	-	-	-	1	-	-	1	-	-	2
Ulna	-	-	-	-	-	-	1	1	-	2
Os Coxae	-	-	-	-	-	-	2	-	-	2
Femur	-	-	-	1	-	-	3	-	-	4
Tibia	-	-	-	-	-	-	1	-	-	1
Fibula	-	-	-	-	-	-	2	-	-	2
Lat.Metapodial	-	-	-	-	-	-	2	-	-	2
Metapodial	-	-	-	1	-	-	-	-	-	1
1st Phalanx	-	-	-	1	-	-	1	-	-	2
2nd Phalanx	-	-	-	-	-	-	-	1	-	1
TOTAL	1	2	3	12	22	1	65	4	2	92

Horse	F236-3	Layer 14	15	16	17	Total
Skull frags.	-	2	-	-	-	2
Loose teeth	-	-	-	-	-	1
Scapula	-	1	-	-	-	1
Os Coxae	-	1	-	-	-	1
Tibia	-	-	-	-	1	1
Astragalus	-	-	-	-	1	1
Metacarpal	1	-	-	-	-	1
Lat. Metapodial	-	-	1	-	-	1
2nd Phalanx	-	1	-	-	-	1
Cervical verts.	-	-	-	1	-	1
Thoracic verts.	-	-	-	-	1	1
TOTAL	1	5	1	1	4	12

Dog: Layer 14: Loose teeth - 1; femur - 1.
Layer 17: Skull frags. - 2; humerus - 1; femur - 1; ribs - 1.
Total - 7.

Unid. Large Mammal	Total
Skull and mandible frags.	46
Ribs	12
Vertebrae	36
Longbone fragments	51
Unid. fragments	218
Total	363

Sheep-sized Mammal	Total
Skull and mandible frags.	4
Ribs	26
Vertebrae	6
Longbone fragments	174
Unid. fragments	41
Total	251

TABLE F236.3

F236 Summary Statistics

	Layer 1	3	4	5	14	15	16	17	18	19	Total
Total Fragments	11	7	19	27	180	40	44	827	120	26	1301
ex.rarer species	10			26	131			825			1248
+ ex.articulated bones									23		1151
% Unid. Fragments					47			58			55
Erosion Index					.04			.28			.33
Loose Teeth Index					(.14)			.36			.33
% Gnawed Fragments								12			15
% Butchered Frags.								3			3
% Fragments of Major Species											
Cattle								33			35
Sheep/Goat								45			42
Pig								19			18
Horse								1			2
Dog								1			1
Red Deer								.3			.1
Roe Deer								-			.2
Cattle Loose Teeth Index											.22
Cattle Longbone Fragmentation I.											.30
Sheep/Goat Loose Teeth Index											.45
S/G Longbone Fragmentation Index											.26

TABLE F290.1

Feature 290 Animal Bone Fragments in all Layers

Layer	N	Layer	N	Layer	N
3	4	15	2	24	3
5	1	17	16	26	24
8	17	20	10	27	218
10	50	21	9	28	359
12	1	23	5	Total	719

TABLE F290.2

Species represented in Feature 290 (Fragments)

Species	Layer 1-26	Layer 27	Layer 28	Total
Cattle	34	27	37	98
Sheep/Goat	15	42	95	152
Pig	10	16	16	42
Horse	-	-	2	2
Dog	27*	1	-	28
Red Deer	1	-	1	2
Roe Deer	3	-	-	3
Unid. Large Mammal	19	50	104	173
Sheep-sized Mammal	29	72	90	191
Unid. Mammal	4	10	14	28
TOTAL	142	218	359	719
Goat	1	1	-	2

* Dog includes 20 articulated bones.

TABLE F290.3

Fragments of Major Species Represented in F290

Cattle F290	Layer 1-26	27	28	Total	%
Skull frags.	2	2	-	4	4
Mandible	3	4	4	11	11
Loose teeth	11	10	24	45	46
Scapula	5	2	-	7	7
Humerus	1	-	1	2	2
Radius	1	-	-	1	1
Ulna	-	1	-	1	1
Os Coxae	-	1	-	1	1
Femur	2	-	-	2	2
Tibia	2	1	1	4	4
Calcaneus	-	-	1	1	1
Astragalus	1	-	1	2	2
Metacarpal	1	1	-	2	2
Metatarsal	2	-	2	4	4
Metapodial	-	1	-	1	1
1st Phalanx	-	1	-	1	1
Ribs	-	-	1	1	1
Thoracic verts.	-	2	2	4	4
Lumbar verts.	1	1	-	2	2
Sacrum	2	-	-	2	2
TOTAL	34	27	37	98	

Sheep/Goat	1-26	27	28	Total	%
Skull frags.	1	-	-	1	.7
Mandible	1	7	7	15	10
Loose teeth	8	20	76	104	68
Scapula	-	1	-	1	.7
Humerus	2	2	1	5	3
Radius	-	5	-	5	3
Ulna	-	2	-	2	1
Os Coxae	-	1	-	1	.7
Femur	1	-	-	1	.7
Tibia	2	-	6	8	5
Metacarpal	-	1	1	1	.7
Metatarsal	-	2	5	7	5
1st Phalanx	-	1	-	1	.7
TOTAL	15	42	95	152	

Pig	F290 1-26	Layer 27	28	Total
Skull frags.	1	1	1	3
Mandible	3	1	4	8
Loose teeth	1	4	8	13
Scapula	1	1	-	2
Humerus	-	2	1	3
Radius	-	1	1	2
Ulna	1	-	-	1
Os Coxae	2	-	-	2
Femur	1	2	-	3
Tibia	-	1	-	1
Fibula	-	1	-	1
Astragalus	-	1	-	1
Metatarsal	-	-	1	1
Lat. Metapodial	-	1	-	1
TOTAL	10	16	16	42

Horse	Layer 28
Skull frags.	-
Mandible	-
Loose teeth	2
Scapula	-
Humerus	-
Radius	-
Ulna	-
Os Coxae	-
Femur	-
Tibia	-
Fibula	-
Astragalus	-
Metatarsal	-
Lat.Metapodial	-
TOTAL	2

Dog	F290 Art. 1-26	Other 1-26	27	Total
Skull frags.	-	-	1	1
Mandible	1	-	-	1
Loose teeth	-	1	-	1
Radius	2	-	-	2
Ulna	1	-	-	1
Femur	-	1	-	1
Fibula	1	-	-	1
Calcaneus	-	1	-	1
Metatarsal	1	2	-	3
Ribs	7	2	-	9
Cervical verts.	1	-	-	1
Caudal verts.	4	-	-	4
Unid. verts.	2	-	-	2
TOTAL	20	7	1	28

Unid. Large Mammal	Total
Skull and mandible frags.	11
Ribs	13
Vertebrae	15
Longbone fragments	32
Unid. fragments	102
Total	173

Sheep-sized Mammal	Total
Skull and mandible frags.	4
Ribs	6
Vertebrae	4
Longbone fragments	132
Unid. fragments	45
Total	191

TABLE F290.4

F290 Summary Statistics

	Layer 1-26	27	28	Total
Total Fragments	142	218	359	719
ex.articulated bones	122			699
% Unid. Fragments	43	61	58	56
Erosion Index	.73	1.21	1.55	1.28
Loose Teeth Index	(.30)	(.40)	.73	.54
% Gnawed Fragments				4
% Butchered Frags.				1
% Fragments of Major Species				
Cattle	(49)	(31)	25	32
Sheep/Goat	(21)	(49)	63	46
Pig	(14)	(19)	11	14
Horse	(-)	(-)	1	.7
Dog	(10)	(1)	-	3
Red Deer	(1)	(-)	1	.7
Roe Deer	(4)	(-)	-	1
Cattle Loose Teeth Index				.46
Sheep/Goat Loose Teeth Index			(.80)	.68

TABLE F367.1

Feature 367 Animal Bone Fragments in all Layers and Sections

Section	Layer 1	Layer 2	Layer 3	Total
1	184	252	24	460
2	134	417	89	640
TOTAL	318	669	113	1100

TABLE F367.2

Species represented in Feature 367 (Fragments)

Species	Layer 1	Layer 2	Layer 3	Total
Cattle	47	74	15	136
Sheep/Goat	50	148	25	223
Pig	32	46	2	80
Horse	8	13	-	21
Dog	9	10	-	19
Unid. Large Mammal	51	144	43	238
Sheep-sized Mammal	98	185	21	304
Unid. Mammal	15	32	1	48
Unid. Bird	1	5	1	7
Dog/Fox	3	-	-	3
Woodmouse	-	-	1	1
Unid. Rodent	2	2	2	6
Toad	-	2	-	2
Amphibian	2	1	1	4
Domestic Fowl	-	2	-	2
Thrush sp.	-	3	-	3
Starling	-	-	1	1
Rook/Crow	-	1	-	1
Raven	-	1	-	1
TOTAL	318	669	113	1100
Sheep	2	10	-	12

TABLE F367.3

Fragments of Major Species Represented in F367

Cattle	F367-1	Layer 2	3	Total	%
Skull frags.	13	6	-	19	14
Mandible	4	13	2	19	14
Loose teeth	7	17	6	30	22
Scapula	2	4	-	6	4
Humerus	-	2	-	2	1
Radius	-	2	-	2	1
Ulna	1	2	-	3	2
Os Coxae	1	1	-	2	1
Femur	1	5	1	7	5
Tibia	2	2	-	4	3
Carpals	-	-	1	1	.7
Calcaneus	2	1	-	3	2
Astragalus	-	2	-	2	1
Metacarpal	4	2	3	9	7
Metatarsal	3	6	-	9	7
Metapodial	2	-	-	2	1
1st Phalanx	2	5	1	8	6
2nd Phalanx	1	-	-	1	.7
3rd Phalanx	-	1	-	1	.7
Ribs	-	1	-	1	.7
Cervical verts.	1	-	1	2	1
Thoracic verts.	-	2	-	2	1
Caudal verts.	1	-	-	1	.7
TOTAL	47	74	15	136	

Sheep/Goat	F367-11	2	3	Total	%
Skull frags.	1	3	-	4	2
Mandible	10	24	1	35	16
Loose teeth	21	69	16	106	48
Scapula	-	1	-	1	.4
Humerus	-	8	-	8	4
Radius	2	5	-	7	3
Ulna	-	1	-	1	.4
Os Coxae	-	1	1	2	.9
Femur	-	8	3	11	5
Tibia	2	9	3	14	6
Calcaneus	-	3	-	3	1
Astragalus	-	1	-	1	.4
Metacarpal	2	1	-	3	1
Metatarsal	4	6	1	11	5
Metapodial	1	-	-	1	.4
1st Phalanx	3	5	-	8	4
2nd Phalanx	-	1	-	1	.4
3rd Phalanx	1	1	-	2	.9
Ribs	1	1	-	2	.9
Cervical verts.	1	-	-	1	.4
Caudal verts.	1	-	-	1	.4
TOTAL	50	148	25	223	

Pig	Layer F367-1	2	3	Total
Skull frags.	6	4	-	10
Mandible	4	10	-	14
Loose teeth	11	16	1	28
Scapula	2	5	-	7
Humerus	-	3	1	4
Radius	1	-	-	1
Os Coxae	-	1	-	1
Femur	1	2	-	3
Tibia	3	1	-	4
Fibula	1	-	-	1
Calcaneus	1	-	-	1
Other tarsals	-	1	-	1
1st Phalanx	1	-	-	1
2nd Phalanx	-	1	-	1
3rd Phalanx	-	1	-	1
Ribs	1	1	-	2
TOTAL	32	46	2	80

Horse	F367-1	2	Total
Skull frags.	1	-	1
Mandible	-	-	-
Loose teeth	-	5	5
Humerus	1	1	2
Radius	-	1	1
Os Coxae	1	-	1
Femur	1	-	1
Calacaneus	1	1	2
Other tarsals	-	1	1
Metacarpal	-	-	-
Metatarsal	-	-	-
Lat. Metapodial	1	-	1
Metapodial	-	-	-
1st Phalanx	1	3	4
2nd Phalanx	-	-	-
3rd Phalanx	-	1	1
Ribs	1	-	1
Thoracic verts.	-	-	-
TOTAL	8	13	21

Dog	F367-1	2	Total
Skull frags.	2	-	2
Mandible	-	1	1
Loose teeth	-	1	1
Humerus	-	-	-
Radius	2	-	2
Os Coxae	-	-	-
Femur	-	-	-
Calacaneus	-	-	-
Other tarsals	-	-	-
Metacarpal	2	-	2
Metatarsal	-	2	2
Lat. Metapodial	-	-	-
Metapodial	1	2	3
1st Phalanx	1	3	4
2nd Phalanx	1	-	1
3rd Phalanx	-	-	-
Ribs	-	-	-
Thoracic verts.	-	1	1
TOTAL	9	10	19

Unid. Large Mammal	Total
Skull and mandible frags.	24
Ribs	38
Vertebrae	29
Longbone fragments	33
Unid. fragments	114
Total	238

Sheep-sized Mammal	Total
Skull and mandible frags.	16
Ribs	36
Vertebrae	16
Longbone fragments	144
Unid. fragments	92
Total	304

TABLE F367-4

F367 Summary Statistics

	Layer 1	2	3	Total
Total Fragments	318	669	113	1100
ex.rarer species	310	652	107	1069
% Unid. Fragments	53	55	61	55
Erosion Index	.32	.31	(2.27)	.49
Loose Teeth Index	.27	.37		.35
% Gnawed Fragments	9	13		11
% Butchered Frags.	1	5		4
% Fragments of Major Species				
Cattle	32	25		28
Sheep/Goat	34	51		47
Pig	22	16		17
Horse	5	4		4
Dog	6	3		4
Cattle Loose Teeth Index				.22
Sheep/Goat Loose Teeth Index		.47		.48
S/G Longbone Fragmentation Index				.25

TABLE F369.1

Feature 369 Animal Bone Fragments in all Layers and Sections

Section	Layer 1	2	3	4	5	6	Total
1	12					14	26
2	15	62	20	24			121
3	11	90	96		12		209
4		270					270
5	14	142					156
TOTAL	52	564	116	24	12	14	782

TABLE F369.2

Species represented in Feature 369 (Fragments)

Species	Layer 1	2	3	4	5	6	Total
Cattle	10	81	21	3	2	5	122
Sheep/Goat	11	169	41	1	2	4	228
Pig	4	49	9	8	1	2	73
Horse	6	6	1	1	1	-	15
Dog	-	9	2	-	-	-	11
Hare	-	1	-	-	-	-	1
Unid. Large Mammal	14	86	15	3	1	1	120
Sheep-sized Mammal	5	136	21	8	2	1	173
Unid. Mammal	-	13	3	-	3	-	19
Unid. Bird	1	-	-	-	-	-	1
Dog/Fox	1	-	-	-	-	-	1
Amphibian	-	-	3	-	-	-	3
Domestic Fowl	-	1	-	-	-	-	1
Raven	-	13*	-	-	-	-	13
TOTAL	52	564	116	24	12	14	782
Sheep	2	23	5	-	-	1	31

* includes articulated bones.

TABLE F369.3

Fragments of Major Species Represented in Feature 369

Cattle	Layer F369-2	Other	Total	%
Skull frags.	15	10	25	21
Mandible	7	9	16	13
Loose teeth	17	3	20	17
Scapula	4	2	6	5
Humerus	2	1	3	2
Radius	3	1	4	3
Ulna	5	3	8	7
Os Coxae	3	2	5	4
Femur	1	2	3	2
Tibia	4	3	7	6
Carpals	1	-	1	1
Calcaneus	3	-	3	2
Astragalus	3	-	3	2
Metacarpal	3	-	3	2
Metatarsal	3	2	5	4
1st Phalanx	1	-	1	1
2nd Phalanx	1	1	2	2
Sesamoids	1	-	1	1
Ribs	1	-	1	1
Thoracic verts.	-	1	1	1
Lumbar verts.	2	-	2	2
Sacrum	1	-	1	1
TOTAL	81	40	121	

Sheep/Goat	F369-2	Other	Total	%
Skull frags.	23	10	33	14
Mandible	18	5	23	10
Hyoid	1	-	1	.4
Loose teeth	58	18	76	33
Scapula	2	-	2	1
Humerus	5	3	8	4
Radius	6	2	8	4
Ulna	2	-	2	1
Os Coxae	6	2	8	4
Femur	5	3	8	4
Tibia	20	2	22	10
Carpals	-	2	2	1
Calcaneus	2	-	2	1
Astragalus	-	2	2	1
Metacarpal	5	2	7	3
Metatarsal	8	-	8	4
1st Phalanx	4	3	7	3
2nd Phalanx	-	3	3	1
3rd Phalanx	1	1	2	1
Thoracic verts.	2	1	3	1
Caudal verts.	1	-	1	.4
TOTAL	169	59	228	

Pig	Layer F369-2	Other	Total
Skull frags.	7	4	11
Mandible	5	3	8
Loose teeth	11	2	13
Scapula	1	1	2
Humerus	-	2	2
Radius	2	2	4
Ulna	2	1	3
Os Coxae	2	2	4
Femur	3	-	3
Patella	-	1	1
Tibia	4	3	7
Carpals	-	-	-
Calcaneus	1	-	1
Metacarpal	1	-	1
1st Phalanx	1	-	1
3rd Phalanx	-	-	-
Ribs	2	1	3
Cervical verts.	4	-	4
Thoracic verts.	2	-	2
Lumbar verts.	1	1	2
TOTAL	49	23	72

Horse	Layer 2.	Other	Total
Skull frags.	-	1	1
Mandible	-	-	-
Loose teeth	1	-	1
Scapula	1	1	2
Humerus	-	2	2
Radius	1	1	2
Ulna	1	1	2
Os Coxae	-	-	-
Femur	-	-	-
Patella	-	-	-
Tibia	-	-	-
Carpals	-	2	2
Calcaneus	-	-	-
Metacarpal	-	1	1
1st Phalanx	-	1	1
3rd Phalanx	1	-	1
Ribs	-	-	-
Cervical verts.	-	-	-
Thoracic verts.	1	-	1
Lumbar verts.	-	-	-
TOTAL	6	10	16

Dog	F369-2	Other	Total
Skull frags.	4	-	4
Mandible	1	-	1
Loose teeth	2	-	2
Radius	-	1	1
Os Coxae	1	-	1
Metatarsal	1	-	1
Metapodial	-	1	1
TOTAL	9	2	11

Unid. Large Mammal	Total
Skull and mandible frags.	31
Ribs	14
Vertebrae	10
Longbone fragments	15
Unid. fragments	51
TOTAL	121

Sheep-Sized Mammal	Total
Skull and mandible frags.	17
Ribs	44
Vertebrae	9
Longbone fragments	78
Unid. fragments	25
TOTAL	173

TABLE F369.4

F369 Summary Statistics

	Layer 1	2	3	4	5	6	Total
Total Fragments	52	564	116	24	12	14	782
ex.rarer species	50	550	113				763
% Unid. Fragments		42					41
Erosion Index		.29					.27
Loose Teeth Index		.30					.25
% Gnawed Fragments		15					15
% Butchered Frags.		11					11
% Fragments of Major Species							
Cattle		26					27
Sheep/Goat		54					51
Pig		16					16
Horse		2					4
Dog		3					2
Hare		.3					.2
Cattle Loose Teeth Index		(.21)					.17
Cattle Longbone Fragmentation I.							(.25)
Sheep/Goat Loose Teeth Index		.34					.33
S/G Longbone Fragmentation Index							.39

TABLE F370.1

Feature 370 Animal Bone Fragments in all Layers and Sections

Section	Layer 1	2	3	4	5	6	Total
1		19			12	12	43
2		344			207	73	624
3					265	145	410
4	20			249	62	60	391
5	20			56	322	97	495
6	9		21	7	121	38	196
7	28		95	43		70	236
9	1		32		37	40	110
10	43		184	861		213	1301
11	35		224	237		68	564
12	14		239	243	361	152	1009
TOTAL	170	363	795	1696	1387	968	5379

TABLE F370.2

Species represented in Feature 370 (Fragments)

Species	Layer 1	2	3	4	5	6	Total
Cattle	43	97*	86	407	224	164	1021
Sheep/Goat	34	29	122	274	321	290*	1070
Pig	32	16	332*	203	160	92	835
Horse	4	1	17	22	14	10	68
Dog	1	156*	8	15	5	5	190
Red Deer	-	1	-	-	1	-	2
Unid. Large Mammal	19	26	91	437	283	241	1097
Sheep-sized Mammal	23	33	111	288	306	140	901
Unid. Mammal	11	4	19	39	52	25	150
Unid. Bird	1	-	-	6	1	1	9
Water Vole	-	-	-	-	1	-	1
Unid. Rodent	-	-	-	1	-	-	1
Toad	-	-	-	1	1	-	2
Domestic Fowl	1	-	1	1	2	-	5
Snipe	-	-	1	-	-	-	1
Peregrine	-	-	-	1	-	-	1
Buzzard	-	-	-	1	-	-	1
Rook/Crow	-	-	7*	-	-	-	7
Raven	1	-	-	-	16*	-	17
TOTAL	170	363	795	1696	1387	968	5379
Sheep	6	1	8	29	34	45*	123

* Cattle includes 40 articulated bones in F370-2-2.
Sheep includes 45 articulated bones in F370-6-10.
Pig includes 191 articulated bones in F370-3-12.
Dog includes 150 articulated bones in F370-2-2.
Rook/Crow includes 7 articulated bones in F370-3-10.
Raven includes 16 articulated bones in F370-5-6.

TABLE F370.3

Fragments of Major Species Represented in Feature 370

				Layer					
		Art.	Other						
Cattle	F370-1	2	2	3	4	5	6	Total	%
Skull frags.	8	-	11	23	112	30	17	201	20
Mandible	6	-	4	5	83	36	26	160	16
Hyoid	-	-	2	1	-	1	-	4	.4
Loose teeth	6	-	24	13	80	56	60	239	24
Scapula	7	-	1	6	17	17	12	60	6
Humerus	3	-	1	4	8	11	4	31	3
Radius	-	-	-	4	4	7	1	16	2
Ulna	1	-	1	1	3	6	2	14	1
Os Coxae	-	-	-	2	9	8	6	25	3
Femur	2	-	-	5	10	4	6	27	3
Tibia	4	-	-	4	12	6	10	36	4
Carpals	-	-	-	1	3	4	-	8	1
Calcaneus	-	-	-	-	3	2	1	6	.6
Astragalus	-	-	-	-	5	1	1	7	.7
Centroquartal	-	-	-	1	1	1	-	3	.3
Other tarsals	-	-	-	-	2	-	-	2	.2
Metacarpal	-	-	1	2	7	4	3	17	2
Metatarsal	-	-	4	2	7	11	4	28	3
Metapodial	-	-	-	1	1	2	3	7	.7
1st Phalanx	1	-	-	2	8	1	3	15	2
2nd Phalanx	-	-	-	5	7	2	2	16	2
3rd Phalanx	3	-	-	1	3	3	-	10	1
Sesamoids	-	-	1	-	1	2	-	4	.4
Ribs	-	15	-	-	1	1	-	17	.2
Cervical verts.	1	5	4	2	8	4	2	26	2
Thoracic verts.	-	13	1	-	3	2	-	19	.6
Lumbar verts.	1	6	1	1	6	2	-	17	1
Sacrum	-	1	1	-	2	-	1	5	.4
Caudal verts.	-	-	-	-	1	-	-	1	.1
TOTAL	43	40	57	86	407	224	164	1021	

Sheep/Goat	F370-1	2	3	4	5	Art. 6	Other 6	Total	%
Skull frags.	-	3	15	41	52	2	5	118	11
Mandible	8	3	17	34	33	-	27	122	12
Hyoid	-	-	-	1	1	-	-	2	.2
Loose teeth	11	9	44	72	120	-	126	382	37
Scapula	1	1	-	5	4	1	2	14	1
Humerus	1	-	4	6	11	3	5	30	3
Radius	1	1	2	13	10	2	12	41	4
Ulna	-	2	2	4	6	1	1	16	1
Os Coxae	-	-	2	1	7	1	10	21	2
Femur	2	-	1	11	10	5	9	38	3
Patella	-	-	-	-	-	1	-	1	-
Tibia	2	2	13	25	23	4	20	89	8
Carpals	-	-	-	-	-	1	-	1	-
Calcaneus	-	-	-	2	2	2	1	7	.5
Astragalus	1	-	2	1	2	1	1	8	.7
Centroquartal	-	-	1	1	1	-	1	4	.4
Other tarsals	-	-	1	-	-	-	-	1	.1
Metacarpal	3	3	7	10	7	2	5	37	3
Metatarsal	2	-	6	11	15	4	5	43	4
Metapodial	-	-	-	-	2	-	-	2	.2
1st Phalanx	1	1	1	4	3	4	6	20	2
2nd Phalanx	-	-	-	1	7	4	-	12	.8
3rd Phalanx	-	-	-	-	1	-	-	1	.1
Ribs	-	1	2	5	-	3	3	14	1
Cervical verts.	1	2	2	12	3	4	-	24	2
Thoracic verts.	-	-	-	5	-	-	5	10	1
Lumbar verts.	-	1	-	7	-	-	1	9	1
Sacrum	-	-	-	2	-	-	-	2	.2
Sternebrae	-	-	-	-	1	-	-	1	.1
TOTAL	34	29	122	274	321	45	245	1070	

Pig	F370-1	2	Art. 3	Other 3	4	5	6	Total	%
Skull frags.	5	4	3	31	66	32	12	153	22
Mandible	6	-	1	22	51	39	22	141	20
Loose teeth	5	1	-	48	30	44	32	160	23
Scapula	4	2	3	2	8	5	4	28	4
Humerus	1	2	5	3	7	8	3	29	3
Radius	1	-	4	1	1	4	1	12	1
Ulna	1	-	3	2	3	1	-	10	1
Os Coxae	2	2	6	2	4	2	2	20	2
Femur	1	1	5	4	3	10	2	26	3
Patella	-	-	2	-	-	-	-	2	-
Tibia	4	-	5	7	8	4	5	33	4
Fibula	-	1	5	3	-	-	1	10	.7
Carpals	-	-	8	-	-	-	-	8	-
Calcaneus	-	-	5	-	-	2	1	8	.4
Astragalus	-	-	3	1	1	-	-	5	.3
Other tarsals	-	-	4	-	-	-	-	4	-
Metacarpal	-	-	7	3	3	-	2	15	1
Metatarsal	-	-	8	2	2	-	-	12	.6
Lat. Metapodial	-	-	12	4	1	1	2	20	1
Metapodial	-	-	-	-	1	-	-	1	.1
1st Phalanx	1	-	5	2	2	2	1	13	1
2nd Phalanx	-	1	2	1	-	-	-	4	.3
3rd Phalanx	-	-	1	1	-	2	-	4	.4
Ribs	-	-	35	2	2	1	-	40	.7
Cervical verts.	-	1	1	-	2	1	-	5	.6
Thoracic verts.	1	-	1	-	3	1	1	7	1
Lumbar verts.	-	1	9	-	5	1	1	17	1
Sacrum	-	-	1	-	-	-	-	1	-
Unid. verts.	-	-	43	-	-	-	-	43	-
Sternebrae	-	-	4	-	-	-	-	4	-
TOTAL	32	16	191	141	203	160	92	835	

Horse	F370-1	2	3	4	5	6	Total
Skull frags.	-	-	1	-	3	-	4
Mandible	-	-	3	1	1	1	6
Loose teeth	3	-	8	5	-	3	19
Scapula	-	-	1	1	1	-	3
Humerus	-	-	-	-	-	1	1
Radius	-	-	-	-	-	2	2
Ulna	-	-	-	-	3	1	4
Os Coxae	-	-	1	3	-	1	5
Femur	-	-	-	1	-	-	1
Tibia	-	-	1	1	1	-	3
Astragalus	1	-	-	1	-	-	2
Other tarsals	-	-	-	-	2	-	2
Metatarsal	-	-	-	4	2	1	7
Lat. Metapodial	-	1	-	-	-	-	1
Ribs	-	-	1	-	1	-	2
Cervical verts.	-	-	-	3	-	-	3
Thoracic verts.	-	-	-	1	-	-	1
Lumbar verts.	-	-	1	1	-	-	2
TOTAL	4	1	17	22	14	10	68

Dog	F370-1	Art. 2	Other 2	3	4	5	6	Total
Skull frags.	1	2	-	5	4	-	2	14
Mandible	-	-	-	-	1	-	1	2
Loose teeth	-	-	3	1	-	-	1	5
Scapula	-	2	1	1	1	-	-	5
Humerus	-	2	-	-	-	1	-	3
Radius	-	2	-	-	1	-	-	3
Ulna	-	-	-	-	2	-	-	2
Os Coxae	-	-	-	-	2	1	-	3
Femur	-	1	-	-	-	-	-	1
Tibia	-	2	2	-	-	2	-	6
Carpals	-	14	-	-	-	-	-	14
Calcaneus	-	2	-	-	-	-	-	2
Astragalus	-	2	-	-	-	-	-	2
Metacarpal	-	10	-	-	-	-	-	10
Metatarsal	-	8	-	-	-	-	-	8
1st Phalanx	-	11	-	-	-	-	-	11
2nd Phalanx	-	9	-	-	-	-	-	9
3rd Phalanx	-	9	-	-	-	-	-	9
Sesamoids	-	4	-	-	-	-	-	4
Ribs	-	26	-	3	1	-	-	30
Cervical verts.	-	4	-	-	1	-	1	6
Thoracic verts.	-	21	-	-	-	-	-	21
Lumbar verts.	-	3	-	1	-	-	-	4
Sacrum	-	1	-	-	-	-	-	1
Caudal Verts.	-	12	-	-	-	-	-	12
Sternebrae	-	1	-	-	-	-	-	1
TOTAL	1	150	6	8	15	5	5	190

Unid. Large Mammal	Total
Skull and mandible frags.	210
Ribs	215
Vertebrae	83
Longbone fragments	153
Unid. fragments	436
Total	1097

Sheep-sized Mammal	Total
Skull and mandible frags.	139
Ribs	199
Vertebrae	48
Longbone fragments	334
Unid. fragments	181
Total	901

TABLE F370.4

F370 Summary Statistics

	Layer 1	2	3	4	5	6	Total
Total Fragments	170	363	795	1696	1387	968	5379
ex.rarer species	167		786	1685	1366	967	5334
+ ex.articulated bones		173	595			922	4908
% Unid. Fragments	34	36	37	45	47	44	44
Erosion Index	.13	.27	.50	.21	.38	1.06	.43
Loose Teeth Index	.22	.34	.30	.20	.30	.43	.29
% Gnawed Fragments	(15)	(5)	6	5	8	4	6
% Butchered Frags.	(9)	(3)	5	8	7	2	6
% Fragments of Major Species							
Cattle	38	52	23	44	31	32	36
Sheep/Goat	30	26	33	30	44	47	37
Pig	28	15	38	22	22	18	23
Horse	4	1	5	2	2	2	2
Dog	1	5	2	2	.7	1	1
Red Deer	-	1	-	-	.1	-	.1
Cattle Loose Teeth Index		(.42)	(.15)	.20	.25	.37	.24
Cattle Longbone Fragmentation I.			(.35)	.31	.19	.20	.26
Sheep/Goat Loose Teeth Index			.36	.26	.37	.51	.37
S/G Longbone Fragmentation Index			.29	.27	.27	.30	.29

TABLE F370.5

Percentage of Fragments of Major Species by Section

Section	Cattle	S/G	Pig	Horse	Dog	Red Deer	Total
2	46	30	18	2	2	.8	252
3	34	47	15	4	-	-	209
4	40	38	18	1	2	-	209
5	33	43	20	3	2	-	255
6	43	38	15	5	-	-	103
7	38	35	21	5	.7	-	151
9	(37)	(33)	(21)	(5)	(3)	(-)	75
10	39	35	21	3	1	-	732
11	27	34	37	.3	2	-	320
12	26	37	37	.4	.2	-	446

TABLE F377.1

Feature 377 Animal Bone Fragments in all Layers

Layer	N	Layer	N	Layer	N
1	63	6	5	11	35
2	4	7	101	12	84
3	4	9	33	13	50
4	14	10	346	Total	739

TABLE F377.2

Species represented in Feature 377 (Fragments)

Species	Layer 1-6	7	9	10	11	12	13	Total
Cattle	10	23	6	48	13	33	8	141
Sheep/Goat	8	24	7	68	8	12	12	139
Pig	2	8	2	46	1	15	5	79
Horse	1	3	-	7	-	1	2	14
Dog	-	1	2	-	1	1	-	5
Unid. Large Mammal	4	25	7	124	4	11	15	190
Sheep-sized Mammal	5	13	9	50	6	10	4	97
Unid. Mammal	2	4	-	2	1	-	4	13
Hedgehog	1	-	-	-	-	-	-	1
Short-tailed Vole	5	-	-	-	-	-	-	5
Unid. Rodent	52	-	-	-	-	-	-	52
Toad	-	-	-	1	-	-	-	1
Starling	-	-	-	-	1	-	-	1
Rook/Crow	-	-	-	-	-	1	-	1
TOTAL	90	101	33	346	35	84	50	739
Sheep	1	-	1	-	-	1	-	3

Table F377.3

Fragments of Major Species Represented in Feature 377

	Cattle	%	Sheep/G	%	Pig	Horse	Dog
Skull frags.	45	32	4	3	6	-	1
Mandible	20	14	24	17	26	-	1
Hyoid	1	.7	1	.7	-	-	-
Loose teeth	25	18	69	50	27	3	1
Scapula	2	1	-	-	3	-	-
Humerus	7	5	3	2	1	1	-
Radius	7	5	6	4	2	1	1
Ulna	3	2	1	.7	2	1	-
Os Coxae	4	3	1	.7	1	1	-
Femur	1	.7	6	4	2	-	-
Patella	-	-	2	1	-	-	-
Tibia	4	3	8	6	2	-	-
Carpals	1	.7	-	-	-	-	-
Calcaneus	2	1	-	-	1	1	-
Other tarsals	-	-	-	-	-	3	-
Metacarpal	4	3	3	2	-	1	-
Metatarsal	3	2	4	3	1	-	-
Metapodial	3	2	-	-	-	-	-
1st Phalanx	1	.7	3	2	1	-	1
2nd Phalanx	2	1	2	1	1	-	-
3rd Phalanx	1	.7	1	.7	1	-	-
Ribs	1	.7	1	.7	1	-	-
Cervical verts.	2	1	-	-	-	2	-
Lumbar verts.	2	1	-	-	1	-	-
TOTAL	141		139		79	14	5

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull & Mandible	54	Skull & Mandible	7
Ribs	9	Ribs	10
Vertebrae	17	Vertebrae	4
Longbone fragments	40	Longbone fragments	57
Unidentified frags.	70	Unidentified frags.	19
TOTAL	190	TOTAL	97

TABLE F378.1

Species represented in Feature 378 (Fragments)

Species	Layer 1	2	3	4	5	6	Total
Cattle	33	3	4	57	22	2	121
Sheep/Goat	183	34	7	176	90	26	516
Pig	31	24	1	32	26	5	119
Horse	4	-	1	5	2	-	12
Dog	3	-	-	6	5	2	16
Hare	-	-	-	1	-	1	2
Cat	29*	-	-	14*	8*	-	51
Unid. Large Mammal	48	11	-	49	17	11	136
Sheep-sized Mammal	181	67	10	159	194	49	660
Unid. Mammal	11	2	1	18	16	1	49
Unid. Bird	19	-	-	1	4	-	24
Short-tailed Vole	1	-	-	-	-	-	1
Mouse sp.	1	-	-	-	1	1	3
Unid. Rodent	-	1	-	1	1	8	11
Frog	-	-	-	1	-	-	1
Flounder	3	-	-	-	-	-	3
Domestic Fowl	5	-	1	3	1	-	10
Starling	-	-	-	-	-	1	1
Rook/Crow	9*	14*	-	2	-	-	25
Raven	-	-	-	3	1	-	4
TOTAL	561	156	25	528	388	107	1765
Sheep	14	1	1	7	5	1	29

* = articulated bones.

TABLE F378.2

Fragments of Major Species Represented in Feature 378

Cattle	F378-1	2	3	Layer 4	5	6	Total	%
Skull frags.	7	2	1	18	2	-	30	25
Mandible	3	-	-	6	3	-	12	10
Hyoid	-	-	1	-	-	-	1	.8
Loose teeth	7	-	-	5	6	-	18	15
Scapula	2	-	-	1	2	-	5	4
Humerus	1	1	-	2	-	-	4	3
Radius	2	-	-	4	-	-	6	5
Ulna	-	-	-	3	1	-	4	3
Os Coxae	3	-	1	3	2	-	9	7
Femur	1	-	-	2	-	-	3	2
Patella	1	-	-	-	-	-	1	.8
Tibia	1	-	-	5	1	-	7	6
Carpals	-	-	-	-	1	-	1	.8
Calcaneus	-	-	-	-	1	-	1	.8
Centroquartal	-	-	-	1	-	-	1	.8
Metacarpal	-	-	-	-	-	1	1	.8
Metatarsal	1	-	-	-	-	-	1	.8
Metapodial	-	-	1	1	-	-	2	2
2nd Phalanx	-	-	-	-	1	-	1	.8
Sesamoids	-	-	-	-	1	-	1	.8
Cervical verts.	2	-	-	6	-	1	9	7
Thoracic verts.	1	-	-	-	-	-	1	.8
Lumbar verts.	1	-	-	-	-	-	1	.8
Sacrum	-	-	-	-	1	-	1	.8
TOTAL	33	3	4	57	22	2	121	

Sheep/Goat	F378-1	2	3	4	5	6	Total	%
Skull frags.	29	10	2	32	6	3	82	16
Mandible	29	1	2	18	10	2	62	12
Hyoid	2	-	1	1	-	1	5	1
Loose teeth	44	10	-	36	18	10	118	23
Scapula	4	1	-	6	1	-	12	2
Humerus	1	1	1	8	5	-	16	3
Radius	11	3	-	12	10	-	36	7
Ulna	1	-	-	1	3	-	5	1
Os Coxae	5	1	-	10	1	-	17	3
Femur	9	-	-	8	7	-	24	5
Patella	-	-	-	2	-	-	2	.4
Tibia	14	2	1	15	8	4	44	9
Carpals	2	-	-	1	-	-	3	.6
Calcaneus	4	-	-	-	1	1	6	1
Astragalus	2	1	-	3	1	-	7	1
Centroquartal	-	-	-	1	1	-	2	.4
Other tarsals	-	-	-	1	-	-	1	.2
Metacarpal	7	-	-	3	4	3	17	3
Metatarsal	7	-	-	6	9	1	23	4
Metapodial	2	-	-	-	2	-	4	.8
1st Phalanx	4	-	-	3	1	-	8	2
2nd Phalanx	1	-	-	2	-	-	3	.6
3rd Phalanx	-	-	-	1	-	-	1	.2
Ribs	1	2	-	2	1	1	7	1
Cervical verts.	2	1	-	3	-	-	6	1
Lumbar verts.	1	1	-	-	1	-	3	.6
Caudal verts.	1	-	-	1	-	-	2	.4
TOTAL	183	34	7	176	90	26	516	

Pig	F378-1	2	3	4	5	6	Total	%
Skull frags.	10	9	-	2	3	-	24	20
Mandible	4	3	-	7	4	1	19	16
Loose teeth	5	6	-	3	7	-	21	18
Scapula	1	1	-	1	1	-	4	3
Humerus	2	-	-	5	-	-	7	6
Radius	-	1	-	-	1	-	2	2
Ulna	1	-	-	-	-	-	1	.8
Os Coxae	2	1	-	4	1	-	8	7
Femur	3	-	-	2	1	-	6	5
Patella	-	1	-	-	-	-	1	.8
Tibia	2	-	-	1	1	1	5	4
Fibula	-	-	-	1	-	-	1	.8
Carpals	-	-	1	-	1	-	2	2
Calcaneus	1	-	-	-	-	-	1	.8
Metatarsal	-	-	-	-	-	1	1	.8
Metapodial	-	-	-	-	1	-	1	.8
1st Phalanx	-	-	-	-	1	-	1	.8
2nd Phalanx	-	-	-	2	-	-	2	2
3rd Phalanx	-	-	-	-	1	1	2	2
Ribs	-	1	-	1	-	1	3	3
Cervical verts.	-	1	-	2	3	-	6	5
Thoracic verts.	-	-	-	1	-	-	1	.8
TOTAL	31	24	1	32	26	5	119	

F378

Horse: skull frags. - 4; mandible - 2; loose teeth - 2; scapula - 1; radius - 2; femur - 1; Total = 12

Dog: skull frags. - 1; loose teeth - 3; scapula - 1; os coxae - 1; metatarsal - 2; 1st phalanx - 2; 3rd phalanx - 1; ribs - 2; thoracic verts. - 1; lumbar vertebrae - 2; Total = 16

Unid. Large Mammal	Total
Skull and mandible frags.	47
Ribs	24
Vertebrae	13
Longbone fragments	16
Unid. fragments	36
Total	136

Sheep-sized Mammal	Total
Skull and mandible frags.	79
Ribs	198
Vertebrae	57
Longbone fragments	175
Unid. fragments	151
Total	660

TABLE F378.3

F378 Summary Statistics

	Layer 1	2	3	4	5	6	Total
Total Fragments	561	156	25	528	388	107	1765
ex.rarer species	523	141	24	517	380	97	1682
+ ex.articulated bones	494			503	372		1631
% Unid. Fragments	49	57		45	61	63	52
Erosion Index	.10	.03		.17	.40	(.94)	.23
Loose Teeth Index	.23	(.26)		.16	.23		.21
% Gnawed Fragments	10	(11)		19	10		14
% Butchered Frags.	10	(9)		12	13		11
% Burnt Fragments	3	-		1	3		2
% Fragments of Major Species							
Cattle	13			21	15		15
Sheep/Goat	72			64	62		66
Pig	12			12	18		15
Horse	2			2	1		2
Dog	1			2	3		2
Hare	-			.4	-		.3
Cattle Loose Teeth Index							.15
Cattle Longbone Fragmentation I.							.20
S/G Loose Teeth Index	.24			.20	(.20)		.23
S/G Longbone Frag.Index	.27			.30	.39		.31

TABLE F380.1

Feature 380 Animal Bone Fragments in all Layers and Sections

Section	Layer 1	2	3	4	5	6	7	Total
1		3	2					5
2		3	9					12
3	8	19	20		207			254
4				10	69			79
5		12	50*		54*	48*	2	166
6	35*		69*	5	44*	34	12	199
7	3	48*	22			15	32	120
8	2	27	43			5	6	83
9	80*	67*	44		47			238
TOTAL	128	179	259	15	421	102	52	1156

* Bones of rarer species represent >20% of the sample.

TABLE F380.2

Species represented in Feature 380 (Fragments)

Species	Layer 1	2	3	4	5	6	7	Total
Cattle	5	11	25	3	84	6	8	142
Sheep/Goat	12	37	42	2	61	14	10	178
Pig	6	12	26	1	33	3	1	82
Horse	-	-	8	1	17	3	-	29
Dog	-	3	-	-	5	1	-	9
Cat	1	-	2	-	-	-	-	3
Unid. Large Mammal	7	29	37	1	90	25	25	214
Sheep-sized Mammal	9	46	81	3	77	9	8	233
Unid. Mammal	2	14	3	1	17	7	-	44
Unid. Bird	-	-	-	-	3	-	-	3
Short-tailed Vole	4	-	2	-	4	1	-	11
Mouse sp.	3	-	-	-	-	-	-	3
Common Shrew	-	-	-	-	-	1	-	1
Unid. Rodent	43	1	1	1	2	15	-	63
Frog	-	1	2	-	-	-	-	3
Toad	7	3	12	-	24	11	-	57
Amphibian	29	5	15	-	4	6	-	59
Buzzard	-	15*	3*	-	-	-	-	18
Rook/Crow	-	2	-	2	-	-	-	4
TOTAL	128	179	259	15	421	102	52	1156
Sheep	-	3	1	-	3	-	-	7

* = articulated bones.

TABLE F380.3

Fragments of Major Species Represented in Feature 380

Cattle	F380-1	Layer Other	Total	%
Skull frags.	30	4	34	24
Mandible	4	9	13	9
Hyoid	-	-	-	-
Loose teeth	22	11	33	23
Scapula	2	6	8	6
Humerus	-	6	6	4
Radius	1	2	3	2
Ulna	2	-	2	1
Os Coxae	-	6	6	4
Femur	1	7	8	6
Tibia	6	-	6	4
Calcaneus	2	1	3	2
Astragalus	1	-	1	.7
Metacarpal	3	1	4	3
Metatarsal	1	1	2	1
Metapodial	1	-	1	.7
1st Phalanx	3	1	4	3
2nd Phalanx	2	1	3	2
3rd Phalanx	-	1	1	.7
Cervical verts.	2	1	3	2
Lumbar verts.	-	-	-	-
Sacrum	1	-	1	.7
TOTAL	84	58	142	

Sheep/Goat	F380-1	Layer Other	Total	%
Skull frags.	5	4	9	5
Mandible	9	11	20	11
Hyoid	-	1	1	.
Loose teeth	12	37	49	28
Scapula	-	1	1	.
Humerus	2	8	10	6
Radius	6	10	16	9
Ulna	-	-	-	-
Os Coxae	3	5	8	4
Femur	7	7	14	8
Tibia	8	13	21	12
Calcaneus	-	1	1	.
Astragalus	-	1	1	.
Metacarpal	3	2	5	3
Metatarsal	4	9	13	7
Metapodial	-	1	1	.
1st Phalanx	2	3	5	3
2nd Phalanx	-	-	-	-
3rd Phalanx	-	1	1	.
Cervical verts.	-	1	1	.
Lumbar verts.	-	1	1	.
Sacrum	-	-	-	-
TOTAL	61	117	178	

Pig	F380-1	Other	Total
Skull frags.	7	10	17
Mandible	6	7	13
Loose teeth	4	16	20
Scapula	1	2	3
Humerus	3	5	8
Radius	-	1	1
Ulna	-	5	5
Os Coxae	2	-	2
Femur	1	1	2
Tibia	3	1	4
Calcaneus	1	-	1
Astragalus	2	-	2
Metatarsal	-	1	1
Metapodial	-	-	-
2nd Phalanx	2	-	2
Cervical verts.	1	-	1
TOTAL	33	49	82

Horse	F380-1	Other	Total
Skull frags.	3	2	5
Mandible	7	4	11
Loose teeth	3	4	7
Scapula	-	-	-
Humerus	-	-	-
Radius	1	-	1
Ulna	-	-	-
Os Coxae	2	1	3
Femur	1	-	1
Tibia	-	-	-
Calcaneus	-	-	-
Astragalus	-	-	-
Metatarsal	-	-	-
Metapodial	-	1	1
2nd Phalanx	-	-	-
Cervical verts.	-	-	-
TOTAL	17	12	29

Dog: skull frags. - 2; mandible -1; humerus - 1; metatarsal - 2; ribs - 3; Total = 9

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull and mandible frags.	53	Skull and mandible frags.	12
Ribs	21	Ribs	53
Vertebrae	1	Vertebrae	6
Longbone fragments	21	Longbone fragments	110
Unid. fragments	118	Unid. fragments	52
Total	214	Total	233

TABLE F380.4

F380 Summary Statistics

	Layer 1	2	3	4	5	6	7	Total
Total Fragments	128	179	259	15	421	102	52	1156
ex.rarer species	42	152	224	12	384	68		934
% Unid. Fragments		59	54		48	(60)	(63)	53
Erosion Index			.54		.42			.48
Loose Teeth Index			.24		.21			.25
% Gnawed Fragments			(19)		14			16
% Butchered Frags.			(9)		5			6
% Fragments of Major Species								
Cattle			24		42			32
Sheep/Goat			41		31			40
Pig			25		17			19
Horse			8		9			7
Dog			-		3			2
Cat			2		-			.7
Cattle Loose Teeth Index					(.26)			.23
Cattle Longbone Fragmentation I.								.34
Sheep/Goat Loose Teeth Index					(.20)			.28
S/G Longbone Fragmentation Index								.29

TABLE F400.1

Species represented in Feature 400 (Fragments)

Species	Layer 1	2	4	5	6	7	8	Total
Cattle	6	2	20	-	23	54	9	114
Sheep/Goat	12	2	33	5	29	162	61	304
Pig	8	-	19	3	18	33	26	107
Horse	4	-	5	-	3	15	-	27
Dog	1	-	2	-	14*	3	2	22
Red Deer	-	-	-	-	-	-	1	1
Cat	-	-	-	-	-	1	-	1
Unid. Large Mammal	4	-	36	3	41	241	54	379
Sheep-sized Mammal	20	1	67	6	83	134	67	378
Unid. Mammal	1	-	10	1	1	5	3	21
Unid. Bird	-	-	-	-	1	1	1	3
Hedgehog	-	-	-	-	-	1	-	1
Short-tailed Vole	1	-	-	-	-	-	-	1
Pygmy Shrew	1	-	-	-	-	-	-	1
Unid. Rodent	59	-	-	-	-	1	-	60
Frog	17	-	-	-	-	-	-	17
Amphibian	35	-	2	-	-	-	-	37
Unid. Fish	-	-	1	-	1	1	-	3
Domestic Fowl	-	-	-	-	-	-	1	1
Thrush sp.	47*	-	-	-	-	-	-	47
Raven	-	-	-	-	2	-	-	2
TOTAL	216	5	195	18	216	652	225	1527
Sheep	-	-	3	-	2	4	2	11

* includes 13 articulated bones.

TABLE F400.2

Fragments of Major Species Represented in Feature 400

Cattle	F400-1	2	4	6	7	8	Total	%
	Layer							
Skull frags.	1	-	11	10	27	1	51	44
Mandible	1	-	-	-	-	1	2	2
Hyoid	-	-	-	2	-	-	2	2
Loose teeth	3	1	2	1	7	2	16	14
Scapula	-	-	-	2	4	2	8	7
Humerus	-	-	1	1	-	-	2	2
Radius	-	-	1	2	1	-	4	4
Ulna	-	-	1	-	1	-	2	2
Os Coxae	-	-	-	3	3	-	6	5
Femur	-	-	2	-	2	-	4	4
Tibia	-	-	-	-	1	-	1	1
Astragalus	-	-	-	1	-	1	2	2
Metacarpal	1	-	-	-	1	-	2	2
Metatarsal	-	-	1	1	3	-	5	4
Metapodial	-	-	1	-	-	1	2	2
1st Phalanx	-	-	-	-	-	1	1	1
2nd Phalanx	-	-	-	-	1	-	1	1
3rd Phalanx	-	-	-	-	1	-	1	1
Ribs	-	1	-	-	-	-	1	1
Lumbar verts.	-	-	-	-	1	-	1	1
Sacrum	-	-	-	-	1	-	1	1
TOTAL	6	2	20	23	54	9	114	

Sheep/Goat	F400-1	2	4	5	6	7	8	Total	%
Skull frags.	3	-	1	-	1	5	1	11	4
Mandible	2	-	1	-	3	35	4	45	15
Hyoid	-	-	1	-	-	-	-	1	.3
Loose teeth	2	-	4	-	7	59	26	98	32
Scapula	1	-	2	-	-	1	-	4	1
Humerus	1	-	2	-	-	8	-	11	4
Radius	1	1	4	1	1	14	13	35	12
Ulna	-	-	2	-	-	-	-	2	.7
Os Coxae	1	-	-	-	-	2	-	3	1
Femur	-	-	2	-	2	4	1	9	3
Tibia	-	-	4	1	8	14	10	37	12
Calcaneus	-	-	-	-	1	-	1	2	.7
Astragalus	-	-	-	-	2	1	-	3	1
Metacarpal	-	-	3	2	2	6	2	15	5
Metatarsal	-	1	5	1	2	10	3	22	7
Metapodial	-	-	1	-	-	-	-	1	.3
1st Phalanx	-	-	-	-	-	1	-	1	.3
2nd Phalanx	-	-	1	-	-	1	-	2	.7
Ribs	-	-	-	-	-	1	-	1	.3
Cervical verts.	1	-	-	-	-	-	-	1	.3
TOTAL	12	2	33	5	29	162	61	304	

Layer

Pig	F400-1	4	5	6	7	8	Total	%
Skull frags.	1	3	2	3	2	2	13	12
Mandible	-	2	-	2	7	2	13	12
Loose teeth	5	5	-	5	11	12	38	36
Scapula	1	-	-	1	1	1	4	4
Humerus	1	-	-	1	1	-	3	3
Radius	-	2	-	-	1	1	4	4
Ulna	-	-	-	2	-	-	2	2
Os Coxae	-	2	-	-	1	1	4	4
Femur	-	3	-	2	1	2	8	7
Tibia	-	-	-	1	1	3	5	5
Fibula	-	2	-	-	1	1	4	4
Calcaneus	-	-	-	-	1	-	1	1
Metacarpal	-	-	-	-	1	1	2	2
1st Phalanx	-	-	-	-	1	-	1	1
Ribs	-	-	-	-	1	-	1	1
Cervical verts.	-	-	1	-	2	-	3	3
Lumbar verts.	-	-	-	1	-	-	1	1
TOTAL	8	19	3	18	33	26	107	

Horse	F400-1	4	6	7	Total
Skull frags.	-	-	-	11	11
Mandible	1	-	-	1	1
Loose teeth	-	1	-	4	5
Scapula	-	-	1	-	1
Ulna	-	-	1	-	1
Os Coxae	1	-	-	-	1
Femur	1	-	-	-	1
Metacarpal	-	2	-	-	2
Metatarsal	-	-	1	-	1
Lat. Metapodial	-	2	-	-	2
Thoracic verts.	1	-	-	-	1
TOTAL	4	5	3	15	27

Dog	F400-1	4	6	7	8	Total
Skull frags.	1	-	1	1	-	3
Loose teeth	-	-	-	-	1	1
Scapula	-	-	-	-	1	1
Humerus	-	-	-	1	-	1
Tibia	-	1	-	-	-	1
Metatarsal	-	1	-	-	-	1
Ribs	-	-	13*	-	-	13
Thoracic verts.	-	-	-	1	-	1
TOTAL	1	2	14	3	2	22

* = articulated bones.

Unid. Large Mammal	Total
Skull and mandible frags.	137
Ribs	23
Vertebrae	16
Longbone fragments	32
Unid. fragments	171
Total	379

Sheep-sized Mammal	Total
Skull and mandible frags.	15
Ribs	94
Vertebrae	13
Longbone fragments	188
Unid. fragments	68
Total	378

TABLE F400.3

F400 Summary Statistics

	Layer 1	2	4	5	6	7	8	Total
Total Fragments	216	5	195	18	216	652	225	1527
ex.rarer species	56		192		212	648	223	1354
+ ex.articulated bones					199			1341
% Unid. Fragments	(45)		59		63	59	56	58
Erosion Index			.27		.50	.33	1.81	.56
Loose Teeth Index			(.15)		(.18)	.30	(.45)	.29
% Gnawed Fragments						13		17
% Butchered Frags.						3		3
% Burnt Fragments			16		1	21	1	13
% Fragments of Major Species								
Cattle			(25)		(31)	20	9	20
Sheep/Goat			(42)		(39)	60	62	54
Pig			(24)		(24)	12	26	19
Horse			(6)		(4)	6	-	5
Dog			(3)		(1)	1	2	2
Red Deer			(-)		(-)	-	1	.2
Cat			(-)		(-)	.4	-	.2
Cattle Loose Teeth Index.								.14
Sheep/Goat Loose Teeth Index						.36	(.43)	.32
S/G Longbone Fragmentation Index						.33	.35	.37

TABLE F593T6.1

Features 593-596 Animal Bone Fragments in all Layers and Sections

Section	F593-1	F594-2	F594-3	F594-4	F595-1	F596-1	F596-2	F596-3	Total
1		23	6	15	23	64	72	33	226
2					1	47	94	11	153
3	3				52		52	24	131
4	28				42	6	28	12	116
5					71	4	28	23	126
6	2				1	26	24	12	65
7	1				15		16	2	34
8					16		16	19	51
10					1		17		18
TOTAL	34	23	6	15	222	147	347	136	

TABLE F593T6.2

Species represented in Features 593-596 (Fragments)

	Layer								
Species	F593	F594-2	F594-3	F594-4	F595-1	F596-1	F596-2	F596-3	Total
Cattle	4	3	-	2	38	23	60	18	148
Sheep/Goat	12	3	1	1	44	34	79	25	199
Pig	4	1	-	1	15	21	30	7	79
Horse	1	3	-	-	4	2	13	4	27
Dog	-	1	-	-	1	-	1	2	5
Large Mammal	7	10	3	5	54	32	67	34	212
Shp-szd.Mam.	5	2	-	6	32	27	55	35	162
Unid. Mammal	-	-	2	-	23	6	14	10	55
Unid. Bird	1	-	-	-	1	-	7	-	9
Mole	-	-	-	-	2	-	-	-	2
Unid. Rodent	-	-	-	-	8	-	-	-	8
Dom. Fowl	-	-	-	-	-	1	1	-	2
Rook/Crow	-	-	-	-	-	1	20*	-	21
Unid. Corvid	-	-	-	-	-	-	-	1	1
TOTAL	34	23	6	15	222	147	347	136	930
Sheep	1	-	-	1	3	5	3	1	14
Goat	2	-	-	-	-	-	-	-	2

* includes articulated bones.

TABLE F593T6.3

Fragments of Major Species Represented in F593-F596

Cattle	593	594	595	596-1	596-2	596-3	Total	%
			Feature/Layer					
Skull frags.	-	-	9	5	11	3	28	19
Mandible	1	1	5	5	10	4	26	18
Loose teeth	-	-	4	6	8	1	19	13
Scapula	1	-	4	1	6	6	18	12
Humerus	-	-	1	-	2	1	4	3
Radius	-	-	1	1	1	1	4	3
Ulna	-	-	2	2	-	-	4	3
Os Coxae	-	1	4	2	2	-	9	6
Femur	-	-	2	-	2	-	4	3
Tibia	1	1	1	-	-	-	3	2
Astragalus	-	-	-	-	2	-	2	1
Centroquartal	-	-	-	-	1	-	1	.7
Metacarpal	-	-	1	1	2	-	4	3
Metatarsal	-	-	1	-	3	-	4	3
1st Phalanx	1	1	-	-	2	1	5	3
2nd Phalanx	-	-	-	-	2	-	2	1
Cervical verts.	-	1	1	-	2	-	4	3
Thoracic verts.	-	-	2	-	3	-	5	3
Lumbar verts.	-	-	-	-	1	-	1	.7
Sacrum	-	-	-	-	-	1	1	.7
TOTAL	4	5	38	23	60	18	148	

Sheep/Goat	593	594	595	596-1	596-2	596-3	Total	%
Skull frags.	2	-	2	2	7	2	15	8
Mandible	-	-	7	8	10	1	26	13
Loose teeth	3	-	15	7	29	12	66	33
Scapula	1	2	1	-	-	1	5	3
Humerus	-	-	2	-	4	-	6	3
Radius	2	-	3	-	2	1	8	4
Ulna	1	-	-	-	-	-	1	.5
Os Coxae	-	-	4	1	-	-	5	3
Femur	-	-	1	1	-	1	3	2
Tibia	1	2	3	4	11	2	23	12
Calcaneus	-	-	-	1	-	-	1	.5
Metacarpal	-	1	-	4	4	1	10	5
Metatarsal	1	-	1	1	3	4	10	5
1st Phalanx	-	-	1	1	3	-	5	3
Ribs	-	-	1	-	1	-	2	1
Cervical verts.	1	-	2	2	2	-	7	4
Thoracic verts.	-	-	1	2	2	-	5	3
Lumbar verts.	-	-	-	-	1	-	1	.5
TOTAL	12	5	44	34	79	25	199	

Pig	593	594	595	596-1	596-2	596-3	Total
	Feature/Layer						
Skull frags.	-	-	1	6	7	1	15
Mandible	-	-	2	1	3	3	9
Loose teeth	-	1	3	2	5	2	13
Scapula	-	-	4	4	5	-	13
Humerus	1	-	1	2	2	-	6
Radius	-	-	-	1	-	-	1
Os Coxae	-	-	-	1	-	-	1
Femur	1	-	-	-	2	-	3
Tibia	-	-	2	-	3	-	5
Carpals	-	-	-	1	-	-	1
Calcaneus	-	-	-	1	1	-	2
Metacarpal	-	-	-	-	1	-	1
Lat. Metapodial	-	1	-	-	-	-	1
1st Phalanx	-	-	1	-	-	-	1
Ribs	2	-	-	1	-	1	4
Cervical verts.	-	-	-	-	1	-	1
Thoracic verts.	-	-	1	-	-	-	1
Lumbar verts.	-	-	-	1	-	-	1
TOTAL	4	2	15	21	30	7	79

Horse	593	594	595	596-1	596-2	596-3	Total
Skull frags.	-	-	-	2	2	-	4
Loose teeth	-	2	1	-	2	2	7
Scapula	-	-	-	-	1	-	1
Humerus	-	-	-	-	1	1	2
Radius	-	-	-	-	1	-	1
Ulna	1	-	-	-	1	-	2
Femur	-	-	-	-	1	-	1
Tibia	-	-	1	-	1	-	1
Lat. Metapodial (Metatarsal)	-	-	2	-	-	-	2
1st Phalanx	-	-	-	-	-	1	1
Thoracic verts.	-	-	-	-	1	-	1
Lumbar verts.	-	-	-	-	2	-	2
Sacrum	-	1	-	-	-	-	1
TOTAL	1	3	4	2	13	4	27

Dog: F594: loose teeth - 1; F595: metapodial - 1; F596-2: humerus - 1; F596-3: caudal verts. - 1; humerus - 1; TOTAL - 5.

Unid. Large Mammal	Total
Skull and mandible frags.	23
Ribs	28
Vertebrae	5
Longbone fragments	36
Unid. fragments	120
Total	212

Sheep-sized Mammal	Total
Skull and mandible frags.	6
Ribs	22
Vertebrae	9
Longbone fragments	81
Unid. fragments	44
Total	162

TABLE F593T6.4

F593-F596 Summary Statistics

	Feature/Layer						
	593	594	595	596-1	596-2	596-3	Total
Total Fragments	34	44	222	147	347	136	930
ex.rarer species	33		211	145	319	135	887
% Unid. Fragments			52	45	43	59	48
Erosion Index			.43	.03	.34	1.02	.40
Loose Teeth Index			.23	(.19)	.24		.23
% Gnawed Fragments					17		17
% Butchered Frags.					5		3
% Fragments of Major Species							
Cattle			37		33		32
Sheep/Goat			43		43		43
Pig			15		16		17
Horse			4		7		6
Dog			1		.5		1
Cattle Loose Teeth Index							.13
Sheep/Goat Loose Teeth Index							.33
S/G Longbone Fragmentation Index							.39

TABLE F608.1

Feature 608 Animal Bone Fragments in all Layers and Sections

Section	Layer 1	2	3	4	6	7	8	Total
1			12	2				14
2		16	3	10		10		39
3	11	24	53			43		131
4		59	274		12	139	22	506
5	15	7	145	86	21	33		307
TOTAL	26	106	487	98	33	225	22	997

TABLE F608.2

Species represented in Feature 608 (Fragments)

Species	Layer 1	2	3	4	6	7	8	Total
Cattle	4	21	64	13	12	30	3	147
Sheep/Goat	1	22	146	28	4	55	3	259
Pig	6	3	14	2	4	6	-	35
Horse	-	1	7	10	-	1	3	22
Dog	-	1	6	2	-	1	-	10
Red Deer	-	-	-	1	-	1	1	3
Unid. Large Mammal	11	30	90	12	11	72	6	232
Sheep-sized Mammal	2	21	138	21	1	48	4	235
Unid. Mammal	1	2	18	7	-	9	2	39
Unid. Bird	-	1	1	1	-	1	-	4
Mouse sp.	-	-	1	-	-	-	-	1
Unid. Rodent	-	1	1	-	-	-	-	2
Amphibian	-	-	-	-	1	-	-	1
Domestic Fowl	1	2	1	1	-	1	-	6
House Sparrow	-	1	-	-	-	-	-	1
TOTAL	26	106	487	98	33	225	22	997
Sheep	-	5	9	-	2	1	-	17

TABLE F608.3

Fragments of Major Species Represented in Feature 608

Cattle	F608-1	2	3	Layer 4	6	7	8	Total	%
Skull frags.	1	2	10	-	-	1	2	16	11
Mandible	-	2	8	1	3	5	-	19	13
Loose teeth	-	4	12	3	1	8	1	29	20
Scapula	3	4	6	1	-	1	-	15	10
Humerus	-	-	2	-	-	2	-	4	3
Radius	-	1	2	-	1	1	-	5	3
Ulna	-	1	-	1	-	-	-	2	1
Os Coxae	-	-	2	-	-	2	-	4	3
Femur	-	2	1	-	-	1	-	4	3
Patella	-	-	1	1	-	-	-	2	1
Tibia	-	-	3	2	-	-	-	5	3
Carpals	-	1	1	-	-	-	-	2	1
Calcaneus	-	-	-	-	1	2	-	3	2
Astragalus	-	-	1	-	-	1	-	2	1
Centroquartal	-	-	1	-	-	-	-	1	.7
Metacarpal	-	1	3	1	-	1	-	6	4
Metatarsal	-	-	4	-	-	3	-	7	5
Metapodial	-	-	-	-	1	-	-	1	.7
1st Phalanx	-	-	3	1	2	-	-	6	4
2nd Phalanx	-	1	-	-	-	-	-	1	.7
3rd Phalanx	-	-	2	-	-	1	-	3	2
Ribs	-	2	1	-	1	-	-	4	3
Cervical verts.	-	-	1	2	-	1	-	4	3
Thoracic verts.	-	-	-	-	2	-	-	2	1
TOTAL	4	21	64	13	12	30	3	147	

Sheep/Goat	F608-1	2	3	4	6	7	8	Total	%
Skull frags.	-	2	9	-	2	-	-	13	5
Mandible	-	-	16	2	-	3	-	21	8
Hyoid	-	1	1	-	-	-	-	2	.8
Loose teeth	-	4	40	12	1	29	2	88	34
Scapula	-	-	1	-	-	1	-	2	.8
Humerus	-	-	2	1	-	4	-	7	3
Radius	-	-	8	4	-	3	-	15	6
Ulna	-	-	6	-	-	1	-	7	3
Os Coxae	-	-	6	-	-	-	-	6	2
Femur	-	1	2	1	-	1	-	5	2
Tibia	1	2	10	3	1	3	-	20	8
Calcaneus	-	-	2	-	-	-	-	2	.8
Metacarpal	-	5	6	2	-	1	1	15	6
Metatarsal	-	2	10	1	-	6	-	19	7
1st Phalanx	-	3	2	1	-	1	-	7	3
2nd Phalanx	-	1	1	-	-	-	-	2	.8
Ribs	-	-	3	1	-	-	-	4	2
Cervical verts.	-	1	10	-	-	1	-	12	5
Thoracic verts.	-	-	7	-	-	-	-	7	3
Lumbar verts.	-	-	4	-	-	1	-	5	2
TOTAL	1	22	146	28	4	55	3	259	

Pig	Layer F608-1	2	3	4	6	7	Total
Mandible	1	1	3	-	-	2	7
Loose teeth	-	-	3	1	2	2	8
Humerus	1	-	2	-	-	-	3
Radius	-	-	-	-	1	-	1
Ulna	-	-	-	1	-	-	1
Os Coxae	-	-	-	-	1	-	1
Femur	2	1	1	-	-	-	4
Tibia	1	-	1	-	-	-	2
Fibula	1	-	2	-	-	-	3
Lat. Metapodial	-	-	1	-	-	2	3
1st Phalanx	-	1	-	-	-	-	1
Lumbar verts.	-	-	1	-	-	-	1
TOTAL	6	3	14	2	4	6	35

Horse	F608-2	3	4	7	8	Total
Skull frags.	-	-	2	-	-	2
Mandible	-	1	-	-	-	1
Loose teeth	1	2	4	-	1	8
Humerus	-	1	-	-	1	2
Radius	-	1	-	-	-	1
Femur	-	-	1	-	-	1
Patella	-	-	1	-	-	1
Astragalus	-	-	1	-	-	1
Metatarsal	-	-	-	1	-	1
Metapodial	-	-	-	-	1	1
1st Phalanx	-	1	1	-	-	2
2nd Phalanx	-	1	-	-	-	1
TOTAL	1	7	10	1	3	22

Dog: loose teeth - 2; humerus - 1; femur - 1; ribs -5; thoracic vertebrae - 1; Total = 10

Unid. Large Mammal	Total
Skull and mandible frags.	8
Ribs	52
Vertebrae	9
Longbone fragments	44
Unid. fragments	119
Total	232

Sheep-sized Mammal	Tota
Skull and mandible frags.	[illegible]
Ribs	4[illegible]
Vertebrae	1[illegible]
Longbone fragments	14[illegible]
Unid. fragments	3[illegible]
Total	23[illegible]

TABLE F608.4

F608 Summary Statistics

	Layer 1	2	3	4	6	7	8	Total
Total Fragments	26	106	487	98	33	225	22	997
ex.rarer species	25	101	483	96	32	223		982
% Unid. Fragments		52	51	(42)		58		52
Erosion Index		(.05)	.17			.74		.30
Loose Teeth Index			.24			(.43)		.28
% Gnawed Fragments			17					16
% Butchered Frags.			2					3
% Fragments of Major Species								
Cattle			27			(32)		31
Sheep/Goat			62			(59)		54
Pig			6			(6)		7
Horse			3			(1)		5
Dog			3			(1)		2
Red Deer			-			(1)		.6
Cattle Loose Teeth Index								.20
Sheep/Goat Loose Teeth Index			.27					.34
S/G Longbone Fragmentation Index								.35

TABLE F632.1

Species represented in Feature 632 (Fragments)

Species	Layer 2	3	4	5	6	7	8	9	Total
Cattle	2	5	25	-	22	9	4	1	68
Sheep/Goat	3	11	48	3	13	9	5	5	97
Pig	-	4	11	-	5	-	1	-	21
Horse	-	1	7	6	12	-	-	-	26
Dog	1	1	4	-	120*	49*	24*	2	201
Unid. Large Mammal	1	4	54	2	17	5	-	5	88
Sheep-sized Mammal	1	4	43	5	15	21	5	14	108
Unid. Mammal	-	2	13	2	3	2	-	6	28
Unid. Bird	-	1	9	-	1	1	-	-	12
Short-tailed Vole	-	1	-	-	-	-	-	-	1
Unid. Rodent	1	-	5	-	-	-	-	-	6
Frog	-	23*	129*	-	-	-	-	-	152
Toad	-	6*	23*	-	-	-	-	-	29
Amphibian	-	25*	67*	-	-	-	-	-	92
Domestic Fowl	130*	1	2	-	-	-	-	-	133
Dom. Duck/Mallard	-	-	3	-	-	-	-	-	3
Skylark	-	1	-	-	-	-	-	-	1
Thrush sp.	-	-	2	-	-	-	-	-	2
House Sparrow	-	1	3	-	-	-	-	-	4
TOTAL	139	91	448	18	208	96	39	33	1072
Sheep	-	1	3	-	-	-	-	-	4

* includes articulated bones

TABLE F632.2

Fragments of Major Species Represented in Feature 632

Cattle	Layer F632-2	3	4	6	7	8	9	Total
Skull frags.	1	-	1	3	1	-	-	6
Mandible	-	-	2	2	-	-	1	5
Loose teeth	1	5	4	8	3	1	-	22
Scapula	-	-	3	2	-	1	-	6
Humerus	-	-	1	1	-	-	-	2
Radius	-	-	1	-	-	-	-	1
Os Coxae	-	-	1	1	1	1	-	4
Femur	-	-	2	1	-	-	-	3
Tibia	-	-	1	-	2	-	-	3
Calcaneus	-	-	1	-	1	-	-	2
Astragalus	-	-	1	-	-	-	-	1
Centroquartal	-	-	-	-	-	1	-	1
Other tarsals	-	-	1	-	-	-	-	1
Metacarpal	-	-	-	1	-	-	-	1
Metatarsal	-	-	4	-	-	-	-	4
1st Phalanx	-	-	1	-	1	-	-	2
2nd Phalanx	-	-	1	-	-	-	-	1
3rd Phalanx	-	-	-	1	-	-	-	1
Cervical verts.	-	-	-	1	-	-	-	1
Lumbar verts.	-	-	-	1	-	-	-	1
TOTAL	2	5	25	22	9	4	1	68

Sheep/Goat	F632-2	3	4	5	6	7	8	9	Total
Mandible	-	-	4	1	2	-	2	-	9
Loose teeth	2	7	11	1	6	5	2	4	38
Scapula	-	-	1	-	-	-	-	-	1
Humerus	-	-	2	1	-	1	-	-	4
Radius	-	2	-	-	1	-	-	-	3
Os Coxae	-	-	1	-	-	-	-	-	1
Femur	-	-	2	-	1	-	-	-	3
Tibia	-	-	5	-	-	2	1	-	8
Carpals	-	-	1	-	-	-	-	-	1
Calcaneus	-	-	1	-	-	-	-	-	1
Metacarpal	1	1	3	-	1	-	-	-	6
Metatarsal	-	-	6	-	1	1	-	1	9
1st Phalanx	-	1	1	-	-	-	-	-	2
2nd Phalanx	-	-	3	-	1	-	-	-	4
Ribs	-	-	3	-	-	-	-	-	3
Sternebrae	-	-	1	-	-	-	-	-	1
Thoracic verts.	-	-	3	-	-	-	-	-	3
TOTAL	3	11	48	3	13	9	5	5	~~99~~ 97

Pig	Layer F632-3	4	6	8	Total
Skull frags.	-	-	2	-	2
Mandible	1	1	1	-	3
Loose teeth	1	6	2	-	9
Os Coxae	-	1	-	-	1
Tibia	-	1	-	1	2
Carpals	-	1	-	-	1
Lat. Metapodial	-	1	-	-	1
1st Phalanx	1	-	-	-	1
Thoracic verts.	1	-	-	-	1
TOTAL	4	11	5	1	21

Horse	F632-3	4	5	6	Total
Skull frags.	-	-	1	1	2
Mandible	-	-	1	-	1
Loose teeth	-	-	-	2	2
Scapula	-	1	-	1	2
Humerus	-	-	1	1	~~1~~ 2
Radius	-	-	1	1	2
Ulna	-	-	-	1	1
Os Coxae	-	2	-	-	2
Femur	-	-	1	2	3
Tibia	-	1	-	-	1
Carpals	-	-	-	1	1
Astragalus	-	1	-	-	1
Metatarsal	-	1	-	1	2
Lat. Metapodial	-	-	-	1	1
1st Phalanx	1	-	-	-	1
Ribs	-	-	1	-	1
Cervical verts.	-	1	-	-	1
TOTAL	1	7	6	12	26

Dog	F632-2	3	4	Layer 6	7	8	9	Total
Skull frags.	1	-	-	1	3	1	-	6
Mandible	-	-	-	4	-	-	-	4
Hyoid	-	-	-	-	1	-	-	1
Loose teeth	-	-	-	4	-	-	1	5
Scapula	-	-	-	2	-	-	-	2
Humerus	-	-	-	2	-	-	-	2
Radius	-	-	-	2	-	1	-	3
Ulna	-	-	-	4	-	-	-	4
Os Coxae	-	-	-	2	-	-	-	2
Femur	-	-	1	1	-	-	-	2
Tibia	-	1	-	1	2	1	-	5
Fibula	-	-	-	2	2	-	-	4
Carpals	-	-	-	3	-	1	-	4
Calcaneus	-	-	-	1	-	-	-	1
Other tarsals	-	-	-	2	-	-	-	2
Metacarpal	-	-	-	7	5	3	-	15
Metatarsal	-	-	-	6	4	-	-	10
Metapodial	-	-	1	-	2	2	-	5
1st Phalanx	-	-	-	7	2	4	-	13
2nd Phalanx	-	-	-	4	1	-	-	5
Ribs	-	-	-	22	13	3	1	39
Sternebrae	-	-	-	1	1	2	-	4
Cervical verts.	-	-	-	7	2	1	-	10
Thoracic verts.	-	-	-	14	2	2	-	18
Lumbar verts.	-	-	1	8	3	2	-	14
Sacrum	-	-	-	2	-	-	-	2
Caudal Verts.	-	-	1	10	5	1	-	17
Baculum	-	-	-	1	1	-	-	2
TOTAL	1	1	4	120	49	24	2	201

Unid. Large Mammal	Total
Skull and mandible frags.	7
Ribs	10
Vertebrae	7
Longbone fragments	8
Unid. fragments	56
Total	88

Sheep-sized Mammal	Total
Skull and mandible frags.	10
Ribs	15
Vertebrae	14
Longbone fragments	44
Unid. fragments	25
Total	108

TABLE F633.1

Feature 633 Animal Bone Fragments in all Layers

Layer	N	Layer	N	Layer	N	Layer	N
4	3	18	4	31	94	41	157
7	5	21	8	32	71	43	5
9	21	23	153	33	30	44	4
11	18	24	24	35	5	45	121
15	7	25	25	36	21		
16	24	28	1	38	2		
17	188	30	21	40	99	Total	1111

N = number of fragments.

TABLE F633.2

Species represented in Feature 633 (Fragments)

	Layer							
Species	1-16	17	18-21	23	24-40	41	43-45	Total
Cattle	32	30	3	48	85*	20	24	242
Sheep/Goat	13	62	4	27	106	33	34	279
Pig	8	16	-	17	14	9	7	71
Horse	1	7	-	3	5	5	3	24
Dog	3	25*	2	-	14	1	2	47
Hare (Intrusive?)	-	-	-	-	-	-	1	1
Unid. Large Mammal	13	20	2	43	74	40	25	217
Sheep-sized Mammal	7	19	-	9	57	47	25	164
Unid. Mammal	1	7	-	1	18	1	9	37
Unid. Bird	-	1	1	-	4	-	-	6
Water Vole	-	-	-	4	-	-	-	4
Short-tailed Vole	-	-	-	-	1	-	-	1
Unid. Rodent	-	-	-	-	14	-	-	14
Domestic Fowl	-	-	-	-	-	1	-	1
Common Buzzard	-	-	-	1	-	-	-	1
Rook/Crow	-	1	-	-	-	-	-	1
Jackdaw	-	-	-	-	1	-	-	1
TOTAL	78	188	12	153	393	157	130	1111
Sheep	2	5	1	1	13	4	-	26

TABLE F633.3

Fragments of Major Species Represented in Feature 633

Cattle	Layer F633 1-16	17	18-21	23	24-40	41	43-45	Total	%+
Skull frags.	5	8	-	12	21	4	-	50	21
Mandible	5	4	1	6	16	3	4	39	17
Hyoid	-	1	-	-	-	-	-	1	.4
Loose teeth	8	9	1	10	13	1	12	54	23
Scapula	2	1	-	1	1	-	-	5	2
Humerus	-	-	-	4	2	2	-	8	3
Radius	-	1	1	-	1	1	-	4	2
Ulna	1	-	-	-	-	-	-	1	.4
Os Coxae	-	-	-	4	1	-	1	6	3
Femur	1	-	-	-	1	-	1	3	1
Tibia	2	-	-	-	3	1	-	6	3
Carpals	-	1	-	1	-	2	-	4	2
Calcaneus	2	-	-	-	1	1	-	4	2
Astragalus	1	1	-	-	-	-	-	2	.8
Metacarpal	2	2	-	1	5*	-	-	10	4
Metatarsal	2	1	-	2	3	2	-	10	4
1st Phalanx	-	-	-	2	3*	1	2	8	3
2nd Phalanx	-	-	-	-	2*	-	-	2	-
3rd Phalanx	-	-	-	-	3*	-	1	4	1
Cervical verts.	-	1	-	2	6	1	3	13	6
Thoracic verts.	-	-	-	-	-	1	-	1	.4
Lumbar verts.	1	-	-	1	3	-	-	5	2
Sacrum	-	-	-	2	-	-	-	2	.8
TOTAL	32	30	3	48	85	20	24	242	

* includes 1 metacarpus, 2 1st phalanges, 2 2nd phalanges and 1 3rd phalanx from articulated group in layer 31.
+ excluding articulated bones.

Layer

Sheep/Goat	F633 1-16	17	18-21	23	24-40	41	43-45	Total	%
Skull frags.	1	3	-	-	17	2	-	23	8
Mandible	3	14	-	4	12	1	3	37	13
Hyoid	-	-	-	1	-	-	-	1	.4
Loose teeth	3	27	2	13	27	12	22	106	38
Scapula	-	-	-	-	1	-	-	1	.4
Humerus	-	2	-	2	5	-	-	9	3
Radius	2	6	-	1	4	4	4	21	8
Ulna	-	-	-	-	1	1	1	3	1
Os Coxae	-	1	1	1	4	1	2	10	4
Femur	-	-	-	-	5	-	-	5	2
Tibia	3	3	-	2	10	4	1	23	8
Carpals	-	-	-	-	1	-	-	1	.4
Calcaneus	-	-	-	-	-	1	-	1	.4
Astragalus	-	-	-	-	-	1	-	1	.4
Metacarpal	-	2	-	1	2	1	-	6	2
Metatarsal	1	2	1	1	3	3	1	12	5
Metapodial	-	-	-	-	1	-	-	1	.4
1st Phalanx	-	-	-	-	1	2	-	3	1
2nd Phalanx	-	1	-	1	1	-	-	3	1
Ribs	-	-	-	-	2	-	-	2	.7
Cervical verts.	-	1	-	-	2	-	-	3	1
Thoracic verts.	-	-	-	-	3	-	-	3	1
Lumbar verts.	-	-	-	-	3	-	-	3	1
Sacrum	-	-	-	-	1	-	-	1	.4
TOTAL	13	62	4	27	106	33	34	279	

Pig	F633 1-16	17	23	24-40	41	43-45	Total
Skull frags.	1	-	3	4	-	-	8
Mandible	1	2	1	1	1	-	6
Loose teeth	5	7	8	6	4	5	35
Scapula	-	-	1	-	-	1	2
Humerus	-	-	1	-	-	-	1
Radius	-	1	1	-	1	-	3
Ulna	-	-	-	-	1	-	1
Os Coxae	1	1	-	-	-	-	2
Femur	-	2	-	1	1	-	4
Tibia	-	2	2	-	-	-	4
Fibula	-	-	-	1	1	1	3
Metacarpal	-	1	-	-	-	-	1
1st Phalanx	-	-	-	1	-	-	1
TOTAL	8	16	17	14	9	7	71

Horse	F633 1-16	17	23	Layer 24-40	41	43-45	Total
Skull frags.	1	3	2	-	-	-	6
Mandible	-	1	-	-	-	-	1
Loose teeth	-	2	1	4	2	1	10
Ulna	-	-	-	-	-	1	1
Femur	-	1	-	-	-	-	1
Patella	-	-	-	-	1	-	1
Tibia	-	-	-	1	-	-	1
Metacarpal	-	-	-	-	-	1	1
Metatarsal	-	-	-	-	1	-	1
1st Phalanx	-	-	-	-	1	-	1
TOTAL	1	7	3	5	5	3	24

Dog	F633 1-16	Art. 17	Oth. 17	18-21	24-40	41	43-45	Total
Skull frags.	-	1	1	-	1	-	-	3
Mandible	-	-	-	-	3	-	-	3
Loose teeth	-	-	1	1	7	-	-	9
Humerus	1	-	-	1	-	1	-	3
Radius	-	-	-	-	-	-	1	1
Ulna	-	-	1	-	-	-	-	1
Os Coxae	-	2	-	-	1	-	-	3
Femur	-	2	-	-	1	-	-	3
Tibia	-	2	-	-	-	-	-	2
Fibula	-	1	-	-	-	-	-	1
Calcaneus	1	-	-	-	-	-	-	1
Metacarpal	1	2	-	-	-	-	1	4
Metatarsal	-	2	1	-	-	-	-	3
1st Phalanx	-	1	-	-	-	-	-	1
Ribs	-	5	-	-	-	-	-	5
Thoracic verts.	-	1	-	-	1	-	-	2
Lumbar verts.	-	1	-	-	-	-	-	1
Caudal Verts.	-	-	1	-	-	-	-	1
TOTAL	3	20	5	2	14	1	2	47

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull and mandible frags.	61	Skull and mandible frags.	8
Ribs	16	Ribs	23
Vertebrae	18	Vertebrae	7
Longbone fragments	36	Longbone fragments	86
Unid. fragments	86	Unid. fragments	45
Total	217	Total	164

TABLE F633.4

F633 Summary Statistics

	Layer							
	1-16	17	18-21	23	24-40	41	43-45	Total
Total Fragments	78	188	12	153	393	157	130	1111
ex.rarer species		186		148	373	156		1083
+ ex.articulated bones		166			367			1057
% Unid. Fragments		28		36	41	56	45	40
Erosion Index		.44		.49	.24	.48		.42
Loose Teeth Index		.38		.33	.27			.34
% Gnawed Fragments		(18)			12			12
% Butchered Frags.		(1)			6			5
% Fragments of Major Species								
Cattle		25		(51)	36			37
Sheep/Goat		52		(28)	49			44
Pig		13		(18)	6			11
Horse		6		(3)	2			4
Dog		4		(-)	6			4
Hare		-		(-)	-			.2
Cattle Loose Teeth Index					(.15)			.23
Cattle Longbone Fragmentation I.								.29
Sheep/Goat Loose Teeth Index					.25			.38
S/G Longbone Fragmentation Index					.35			.32

TABLE F634.1

Feature 634 Animal Bone Fragments in all Layers and Sections

Section	Layer 1	Layer 2	Layer 3	Total
1		36	2	38
3		116	21	137
4		34	10	44
5	20	47	4	71
6		41	30	71
7	1	24	3	28
8	4	8		12
9		11	12	23
10			4	4
11		6	3	9
13			41	41
14			2	2
15		4		4
16		112	6	118
17	6			6
18		22		22
19		122		122
20	8	67		75
21	22	12		34
22		53	9	62
23	6	79		85
24		73	4	77
25	1	23	5	29
26		22		22
27		66	1	67
28	1	51	12	64
29	2	25	24	51
30	11	8		19
31		7	6	13
32		1	18	19
33	1	14	20	35
34		41		41
35	20	38	18	76
36	7	61	43	111
38		13	13	26
39	4			4
40	3	4	9	16
41	5	28		33
42	8	91	59	158
43		23	16	39
44		33	43	76
45	5	22	46	73
46	1	347	58	406
47		129	13	142
48	112	89		201
49		187		187
50		55		55
Total	249	2245	555	3049

TABLE F634.2

Species represented in Feature 634 (Fragments)

Species	Layer 1	Layer 2	Layer 3	Total
Cattle	23	486*	94	603
Sheep/Goat	37	232*	39	308
Pig	2	40	9	51
Horse	3	102*	35	140
Dog	9	257*	-	266
Red Deer	-	2	3	5
Roe Deer	-	1	-	1
Hare	-	1	-	1
Unid. Large Mammal	80	837	303	1220
Sheep-sized Mammal	24	212	49	285
Unid. Mammal	11	65	23	99
Unid. Bird	7	3	-	10
Water Vole	-	1	-	1
Domestic Fowl	52*	5	-	57
Rook/Crow	1	1	-	2
TOTAL	249	2245	555	3049
Sheep	1	14	1	16

* the following groups of articulated bones are included:-
634-1-20: 6 bones of dog
634-1-48: 52 bones of domestic fowl
634-2-3: 78 bones of dog
634-2-9: 5 bones of horse
634-2-19: 36 bones of cattle
634-2-20: 26 bones of cattle
634-2-23: 4 bones of cattle
634-2-42: 14 bones of cattle; 6 bones of horse
634-2-46: 4 bones of sheep/goat; 146 bones of dog

TABLE F634.3

Fragments of Major Species Represented in Feature 634

Cattle	F634-1	Layer Art. 2	Layer Oth. 2	3	Total	%*
Skull frags.	-	-	44	3	47	9
Mandible	3	-	39	12	54	10
Loose teeth	3	-	103	23	129	25
Scapula	1	-	23	8	32	6
Humerus	-	-	15	10	25	5
Radius	3	-	10	9	22	4
Ulna	2	-	6	2	10	2
Os Coxae	-	2	13	1	16	3
Femur	1	-	19	6	26	5
Patella	-	-	2	-	2	.4
Tibia	2	-	23	8	33	6
Carpals	-	-	1	-	1	.2
Calcaneus	-	-	11	1	12	2
Astragalus	-	-	10	1	11	2
Centroquartal	-	-	7	-	7	1
Other tarsals	-	-	4	-	4	.8
Metacarpal	2	-	10	4	16	3
Metatarsal	-	-	15	5	20	4
Metapodial	1	-	5	-	6	1
1st Phalanx	1	-	10	-	11	2
3rd Phalanx	-	-	1	-	1	.2
Sesamoids	-	-	-	1	1	.2
Ribs	-	31	2	-	33	.4
Cervical verts.	2	17	21	-	40	4
Thoracic verts.	1	25	6	-	32	1
Lumbar verts.	-	3	6	-	9	1
Sacrum	1	2	-	-	3	.2
TOTAL	23	80	406	94	603	

* excludes articulated bones

Sheep/Goat	F634-1	Layer 2	3	Total	%+
Skull frags.	1	29*	2	32	10
Mandible	3	26*	2	31	10
Loose teeth	19	121	30	170	56
Scapula	-	3	-	3	1
Humerus	2	4	-	6	2
Radius	-	6	1	7	2
Ulna	-	2	-	2	.7
Os Coxae	-	5	-	5	2
Femur	-	3	-	3	1
Patella	-	1	-	1	.3
Tibia	4	10	3	17	6
Calcaneus	1	-	-	1	.3
Astragalus	-	1	-	1	.3
Metacarpal	2	11	-	13	4
Metatarsal	2	9	1	12	4
Metapodial	1	-	-	1	.3
3rd Phalanx	-	1	-	1	.3
Lumbar verts.	2	-	-	2	.7
TOTAL	37	232	39	308	

* includes 2 articulated skull fragments and 2 mandibles
+ excludes articulated bones

Pig	F634-1	2	3	Total
Skull frags.	-	6	-	6
Mandible	-	7	-	7
Loose teeth	-	17	9	26
Humerus	-	3	-	3
Radius	-	1	-	1
Ulna	1	-	-	1
Os Coxae	-	1	-	1
Femur	-	1	-	1
Tibia	-	3	-	3
Calcaneus	-	1	-	1
Metapodial	1	-	-	1
TOTAL	2	40	9	51

Horse	F634-1	Layer Art. 2	Other 2	3	Total	%*
Skull frags.	-	-	4	-	4	3
Mandible	-	-	8	2	10	8
Loose teeth	1	-	26	17	44	34
Scapula	1	-	1	-	2	2
Humerus	-	2	3	1	6	3
Radius	1	2	5	-	8	5
Ulna	-	1	3	-	4	2
Os Coxae	-	-	2	5	7	5
Femur	-	-	5	5	10	8
Patella	-	-	1	-	1	.8
Tibia	-	-	9	-	9	7
Calcaneus	-	1	1	-	2	.8
Astragalus	-	-	2	1	3	2
Other tarsals	-	1	-	-	1	-
Metacarpal	-	-	5	-	5	4
Metatarsal	-	1	1	1	3	2
Lat. Metapodial	-	2	3	-	5	2
Metapodial	-	-	1	-	1	.8
1st Phalanx	-	1	4	-	5	3
2nd Phalanx	-	-	1	-	1	.8
Ribs	-	-	4	-	4	3
Cervical verts.	-	-	2	3	5	3
TOTAL	3	11	91	35	140	

* excluding articulated bones

Dog	Art. F634-1	Layer Oth. 1	Art. 2	Oth. 2	Total
Skull frags.	-	1	-	3	4
Mandible	-	1	3	4	8
Hyoid	-	-	1	-	1
Loose teeth	-	-	-	15	15
Scapula	-	-	1	-	1
Humerus	-	-	1	1	2
Radius	-	-	4	1	5
Ulna	-	-	4	-	4
Os Coxae	-	-	2	-	2
Femur	-	-	3	2	5
Patella	-	-	3	-	3
Tibia	-	-	3	2	5
Fibula	-	-	4	-	4
Carpals	-	-	18	-	18
Calcaneus	-	-	1	2	3
Astragalus	-	-	2	-	2
Other tarsals	-	-	5	-	5
Metacarpal	-	-	17	-	17
Metatarsal	-	-	9	-	9
Metapodial	-	-	-	2	2
1st Phalanx	-	-	26	-	26
2nd Phalanx	-	-	27	1	28
3rd Phalanx	-	-	17	-	17
Ribs	-	-	22	-	22
Costal carts.	-	-	8	-	8
Sternebrae	-	-	1	-	1
Cervical verts.	-	1	8	-	9
Thoracic verts.	-	-	17	-	17
Lumbar verts.	6	-	1	-	1
Caudal Verts.	-	-	9	-	9
TOTAL	6	3	224	33	266

Unid. Large Mammal	Total
Skull and mandible frags.	60
Ribs	155
Vertebrae	89
Longbone fragments	204
Unid. fragments	712
Total	1220

Sheep-sized Mammal	Total
Skull and mandible frags.	26
Ribs	17
Vertebrae	5
Longbone fragments	173
Unid. fragments	64
Total	285

TABLE F634.4

F634 Summary Statistics

	Layer 1	2	3	Total
Total Fragments	249	2245	555	3049
ex.rarer species	189	2235		2979
+ ex.articulated bones	183	1916		2654
% Unid. Fragments	63	58	68	60
Erosion Index	1.51	1.52	1.26	1.47
Loose Teeth Index		.35	.49	.38
% Gnawed Fragments		8	(3)	7
% Butchered Frags.		1	(-)	1
% Fragments of Major Species				
Cattle		51	52	50
Sheep/Goat		28	22	29
Pig		5	5	5
Horse		11	19	12
Dog		4	-	4
Red Deer		.2	2	.5
Roe Deer		.1	-	.1
Hare		.1	-	.1
Cattle Loose Teeth Index		.25		.25
Cattle Longbone Fragmentation I.		.45	.38	.44
Sheep/Goat Loose Teeth Index		.52		.56
S/G Longbone Fragmentation Index		.43		.40

TABLE F642.1

Feature 642 Animal Bone Fragments in all Layers and Sections

	Layer												
Sect.	1	3	4	5	6	7	8	9	10	11	12	14	Total
1	3	29											32
2		115		161				62					338
3		285		88			14	13					400
4	19	287		317			9						632
5	5	141		119				25					290
6	17	139		136				41					333
7	53	287		226			112	46	12				736
8	407	112		1	60	147	154	14					895
9	36		568	65		402	47	22					1140
8/9							132						132
10	5	45	103	38		189	316						696
11	46	44	110	3		55	53						311
12				54		318	247						619
13		28		209		51	25	12					325
14	20	56		4		1	31	122					234
15	18	279		24		168	20	21					530
16		122		217		49	8	29					425
17	36	608		287	3	155	281	94					1464
18				168					7	44			219
19	13			21					7	179	49		269
20	10			156			1			125	8		30[illegible]
21	46			28						234	8		31[illegible]
22				1						41			4[illegible]
23	13			125					13	160	2		31[illegible]
24	5			15								7	2[illegible]
25				13								3	1[illegible]
26	29	16		34								24	10[illegible]
27	4	30		124								27	18[illegible]
28	10	19		156								42	22[illegible]
29		1											
30	49	4		74								14	14[illegible]
31	12	18		40								24	9[illegible]
32		60		73								50	18[illegible]
TOT	856	2725	781	2977	63	1535	1450	501	39	783	67	191	1196[illegible]

TABLE F642.2

Species represented in Feature 642 (Fragments)

Species	Layer 1	3	4	5	6	7	8
Cattle	171*	628*	195	636*	16	362*	294
Sheep/Goat	83	576	153	628	11	392*	309
Pig	245*	261	69	183	8	58	95
Horse	16	73*	19	98	1	24	36
Dog	16	263*	69*	138*	4	59*	38
Red Deer	-	1	-	-	-	-	-
Hare	-	3	-	1	-	2	1
Cat	-	1	-	1	-	-	-
Unid. Large Mammal	101	488	139	708	14	331	378
Sheep-sized Mammal	96	336	106	432	5	261	243
Unid. Mammal	12	50	22	59	3	33	43
Unid. Bird	7	3	2	7	-	5	2
Hedgehog	-	-	-	3	-	-	-
Weasel	-	-	-	1	-	-	-
Water Vole	-	1	-	-	-	-	-
Short-tailed Vole	-	2	-	-	-	-	-
Mouse sp.	-	-	-	55*	-	-	-
Unid. Rodent	1	10	1	4	-	1	-
Frog	-	-	-	2	-	-	-
Toad	-	5	-	3	-	-	-
Amphibian	-	2	1	3	-	-	-
Flounder	-	1	-	-	-	-	-
Unid. Fish	-	-	-	1	-	-	-
Domestic Fowl	32*	7	5*	7	-	4	10
Grey Lag/Dom. Goose	3	-	-	-	-	-	-
Goose/Duck sp.	-	-	-	1	-	-	-
Mallard/ Dom. Duck	-	-	-	-	-	-	1
Duck species	-	-	-	-	-	2	-
Woodcock	-	-	-	1	-	-	-
Rook/Crow	4	3	-	2	1	-	-
~~Jackdaw~~	~~3~~	-	-	-	-	-	-
Raven	69*	8	-	2	-	-	-
Unid. Corvid	-	1	-	-	-	-	-
Thrush sp.	-	1	-	1	-	-	-
House Sparrow	-	1	-	-	-	1	-
TOTAL	856	2725	781	2977	63	1535	1450
Sheep	14	51	16	38	1	24	16
Goat	-	-	-	-	-	-	1

* the following groups of articulated bones were recorded:-
F642-1-15 6 cattle bones. F642-1-8 180 pig bones.
F642-1-21 29 domestic fowl bones. F642-1-7 14 bones of a raven.

F642-1-8 50 bones of a raven. F642-3-17 6 cattle bones; 9 horse bones. F642-3-4 65 dog bones. F642-3-15 93 bones of a dog. F642-4-11 50 dog bones; 5 bones of a domestic fowl. F642-5-5 5 bones of cattle. F642-5-13 55 bones of a mouse. F642-5-18 16 bones of a dog. F642-5-23 43 bones of a dog. F642-7-9 28 cattle bones. F642-7-17 18 cattle bones. F642-7-12 6 sheep/goat bones; 13 bones of a dog.

Species	9	10	11	12	14	Total
Cattle	73	6	128	2	37	2548
Sheep/Goat	117	10	127	13	42	2461
Pig	33	2	35	8	7	1004
Horse	9	-	18	-	8	302
Dog	3	5	41	-	2	638
Red Deer	-	-	-	-	1	2
Hare	-	-	-	-	-	7
Cat	-	-	36*	-	-	38
Unid. Large Mammal	154	6	197	30	81	2627
Sheep-sized Mammal	99	7	178	13	12	1788
Unid. Mammal	12	3	20	1	-	258
Unid. Bird	-	-	3	-	-	29
Hedgehog	-	-	-	-	-	3
Weasel	-	-	-	-	-	1
Water Vole	-	-	-	-	-	1
Short-tailed Vole	-	-	-	-	-	2
Mouse sp.	-	-	-	-	-	55
Unid. Rodent	-	-	-	-	-	17
Frog	-	-	-	-	-	2
Toad	-	-	-	-	-	8
Amphibian	-	-	-	-	-	6
Flounder	-	-	-	-	-	1
Unid. Fish	-	-	-	-	-	1
Domestic Fowl	-	-	-	-	1	66
Grey Lag/Dom. Goose	-	-	-	-	-	3
Goose/Duck sp.	-	-	-	-	-	1
Mallard/ Dom. Duck	-	-	-	-	-	1
Duck species	-	-	-	-	-	2
Woodcock	-	-	-	-	-	1
Rook/Crow	-	-	-	-	-	10
~~Jackdaw~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~3~~
Raven	-	-	-	-	-	79
Unid. Corvid	-	-	-	-	-	1
Thrush sp.	1	-	-	-	-	3
House Sparrow	-	-	-	-	-	2
TOTAL	501	39	783	67	191	11968
Sheep	3	1	4	-	-	168
Goat	1	-	1	-	-	3

* F642-11-19 includes 28 bones of a cat.

TABLE F642.3

F642 Summary Statistics

	Layer 1	3	4	5	6	7	8
Total Fragments	856	2725	781	2977	63	1535	1450
ex.rarer species	740	2680	772	2882	62	1522	1437
+ ex.articulated bones	554	2507	722	2820		1457	
% Unid. Fragments	38	35	37	43		43	46
Erosion Index	.11	.15	.10	.35		.19	.35
Loose Teeth Index	.19	.21	.28	.34		.26	.31
% Gnawed Fragments	18	21	14	13		11	15
% Butchered Frags.	13	7	11	6		4	5
% Fragments of Major Species							
Cattle	48	38	43	39		38	38
Sheep/Goat	24	35	34	39		47	40
Pig	19	16	15	11		7	12
Horse	5	4	4	6		3	5
Dog	5	6	4	5		6	5
Red Deer	-	.1	-	-		-	-
Hare	-	.2	-	.1		.2	.1
Cat	-	.1	-	.1		-	-
Cattle Loose Teeth Index	.21	.16	.25	.26		.21	.23
Cattle Longbone Frag. I.	.37	.35	(.37)	.31		.34	.25
S/G Loose Teeth Index	(.19)	.30	.37	.42		.32	.40
S/G Longbone Frag. Index	.33	.33	.36	.32		.40	.28

	Layer 9	10	11	12	14	Total
Total Fragments	501	39	783	67	191	11968
ex.rarer species	500		780		190	11673
+ ex.articulated bones			752			11107
% Unid. Fragments	53		53		49	42
Erosion Index	1.31		.80		1.81	.36
Loose Teeth Index	.63		.35		(.57)	.30
% Gnawed Fragments	(2)		9			15
% Butchered Frags.	(-)		2			6
% Fragments of Major Species						
Cattle	31		36		(38)	39
Sheep/Goat	50		36		(43)	38
Pig	14		10		(7)	13
Horse	4		5		(8)	5
Dog	1		11		(2)	6
Red Deer	-		-		(-)	.03
Hare	-		-		(-)	.1
Cat	-		2		(-)	.2

	F642-9	10	Layer 11	12	14	Total
Cattle Loose Teeth I.	(.49)		.34			.23
Cattle Longbone Frag. I.			(.27)			.32
S/G Loose Teeth Index	.70		.47			.39
S/G Longbone Frag. I.	(.24)		.36			.33

TABLE F642-1.1

Fragments of Major Species Represented in Feature 642-1

	Cattle	%	Sheep/G	Art. Pig	Other Pig	Horse	Dog
Skull frags.	48	28	15	1	5	-	-
Mandible	18	10	5	2	12	-	1
Loose teeth	36	21	16	-	13	1	1
Scapula	9	5	1	1	3	-	1
Humerus	6	3	7	2	5	-	2
Radius	5	3	3	3	2	3	1
Ulna	3	2	-	2	2	2	-
Os Coxae	3	2	4	2	5	1	1
Femur	10	6	3	1	1	-	2
Patella	-	-	1	-	-	-	-
Tibia	5	3	11	2	1	-	-
Fibula	-	-	-	1	1	-	-
Carpals	7	1*	1	6	-	-	-
Calcaneus	1	.6	1	2	-	1	1
Astragalus	-	-	-	2	2	1	-
Other tarsals	1	.6	-	7	-	3	-
Metacarpal	6	3*	3	3	2	-	2
Metatarsal	4	2	3	4	1	1	-
Lat. Metapodial	-	-	-	6	2	1	-
Metapodial	2	1	-	-	-	-	-
1st Phalanx	2	1	2	13	1	1	-
2nd Phalanx	2	1	3	9	2	-	-
3rd Phalanx	2	1	-	6	-	-	-
Ribs	-	-	1	25	1	-	-
Sternebrae	-	-	-	1	-	-	-
Cervical verts.	2	1	3	13	1	-	1
Thoracic verts.	1	.6	1	27	3	1	-
Lumbar verts.	3	2	1	12	2	-	2
Sacrum	2	1	-	1	-	-	1
Caudal verts.	-	-	1	-	-	-	-
Unid. verts.	-	-	-	26	-	-	-
TOTAL	178		86	180	67	16	16

* excludes articulated group of 5 carpals and a metacarpus.

Unid. Large Mammal	Total
Skull & Mandible	32
Ribs	2
Vertebrae	5
Longbone fragments	11
Unidentified frags.	52
TOTAL	102

Sheep-sized Mammal	Total
Skull & Mandible	6
Ribs	18
Vertebrae	12
Longbone fragments	43
Unidentified frags.	19
TOTAL	98

TABLE F642-3.1

Fragments of Major Species Represented in Feature 642-3

	Cattle	%	Sheep/G	%	Pig	%	Art. Horse	Other Horse	Art. Dog	Oth Dog
Skull frags.	102	16	63	11	57	22	-	-	9	10
Mandible	85	14	84	15	37	14	-	2	3	11
Hyoid	1	.2	1	.2	-	-	-	-	-	-
Loose teeth	97	16	174	30	51	20	-	14	-	6
Scapula	36	6	12	2	9	3	-	2	3	4
Humerus	27	4	17	3	15	6	1	3	11	9
Radius	27	4	27	5	6	2	1	1	2	6
Ulna	29	5	3	.5	8	3	1	2	4	2
Os Coxae	17	3	11	2	11	4	-	1	2	2
Femur	22	4	18	3	12	5	-	3	4	4
Patella	4	.6	1	.2	-	-	-	1	-	-
Tibia	17	3	46	8	10	4	-	1	3	7
Fibula	-	-	-	-	-	-	-	-	1	-
Carpals	22	3*	4	.7	-	-	3	6	8	-
Calcaneus	7	1	3	.5	3	1	-	1	3	1
Astragalus	11	2	4	.7	1	.4	-	-	-	-
Centroquartal	3	.5	5	.9	-	-	-	-	-	-
Other tarsals	2	.3	-	-	1	.4	-	-	2	-
Metacarpal	19	3*	27	5	2	.8	1	2	6	2
Metatarsal	27	4	28	5	4	2	-	1	4	4
Lat. Metapodial	-	-	-	-	2	.8	2	4	-	-
Metapodial	8	1	4	.7	2	.8	-	-	3	3
1st Phalanx	9	1	11	2	3	1	-	5	17	6
2nd Phalanx	10	2	11	2	1	.4	-	1	14	-
3rd Phalanx	2	.3	4	.7	1	.4	-	1	8	-
Sesamoids	2	.3	1	.2	-	-	-	-	7	-
Ribs	-	-	4	.7	5	2	-	1	27	12
Sternebrae	-	-	-	-	-	-	-	-	1	-
Cervical verts.	22	4	7	1	9	3	-	7	-	6
Thoracic verts.	7	1	2	.3	2	.8	-	5	2	3
Lumbar verts.	9	1	4	.7	8	3	-	-	5	5
Sacrum	2	.3	-	-	1	.4	-	-	-	1
Caudal verts.	1	.2	-	-	-	-	-	-	9	1
TOTAL	627		576		261		9	64	158	105

* excludes articulated group of 5 carpals and a metacarpus.

Unid. Large Mammal	Total
Skull & Mandible	88
Ribs	74
Vertebrae	50
Longbone fragments	54
Unidentified frags.	223
TOTAL	489

Sheep-sized Mammal	Total
Skull & Mandible	16
Ribs	81
Vertebrae	35
Longbone fragments	145
Unidentified frags.	59
TOTAL	336

TABLE F642-4.1

Fragments of Major Species Represented in Feature 642-4

	Cattle	%	Sheep/G	%	Pig	Horse	Art. Dog	Other Dog
Skull frags.	42	22	16	10	15	2	1	1
Mandible	23	12	16	10	12	1	2	2
Hyoid	-	-	1	.7	-	-	-	-
Loose teeth	48	25	56	37	15	10	-	-
Scapula	6	3	3	2	7	-	1	1
Humerus	7	4	3	2	4	-	2	2
Radius	5	3	7	5	1	-	2	-
Ulna	2	1	1	.7	-	-	-	2
Os Coxae	4	2	3	2	-	2	1	-
Femur	3	2	6	4	3	2	1	-
Tibia	4	2	13	8	1	1	-	-
Fibula	-	-	-	-	1	-	-	-
Carpals	3	2	-	-	-	-	-	1
Calcaneus	2	1	2	1	1	-	-	-
Astragalus	-	-	3	2	2	-	-	-
Other tarsals	1	.5	1	.7	1	-	-	-
Metacarpal	4	2	5	3	-	-	-	2
Metatarsal	13	7	4	3	-	-	-	2
Lat. Metapodial	-	-	-	-	1	-	-	-
Metapodial	2	1	-	-	-	-	4	1
1st Phalanx	4	2	2	1	2	-	4	2
2nd Phalanx	-	-	1	.7	1	-	-	-
3rd Phalanx	-	-	1	.7	-	-	-	-
Ribs	5	3	-	-	-	-	14	2
Sternebrae	-	-	-	-	1	-	-	-
Cervical verts.	7	4	1	.7	-	1	3	-
Thoracic verts.	3	2	4	3	-	-	2	-
Lumbar verts.	6	3	2	1	1	-	-	-
Sacrum	1	.5	2	1	-	-	-	1
Unid. verts.	-	-	-	-	-	-	13	-
TOTAL	195		153		69	19	50	19

Unid. Large Mammal	Total
Skull & Mandible	39
Ribs	11
Vertebrae	9
Longbone fragments	22
Unidentified frags.	58
TOTAL	139

Sheep-sized Mammal	Total
Skull & Mandible	9
Ribs	28
Vertebrae	10
Longbone fragments	44
Unidentified frags.	15
TOTAL	106

TABLE F642-5.1

Fragments of Major Species Represented in Feature 642-5

	Cattle	%	Sheep/G	%	Pig	%	Horse	Art. Dog	Other Dog
Skull frags.	61	10	22	4	15	8	2	2	5
Mandible	101	16	98	16	27	15	18	1	4
Loose teeth	166	26	266	42	64	35	31	-	22
Scapula	31	5	2	.3	8	4	3	-	1
Humerus	27	4	15	2	10	5	6	1	2
Radius	14	2	37	6	5	3	4	2	4
Ulna	15	2	10	2	5	3	2	1	4
Os Coxae	22	3	15	2	5	3	4	-	5
Femur	16	3	17	3	6	3	3	-	5
Patella	2	.3	-	-	-	-	1	-	-
Tibia	21	3	44	7	7	4	3	-	5
Fibula	-	-	-	-	3	2	-	-	-
Carpals	21	3*	3	.5	1	.5	1	-	-
Calcaneus	4	.6	5	.8	1	.5	1	-	1
Astragalus	7	1	4	.6	-	-	2	-	-
Centroquartal	6	1	2	.3	-	-	-	-	-
Other tarsals	6	1	-	-	-	-	1	5	-
Metacarpal	24	4	26	4	1	.5	1	3	1
Metatarsal	21	3	28	4	-	-	4	8	2
Lat. Metapodial	-	-	-	-	3	2	4	-	-
Metapodial	4	.6	1	.2	1	.5	1	-	4
1st Phalanx	21	3	11	2	6	3	3	10	-
2nd Phalanx	13	2	4	.6	5	3	-	2	1
3rd Phalanx	5	.8	4	.6	1	.5	-	3	-
Sesamoids	2	.3	-	-	-	-	-	-	-
Ribs	-	-	2	.3	3	2	-	5	5
Sternebrae	-	-	-	-	-	-	-	1	-
Cervical verts.	11	2	5	.8	4	2	1	6	4
Thoracic verts.	6	1	3	.5	1	.5	1	6	1
Lumbar verts.	6	1	4	.6	1	.5	1	3	3
Sacrum	3	.5	-	-	-	-	-	-	-
TOTAL	636		628		183		98	59	79

* excludes 5 articulated carpals

Unid. Large Mammal	Total
Skull & Mandible	84
Ribs	97
Vertebrae	53
Longbone fragments	93
Unidentified frags.	381
TOTAL	708

Sheep-sized Mammal	Total
Skull & Mandible	17
Ribs	62
Vertebrae	20
Longbone fragments	240
Unidentified frags.	93
TOTAL	432

TABLE F642-6.1

Fragments of Major Species Represented in Feature 642-1

	Cattle	Sheep/G	Pig	Horse	Dog
Skull frags.	-	2	-	1	-
Mandible	2	-	2	-	1
Loose teeth	4	6	-	-	1
Scapula	1	-	1	-	-
Humerus	1	1	-	-	-
Ulna	1	-	1	-	-
Femur	2	-	1	-	-
Tibia	1	-	1	-	-
Metacarpal	1	1	1	-	-
Metatarsal	1	-	-	-	-
Lat. Metapodial	-	-	1	-	-
Ribs	1	-	-	-	-
Cervical verts.	-	-	-	-	1
Thoracic verts.	1	1	-	-	1
TOTAL	16	11	8	1	4

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull & Mandible	2	Skull & Mandible	-
Ribs	4	Ribs	2
Vertebrae	2	Vertebrae	-
Longbone fragments	3	Longbone fragments	2
Unidentified frags.	3	Unidentified frags.	1
TOTAL	14	TOTAL	5

TABLE F642-7.1

Fragments of Major Species Represented in Feature 642-7

	Art. Cattle	Other Cattle	%	Sheep/G	%	Pig	Horse	Art. Dog	Oth Dog
Skull frags.	-	54	17	35	9	11	1	1	12
Mandible	-	43	14	62	16	7	-	1	1
Hyoid	-	3	1	-	-	-	-	-	-
Loose teeth	-	65	21	126	~~32~~ 33	15	5	-	3
Scapula	-	13	4	6	2	2	1	-	1
Humerus	-	10	3	14	4	2	2	-	3
Radius	-	14	4	11	3	1	2	-	3
Ulna	-	10	3	3	.8	2	1	-	2
Os Coxae	-	6	2	9	2	2	-	2	3
Femur	-	14	4	13	3	3	2	-	1
Patella	-	1	.3	1	.3	-	-	-	-
Tibia	-	6	2	24	6	1	3	1	2
Fibula	-	-	-	-	-	1	-	-	-
Carpals	-	4	1	1	.3	-	-	-	1
Calcaneus	-	5	2	-	-	-	1	-	1
Astragalus	-	2	.6	4	1	2	-	-	1
Centroquartal	-	5	2	-	-	-	-	-	-
Other tarsals	-	2	.6	1	.3	-	-	-	-
Metacarpal	-	8	3	7	2	3	2	-	6
Metatarsal	-	14	4	17	4	-	1	-	-
Lat. Metapodial	-	-	-	-	-	-	2	-	-
Metapodial	-	3	1	-	-	1	-	-	-
1st Phalanx	-	3	1	-	-	1	-	-	-
2nd Phalanx	-	1	.3	1	.3	1	-	-	-
3rd Phalanx	-	2	.6	1	.3	-	-	-	-
Sesamoids	-	1	.3	-	-	-	-	-	-
Ribs	17	3	1	18	5	3	-	1	2
Sternebrae	-	-	-	2	.5	-	-	-	-
Cervical verts.	9	13	4	25	5*	-	-	3	2
Thoracic verts.	20	5	2	9	2	-	1	-	1
Lumbar verts.	-	4	1	11	3	-	-	3	1
Sacrum	-	3	1	-	-	-	-	-	-
Caudal verts.	-	-	-	1	.3	-	-	1	-
TOTAL	46	317		~~403~~ 392		58	24	13	46

* excludes 6 articulated cervical vertebrae

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull & Mandible	67	Skull & Mandible	25
Ribs	43	Ribs	60
Vertebrae	24	Vertebrae	19
Longbone fragments	55	Longbone fragments	108
Unidentified frags.	142	Unidentified frags.	49
TOTAL	331	TOTAL	261

TABLE F642-8.1

Fragments of Major Species Represented in Feature 642-8

	Cattle	%	Sheep/G	%	Pig	Horse	Dog
Skull frags.	30	10	25	8	9	2	4
Mandible	30	10	44	14	14	1	3
Hyoid	1	.3	-	-	-	-	1
Loose teeth	67	23	125	40	42	2	7
Scapula	18	6	5	2	4	1	2
Humerus	17	6	6	2	2	3	2
Radius	15	5	15	5	1	-	2
Ulna	4	1	1	.3	2	-	2
Os Coxae	8	3	9	3	-	1	1
Femur	7	2	7	2	1	4	2
Tibia	19	6	26	8	9	3	1
Fibula	-	-	-	-	1	-	-
Carpals	2	.7	-	-	-	1	-
Calcaneus	3	1	1	.3	-	1	-
Astragalus	4	1	3	1	2	1	-
Other tarsals	3	1	-	-	-	-	-
Metacarpal	4	1	8	3	2	4	2
Metatarsal	13	4	19	6	-	4	-
Lat. Metapodial	-	-	-	-	1	-	-
Metapodial	3	1	-	-	-	1	-
1st Phalanx	7	2	3	1	2	2	1
2nd Phalanx	3	1	1	.3	1	-	-
3rd Phalanx	1	.3	-	-	1	-	-
Sesamoids	-	-	-	-	-	2	2
Ribs	7	2	1	.3	-	-	-
Cervical verts.	7	2	8	3	1	2	2
Thoracic verts.	9	3	2	.6	-	-	-
Lumbar verts.	8	3	-	-	-	-	1
Sacrum	4	1	-	-	-	1	-
Caudal verts.	-	-	-	-	-	-	2
Unid. verts.	-	-	-	-	-	-	1
TOTAL	294		309		95	36	38

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull & Mandible	36	Skull & Mandible	12
Ribs	62	Ribs	53
Vertebrae	24	Vertebrae	13
Longbone fragments	88	Longbone fragments	139
Unidentified frags.	168	Unidentified frags.	26
TOTAL	378	TOTAL	243

TABLE F642-9.1

Fragments of Major Species Represented in Feature 642-9

	Cattle	Sheep/G	%	Pig	Horse	Dog
Skull frags.	4	1	.9	2	-	-
Mandible	16	6	5	4	-	-
Loose teeth	36	82	70	23	4	3
Scapula	1	-	-	1	-	-
Humerus	1	5	4	1	-	-
Radius	-	2	2	1	-	-
Ulna	2	-	-	1	-	-
Os Coxae	2	-	-	-	1	-
Femur	1	3	3	-	-	-
Tibia	1	9	8	-	1	-
Calcaneus	1	1	.9	-	-	-
Astragalus	2	-	-	-	-	-
Metacarpal	3	2	2	-	1	-
Metatarsal	1	4	3	-	-	-
Lat. Metapodial	-	-	-	-	1	-
1st Phalanx	-	1	.9	-	-	-
2nd Phalanx	1	1	.9	-	-	-
Cervical verts.	1	-	-	-	1	-
TOTAL	73	117		33	9	3

Unid. Large Mammal	Total
Skull & Mandible	10
Ribs	1
Vertebrae	14
Longbone fragments	48
Unidentified frags.	81
TOTAL	154

Sheep-sized Mammal	Total
Skull & Mandible	2
Ribs	2
Vertebrae	3
Longbone fragments	85
Unidentified frags.	7
TOTAL	99

TABLE F642-11.1

Fragments of Major Species Represented in Feature 642-11

	Cattle	%	Sheep/G	%	Pig	Horse	Dog
Skull frags.	8	6	-	-	5	-	1
Mandible	8	6	17	13	5	3	3
Loose teeth	43	34	60	47	13	4	5
Scapula	8	6	-	-	2	2	-
Humerus	8	6	4	3	3	-	-
Radius	5	4	7	6	1	-	5
Ulna	3	2	1	.8	-	-	3
Os Coxae	3	2	4	3	2	-	-
Femur	2	2	3	2	1	3	4
Patella	-	-	-	-	1	-	-
Tibia	5	4	10	8	1	-	1
Fibula	-	-	-	-	-	-	1
Carpals	1	.8	-	-	-	-	-
Calcaneus	3	2	1	.8	-	-	-
Astragalus	1	.8	1	.8	-	1	1
Other tarsals	1	.8	-	-	-	-	-
Metacarpal	4	3	6	5	-	-	1
Metatarsal	4	3	9	7	-	2	4
Lat. Metapodial	-	-	-	-	-	1	-
Metapodial	1	.8	1	.8	-	-	1
1st Phalanx	3	2	-	-	-	-	1
2nd Phalanx	2	2	1	.8	-	-	-
3rd Phalanx	1	.8	-	-	-	-	-
Sesamoids	1	.8	-	-	-	-	-
Ribs	3	2	-	-	-	-	6
Cervical verts.	6	5	2	2	-	1	-
Thoracic verts.	4	3	-	-	1	1	1
Lumbar verts.	-	-	-	-	-	-	2
Caudal verts.	-	-	-	-	-	-	1
TOTAL	128		127		35	18	41

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull and mandible	20	Skull and mandible	4
Ribs	30	Ribs	21
Vertebrae	18	Vertebrae	2
Longbone fragments	33	Longbone fragments	130
Unid. fragments	96	Unid. fragments	21
Total	197	Total	178

TABLE F642-12.1

Fragments of Major Species Represented in Feature 642-12

	Cattle	Sheep/G	Pig
Skull frags.	-	-	1
Mandible	-	1	1
Loose teeth	-	7	4
Humerus	1	-	2
Os Coxae	1	-	-
Femur	-	1	-
Calcaneus	-	1	-
Metacarpal	-	1	-
Metatarsal	-	2	-
TOTAL	2	13	8

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull and mandible	1	Skull and mandible	-
Ribs	2	Ribs	-
Longbone fragments	12	Longbone fragments	12
Unid. fragments	15	Unid. fragments	1
Total	30	Total	13

TABLE F642-14.1

Fragments of Major Species Represented in Feature 642-14

	Cattle	Sheep/G	Pig	Horse	Dog
Skull frags.	1	-	-	-	-
Mandible	2	5	2	-	-
Loose teeth	16	31	4	3	1
Scapula	4	-	-	1	-
Humerus	1	1	1	1	-
Radius	2	2	-	-	-
Os Coxae	1	-	-	1	-
Femur	2	-	-	-	1
Tibia	1	2	-	-	-
Carpals	1	-	-	-	-
Calcaneus	2	-	-	-	-
Metatarsal	2	1	-	-	-
Metapodial	-	-	-	1	-
1st Phalanx	1	-	-	-	-
2nd Phalanx	-	-	-	1	-
Cervical verts.	1	-	-	-	-
TOTAL	37	42	7	8	2

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull and mandible	4	Skull and mandible	-
Ribs	4	Ribs	1
Vertebrae	5	Vertebrae	-
Longbone fragments	14	Longbone fragments	6
Unid. fragments	54	Unid. fragments	5
Total	81	Total	12

TABLE F643.1

Features 643-5 Animal Bone Fragments in all Layers and Sections

Section	F643 1	F643 2	Total	F644 1	F644 2	F644 3	Total	F645
1	11	10	21		2	46	48	
2	16		16		2	11	13	
3	16	24	40		2	7	9	
4	46	21	67		3	14	17	1
5	30	58	88	2	3	1	6	
6	48	56	104		23	5	28	2
7	52	58	110	10	1	20	31	2
8	39	57	96		17		17	
9	79	20	99		2	2	4	1
10	22	1	23		2	5	7	
11	39	36	75		1		1	
12	12	34	46					
13		8	8	1	1	6	8	
14	2	44	46			2	2	
15	54		54					
16	9	6	15					
17	31	11	42					
18	19	5	24					
TOTAL	525	449	974	13	59	119	191	6

TABLE F643.2

Species represented in Features F643-F645

Species	F643 1	F643 2	Total	F644 1	F644 2	F644 3	Total	F645
Cattle	68	42	110	4	3	21	28	2
Sheep/Goat	120	91	211	3	14	26	43	1
Pig	26	10	36	1	1	3	5	1
Horse	6	7	13	-	8	6	14	-
Dog	11	6	17	1	4	3	8	-
Cat	1	-	1	-	-	-	-	-
Unid. Large Mammal	126	156	282	1	7	32	40	-
Sheep-sized Mammal	136	119	255	2	19	25	46	1
Unid. Mammal	27	17	44	1	2	1	4	1
Unid. Bird	-	-	-	-	1	1	2	-
Domestic Fowl	3	1	4	-	-	1	1	-
TOTAL	525	449	974	13	59	119	191	6
Sheep	2	2	4	-	2	1	3	-

TABLE F643.3

Fragments of Major Species Represented in F643-F644

Cattle	F643 1	F643 2	Total	%	F644 1	F644 2	F644 3	Total
Skull frags.	7	4	11	10	1	2	2	5
Mandible	3	6	9	8	-	-	2	2
Loose teeth	20	8	28	25	1	-	7	8
Scapula	5	4	9	8	-	1	2	3
Humerus	2	5	7	6	1	-	1	2
Radius	4	1	5	5	-	-	1	1
Ulna	3	3	6	5	-	-	-	-
Os Coxae	3	1	4	4	-	-	3	3
Femur	1	3	4	4	-	-	-	-
Tibia	4	1	5	5	-	-	-	-
Carpals	-	1	1	.9	-	-	-	-
Calcaneus	3	-	3	3	-	-	-	-
Astragalus	-	1	1	.9	-	-	-	-
Centroquartal	-	1	1	.9	-	-	-	-
Metacarpal	2	-	2	2	1	-	1	2
Metatarsal	7	1	8	7	-	-	-	-
1st Phalanx	2	1	3	3	-	-	1	1
2nd Phalanx	2	-	2	2	-	-	-	-
Sesamoids	-	1	1	.9	-	-	-	-
Lumbar verts.	-	-	-		-	-	1	1
TOTAL	68	42	110		4	3	21	28

Sheep/Goat	F643 1	F643 2	Total	%	F644 1	F644 2	F644 3	Total
Skull frags.	2	1	3	1	-	-	-	-
Mandible	17	3	20	9	-	4	2	6
Loose teeth	61	63	124	59	2	7	17	26
Humerus	4	4	8	4	1	1	1	3
Radius	6	5	11	5	-	-	1	1
Ulna	-	2	2	.9	-	-	-	-
Os Coxae	3	1	4	2	-	-	-	-
Femur	3	3	6	3	-	-	-	-
Tibia	10	3	13	6	-	-	4	4
Metacarpal	4	1	5	2	-	-	1	1
Metatarsal	7	5	12	6	-	-	-	-
2nd Phalanx	1	-	1	.5	-	1	-	1
3rd Phalanx	-	-	-	-	-	1	-	1
Ribs	1	-	1	.5	-	-	-	-
Cervical verts.	1	-	1	.5	-	-	-	-
Total	120	91	211		3	14	26	43

Pig	F643 1	F643 2	Total	F644 1	F644 2	F644 3	Total
Skull frags.	1	-	1	-	-	-	-
Mandible	4	2	6	1	1	-	2
Loose teeth	15	4	19	-	-	2	2
Scapula	2	1	3	-	-	-	-
Humerus	-	1	1	-	-	-	-
Tibia	3	-	3	-	-	-	-
Calcaneus	1	-	1	-	-	1	1
Metacarpal	-	1	1	-	-	-	-
Lat. Metapodial	-	1	1	-	-	-	-
TOTAL	26	10	36	1	1	3	5

Horse	F643 1	F643 2	Total	F644 2	F644 3	Total
Skull frags.	-	-	-	1	1	2
Mandible	-	-	-	1	-	1
Loose teeth	3	4	7	2	1	3
Scapula	-	1	1	-	1	1
Radius	1	1	2	1	-	1
Os Coxae	-	-	-	-	2	2
Femur	1	-	1	-	1	1
Carpals	1	-	1	-	-	-
Other tarsals	-	-	-	1	-	1
Metacarpal	-	-	-	1	-	1
Metatarsal	-	1	1	-	-	-
Lat. Metapodial	-	-	-	1	-	1
Total	6	7	13	8	6	14

Dog	F643 1	F643 2	Total	F644 1	F644 2	F644 3	Total
Skull frags.	1	1	2	-	-	-	-
Mandible	2	1	3	-	-	-	-
Loose teeth	5	1	6	1	2	2	5
Radius	-	1	1	-	1	-	1
Os Coxae	-	1	1	-	-	-	-
Tibia	1	-	1	-	-	-	-
Metacarpal	-	-	-	-	-	1	1
Metapodial	-	1	1	-	-	-	-
Cervical verts.	2	-	2	-	1	-	1
TOTAL	11	6	17	1	4	3	8

Unid. Large Mammal	F643
Skull and mandible frags.	22
Ribs	13
Vertebrae	8
Longbone fragments	60
Unid. fragments	179
Total	283

Sheep-sized Mammal	F643
Skull and mandible frags.	1
Ribs	13
Vertebrae	3
Longbone fragments	189
Unid. fragments	49
Total	255

Unid. Large Mammal	F644
Skull and mandible frags.	3
Ribs	8
Vertebrae	1
Longbone fragments	9
Unid. fragments	19
Total	40

Sheep-sized Mammal	F644
Skull and mandible frags.	-
Ribs	3
Vertebrae	-
Longbone fragments	30
Unid. fragments	13
Total	46

TABLE F643.4

F643-F645 Summary Statistics

	F643 1	F643 2	Total	F644 1	F644 2	F644 3	Total	F645
Total Fragments	525	449	974	13	59	119	191	6
ex.rarer species	522	448	970		58	117	188	
% Unid. Fragments	55	65	60			50	48	
Erosion Index	1.27	1.68	1.46				.72	
Loose Teeth Index	.45	.51	.47				.45	
% Gnawed Fragments	9	(3)	6					
% Butchered Frags.	2	(-)	1					
% Fragments of Major Species								
Cattle	29	27	28				(29)	
Sheep/Goat	52	58	54				(44)	
Pig	11	6	9				(5)	
Horse	3	4	3				(14)	
Dog	5	4	4				(8)	
Cat	.4	-	.3				(-)	
Cattle Loose Teeth Index			.25					
Cattle Longbone Fragmentation I.			.25					
S/G Loose Teeth Index	.51		.59					
S/G Longbone Frag. Index	.25		.24					

TABLE F646.1

Species represented in Feature 646 (Fragments)

Species	Layer 2	3	4	5	6	7	8	9	Total
Cattle	-	3	1	8	9	9	5	9	44
Sheep/Goat	3	85*	72*	65*	19*	11	7	4	266
Pig	-	-	-	-	-	-	1	-	1
Horse	-	-	-	4	1	1	-	2	8
Dog	-	13*	28*	15*	8*	1	-	1	66
Hare	-	-	16*	1	16*	1	-	-	34
Cat	-	112*	194*	-	-	-	-	-	306
Unid. Large Mammal	2	1	2	8	3	9	10	20	55
Sheep-sized Mammal	3	18	25	9	9	6	3	4	77
Unid. Mammal	1	3	2	-	-	-	-	-	6
Unid. Bird	-	1	-	-	-	-	3	-	4
Unid. Rodent	-	-	-	1	-	-	-	-	1
Amphibian	-	2	3	-	-	-	-	-	5
Common Eel	-	1	-	-	-	-	-	-	1
Unid. Fish	-	1	-	-	-	-	-	-	1
Domestic Fowl	-	-	-	-	-	1	-	-	1
Buzzard	-	18*	61*	4*	2	-	-	-	85
Raven	-	14*	-	-	-	-	-	-	14
Rook/Crow	-	-	-	-	-	1	-	-	1
Thrush sp.	-	1	-	-	-	-	-	-	1
TOTAL	9	273	404	115	67	40	29	40	977
Sheep	-	81	69	45	15	-	-	-	210

* includes articulated bones.

TABLE F646.2

Fragments of Major Species Represented in F646

Cattle	Layer F646-3	4	5	6	7	8	9	Total
Skull frags.	-	-	6	5	3	1	-	15
Mandible	-	-	-	-	1	-	-	1
Loose teeth	-	-	1	2	2	4	2	11
Scapula	-	-	-	-	-	-	1	1
Radius	1	-	-	1	-	-	1	3
Femur	-	-	-	-	1	-	-	1
Tibia	1	-	-	-	-	-	-	1
Calcaneus	-	-	-	-	-	-	1	1
Metacarpal	-	-	1	-	1	-	1	3
Metatarsal	-	-	-	1	-	-	-	1
1st Phalanx	-	-	-	-	-	-	1	1
2nd Phalanx	-	-	-	-	1	-	-	1
Ribs	1	-	-	-	-	-	-	1
Cervical verts.	-	1	-	-	-	-	2	3
TOTAL	3	1	8	9	9	5	9	44

Sheep/Goat	F646-2	3	4	5	6	7	8	9	Total	%*
Skull frags.	-	2	1	11	2	-	-	-	16	6
Mandible	-	2	2	4	-	-	1	-	9	3
Hyoid	-	2	-	2	-	-	-	-	4	2
Loose teeth	-	-	2	3	-	6	4	3	18	7
Humerus	-	-	-	-	1	-	-	-	1	.4
Radius	-	1	-	1	2	1	1	1	7	3
Patella	-	-	-	-	1	-	1	-	2	.8
Tibia	-	-	1	1	-	-	-	-	2	.8
Carpals	-	10	16	3	1	1	-	-	31	12
Calcaneus	-	1	1	1	-	-	-	-	3	1
Astragalus	-	1	2	1	-	-	-	-	4	2
Centroquartal	-	1	1	2	1	-	-	-	5	2
Other tarsals	-	1	2	1	-	-	-	-	4	2
Metacarpal	-	4	3	4	-	-	-	-	11	4
Metatarsal	-	5	3	4	-	3	-	-	15	6
Metapodial	-	9	-	-	2	-	-	-	11	4
1st Phalanx	1	15	9	10	4	-	-	-	39	15
2nd Phalanx	-	12	8	8	3	-	-	-	31	12
3rd Phalanx	-	13	8	7	2	-	-	-	30	11
Sesamoids	2	4	13	2	-	-	-	-	21	8
Ribs	-	2	-	-	-	-	-	-	2	.8
TOTAL	3	85	72	65	19	11	7	4	266	

* includes in this case articulated bones.

6

Horse	Layer F642-5	6	7	9	Total
Skull frags.	2	-	-	-	2
Loose teeth	2	-	-	-	2
Humerus	-	-	-	1	1
Radius	-	-	1	-	1
Femur	-	-	-	1	1
Sesamoids	-	1	-	-	1
TOTAL	4	1	1	2	8

6

Dog	F642-3	4	5	6	7	9	Total
Skull frags.	3	3	-	-	1	-	7
Mandible	-	2	-	-	-	-	2
Loose teeth	1	-	1	-	-	-	2
Scapula	1	4	1	-	-	-	6
Humerus	-	2	1	2	-	-	5
Radius	-	4	2	-	-	-	6
Ulna	1	1	2	2	-	-	6
Os Coxae	2	6	2	-	-	-	10
Femur	1	2	1	1	-	1	6
Tibia	1	2	2	-	-	-	5
Ribs	2	1	2	-	-	-	5
Caudal verts.	-	-	1	3	-	-	4
Unid. verts.	1	1	-	-	-	-	2
TOTAL	13	28	15	8	1	1	66

Unid. Large Mammal	Total
Skull and mandible frags.	4
Ribs	3
Vertebrae	11
Longbone fragments	10
Unid. fragments	27
Total	55

Sheep-sized Mammal	Total
Skull and mandible frags.	3
Ribs	27
Vertebrae	6
Longbone fragments	19
Unid. fragments	22
Total	77

TABLE F650.1

Species represented in Feature 650 (Fragments)

Species	Layer 1	2	3	4	5	6	7	8	9	10
Cattle	-	3	1	1	1	33*	1	11*	1	-
Sheep/Goat	1	431*	268*	-	42*	84*	-	1	-	2
Pig	-	-	76*	-	-	1	-	-	-	-
Horse	-	1	-	-	-	-	-	-	-	-
Dog	-	64*	44*	-	-	54*	-	75*	-	-
Cat	-	1	60*	-	-	-	-	-	-	-
Unid. Large Mammal	-	1	4	-	2	3	3	-	-	-
Sheep-sized Mammal	-	9	19	-	4	13	-	2	-	-
Unid. Mammal	-	1	4	1	-	1	-	-	-	-
Unid. Bird	1	2	8	-	-	2	-	-	-	-
Rabbit	-	-	1	-	-	-	-	-	-	-
Common Shrew	-	-	32*	2	-	-	-	-	-	-
Water Shrew	-	-	1	-	-	-	-	-	-	-
Water Vole	-	-	3	-	-	-	-	-	-	-
Short-tailed Vole	-	-	110*	3	-	-	-	1	-	-
Mouse sp.	-	-	29*	41*	-	-	-	-	-	-
Harvest Mouse	-	-	-	2	-	-	-	-	-	-
Unid. Rodent	-	3	382	-	-	-	-	-	-	-
Frog	-	1	18*	-	-	-	-	-	-	-
Toad	-	10*	6	-	-	-	-	-	-	-
Amphibian	-	-	20	-	-	-	1	-	-	-
Herring	-	-	1	-	-	-	-	-	-	-
Domestic Fowl	-	53*	-	-	-	-	1	3	-	-
Dom. Duck/Mallard	-	-	-	-	-	-	-	-	-	-
Starling	-	-	1	-	-	1	-	-	-	-
House Sparrow	-	-	4	-	-	5	-	-	-	-
Finch sp.	-	-	-	-	-	-	-	-	-	
TOTAL	2	580	1091	51	49	197	6	93	1	
Sheep	-	398*	265*	-	40*	71*	-	-	-	
Goat	-	-	-	-	-	1	-	-	-	

* = includes articulated bones

Species	F650-11	13	14	15	16	17	18	19	Total
	Layer								
Cattle	3	1	-	-	31	8	8	1	104
Sheep/Goat	2	1	1	2	37	4	4	1	881
Pig	1	2	1	-	4	1	-	-	86
Horse	-	-	-	1	1	-	2	-	5
Dog	-	-	-	-	3	-	-	-	240
Cat	-	-	-	-	-	-	-	-	61
Unid. Large Mammal	2	1	1	2	31	11	14	2	77
Sheep-sized Mammal	4	-	-	3	35	5	5	4	103
Unid. Mammal	1	1	-	-	4	-	1	-	14
Unid. Bird	-	-	-	-	-	-	-	-	11
Rabbit	-	-	-	-	-	-	-	-	1
Common Shrew	-	-	-	-	-	-	-	-	34
Water Shrew	-	-	-	-	-	-	-	-	1
Water Vole	-	-	-	-	-	-	-	-	3
Short-tailed Vole	-	-	-	-	-	-	-	-	114
Mouse sp.	-	-	-	-	-	-	-	-	70
Harvest Mouse	-	-	-	-	-	-	-	-	2
Unid. Rodent	-	-	-	-	-	-	-	-	387
Frog	-	-	-	-	-	-	-	-	19
Toad	-	-	-	-	-	-	-	-	16
Amphibian	-	-	-	-	-	-	-	-	21
Herring	-	-	-	-	-	-	-	-	1
Domestic Fowl	-	-	-	-	-	-	-	-	57
Dom. Duck/Mallard	-	-	-	-	1	-	-	-	1
Starling	-	-	-	-	-	-	-	-	2
House Sparrow	-	-	-	-	-	-	-	-	9
Finch sp.	-	-	-	-	-	-	1	-	1
TOTAL	13	6	3	8	147	29	35	8	2321
Sheep	-	-	-	-	-	-	-	-	774
Goat	-	-	-	-	-	-	-	-	1

TABLE F650.2

Fragments of Major Species Represented in F650

Cattle	F650 1-5	6*	7-10*	11-15	16	17-19	Total	%*
	Layer							
Skull frags.	-	-	2	-	-	1	3	3
Mandible	-	-	-	-	4	2	6	6
Loose teeth	-	1	-	1	9	3	14	13
Scapula	2	-	-	1	3	-	6	6
Humerus	-	-	-	-	3	-	3	3
Radius	-	1	-	-	1	-	2	2
Ulna	-	-	-	-	-	1	1	1
Os Coxae	-	2	-	-	1	1	4	4
Femur	3	2	1	-	2	2	10	10
Patella	-	-	-	1	-	-	1	1
Tibia	-	2	-	-	1	-	3	3
Carpals	-	-	-	-	2	-	2	2
Calcaneus	-	1	1	-	1	1	4	4
Astragalus	1	1	1	-	-	-	3	3
Centroquartal	-	1	1	-	-	1	3	3
Other tarsals	-	2	2	-	-	-	4	4
Metacarpal	-	-	-	-	1	-	1	1
Metatarsal	-	2	1	-	1	1	5	5
1st Phalanx	-	2	1	1	1	1	6	6
2nd Phalanx	-	2	-	-	-	2	4	4
Ribs	-	1	-	-	-	-	1	1
Cervical verts.	-	6	-	-	-	-	6	6
Thoracic verts.	-	5	-	-	-	1	6	6
Lumbar verts.	-	1	3	-	-	-	4	4
Sacrum	-	1	-	-	1	-	2	2
TOTAL	6	33	13	4	31	17	104	

Sheep/Goat	F650-1	2*	3*	5*	6*	7-10	11-15	16	17-19	Total	%
					Layer						
Skull frags.	-	24	20	2	3	-	-	1	-	50	6
Mandible	-	8	11	-	-	1	1	2	2	25	3
Hyoid	-	7	7	2	1	-	-	-	-	17	2
Loose teeth	-	30	-	7	4	2	-	11	3	57	6
Scapula	-	6	1	-	-	-	-	-	-	7	.8
Humerus	-	5	4	-	-	-	-	1	1	11	1
Radius	1	6	5	-	1	-	-	4	2	19	2
Ulna	-	7	4	-	-	-	1	-	-	12	1
Os Coxae	-	4	6	-	-	-	-	3	-	13	1
Femur	-	5	14	-	-	-	1	1	-	21	2
Patella	-	4	2	-	-	-	-	-	-	6	.
Tibia	-	4	10	-	1	-	-	3	-	18	2
Carpals	-	14	6	3	5	-	-	-	-	28	3
Calcaneus	-	4	4	-	1	-	-	-	-	9	1
Astragalus	-	4	2	-	-	-	1	-	-	7	.
Centroquartal	-	6	2	1	1	-	-	-	-	10	1
Other tarsals	-	2	-	1	1	-	-	-	-	4	.
Metacarpal	-	8	5	1	3	-	-	1	-	18	2
Metatarsal	-	8	6	1	4	-	2	6	-	27	3
Metapodial	-	-	13	-	-	-	-	-	-	13	1
1st Phalanx	-	40	19	6	11	-	-	-	1	77	9
2nd Phalanx	-	28	16	5	7	-	-	1	-	57	6
3rd Phalanx	-	17	17	3	11	-	-	-	-	48	5
Sesamoids	-	1	10	8	5	-	-	-	-	24	3
Ribs	-	72	41	-	17	-	-	-	-	130	15
Costal carts.	-	3	-	-	1	-	-	-	-	4	.
Sternebrae	-	6	3	-	-	-	-	-	-	9	1
Cervical verts.	-	31	2	2	6	-	-	2	-	43	5
Thoracic verts.	-	44	15	-	1	-	-	-	-	60	7
Lumbar verts.	-	25	13	-	-	-	-	-	-	38	4
Sacrum	-	2	3	-	-	-	-	1	-	6	.
Caudal verts.	-	6	7	-	-	-	-	-	-	13	.
TOTAL	1	431	268	42	84	3	6	37	9	881	

Pig	F650-3*	6	Layer 11-15	16	17	Total
Skull frags.	1	-	-	-	-	1
Hyoid	1	-	-	-	-	1
Loose teeth	1	-	1	2	1	5
Scapula	2	-	-	-	-	2
Humerus	2	-	-	-	-	2
Radius	2	-	-	-	-	2
Ulna	2	-	-	-	-	2
Os Coxae	1	-	-	-	-	1
Femur	1	1	-	1	-	3
Tibia	2	-	1	-	-	3
Fibula	1	-	-	1	-	2
Calcaneus	2	-	-	-	-	2
Astragalus	1	-	-	-	-	1
Metapodial	3	-	-	-	-	3
1st Phalanx	2	-	2	-	-	4
Ribs	28	-	-	-	-	28
Sternebrae	1	-	-	-	-	1
Cervical verts.	4	-	-	-	-	4
Thoracic verts.	13	-	-	-	-	13
Lumbar verts.	6	-	-	-	-	6
TOTAL	76	1	4	4	1	86

Horse: Layer 2 - scapula; Layer 15 - metacarpal;
Layer 16 - 1st phalanx; Layer 18 - femur, 3rd phalanx:
TOTAL = 5.

Dog	F650-2*	3*	6*	8*	16	Total	%*
Skull frags.	1	4	4	1	-	10	4
Mandible	5	1	2	2	-	10	4
Hyoid	-	-	-	1	-	1	.4
Scapula	3	1	2	1	-	7	3
Humerus	4	4	4	2	-	14	6
Radius	4	-	2	2	-	8	3
Ulna	4	1	3	2	-	10	4
Os Coxae	2	-	3	3	-	8	3
Femur	2	2	4	2	1	11	5
Tibia	6	2	2	1	1	12	5
Metapodial	4	11	-	1	1	17	7
1st Phalanx	-	1	-	-	-	1	.4
Ribs	24	7	25	19	-	75	31
Unid. verts.	5	10	3	38	-	56	23
TOTAL	64	44	54	75	3	240	

* = includes articulated bones

Unid. Large Mammal	Total
Skull and mandible frags.	4
Ribs	12
Vertebrae	5
Longbone fragments	25
Unid. fragments	31
Total	77

Sheep-sized Mammal	Total
Skull and mandible frags.	8
Ribs	23
Vertebrae	8
Longbone fragments	39
Unid. fragments	25
Total	103

TABLE F664.1

Species represented in Feature 664 (Fragments)

Species	Layer 1	2	3	4	5	6	7	8	9	10	11	Total
Cattle	1	-	-	-	-	15	14	3	57*	27	2	119
Sheep/Goat	2	2	16*	8*	21*	46*	59*	2	5	18	6	185
Pig	-	-	-	-	-	-	-	-	2	4	-	6
Horse	-	-	-	-	-	2	4	-	11*	8	-	25
Dog	406*	776*	294*	41*	256*	674*	62*	-	85*	75*	1	2670
Hare	-	14*	-	-	-	-	-	-	1	9*	1	25
Unid. Large Mammal	-	1	-	-	-	12	5	5	19	19	2	63
Sheep-sized Mammal	1	1	-	-	-	7	-	2	7	21	-	40
Unid. Mammal	-	-	-	-	-	3	-	-	2	4	-	9
Unid. Bird	2	-	-	-	-	-	3	-	-	-	-	5
Badger	-	-	-	-	-	-	-	-	3	-	-	3
Short-tailed Vole	-	9	-	-	-	25	-	-	-	-	-	34
Unid. Rodent	-	11	-	-	-	40	-	-	-	1	-	52
Frog	-	3	-	-	-	1	-	-	-	-	-	4
Toad	-	3	-	-	-	-	-	-	-	-	-	3
Amphibian	1	14	-	-	1	8	-	-	-	-	-	24
Meadow Pipit	-	-	-	-	-	-	-	-	-	1	-	1
Dunnock	-	1	-	-	-	-	-	-	-	-	-	1
Robin	3	-	-	-	-	-	-	-	-	-	-	3
TOTAL	416	835	310	49	279	883	147	12	192	187	12	3270
Sheep	-	1	15*	8*	21*	35*	51*	-	-	1	-	132

* includes articulated bones.

TABLE F664.2

Fragments of Major Species Represented in F664

Cattle	F664-1	6	7	8	9	10	11	Total	%
				Layer					
Skull frags.	1	10	3	2	4	7	-	27	23
Mandible	-	1	1	-	2	2	-	6	5
Loose teeth	-	-	5	-	9	10	-	24	20
Scapula	-	-	-	-	2	-	-	2	2
Humerus	-	1	-	-	5	-	-	6	5
Radius	-	-	-	-	1	-	1	2	2
Ulna	-	-	1	1	2	-	-	4	3
Os Coxae	-	-	-	-	8	2	-	10	8
Femur	-	2	1	-	2	1	-	6	5
Tibia	-	1	1	-	1	1	-	4	3
Calcaneus	-	-	-	-	-	1	-	1	.8
Metacarpal	-	-	-	-	-	1	1	2	2
Ribs	-	-	-	-	6	-	-	6	5
Cervical verts.	-	-	1	-	6*	1	-	8	7
Thoracic verts.	-	-	-	-	4*	-	-	4	3
Lumbar verts.	-	-	-	-	4*	-	1	5	4
Sacrum	-	-	1	-	1	-	-	2	2
TOTAL	1	15	14	3	57	27	2	119	

* includes articulated bones.

Sheep/Gt.	664-1	2	3	4	5	6	7	8	9	10	11	Total	%
Skull frags.	-	-	-	-	1	1	2	-	-	-	-	4	2
Mandible	-	-	-	-	2	3	4	1	-	1	1	12	6
Hyoid	-	-	-	-	1	2	2	-	-	-	-	5	3
Loose teeth	-	-	-	-	-	3	3	-	4	13	4	27	15
Radius	-	-	-	-	-	-	-	1	-	-	-	1	.5
Femur	-	-	1	-	-	-	-	-	-	-	-	1	.5
Tibia	-	1	-	-	-	-	1	-	-	-	-	2	1
Carpals	-	-	-	-	-	1	4	-	-	-	-	5	3
Calcaneus	-	-	-	-	-	-	2	-	-	1	-	3	2
Astragalus	-	-	-	-	-	-	2	-	-	-	-	2	1
Centroquartal	-	-	1	1	-	1	2	-	-	-	-	5	3
Other tarsals	-	-	1	-	-	2	3	-	-	-	-	6	3
Metacarpal	2	1	-	-	-	4	2	-	1	1	-	11	6
Metatarsal	-	-	2	1	1	3	4	-	-	1	1	13	7
Metapodial	-	-	1	-	-	-	-	-	-	-	-	1	.5
1st Phalanx	-	-	3	3	5	7	5	-	-	1	-	24	13
2nd Phalanx	-	-	3	1	4	6	6	-	-	-	-	20	11
3rd Phalanx	-	-	3	2	1	6	4	-	-	-	-	16	9
Sesamoids	-	-	1	-	6	7	12	-	-	-	-	26	14
Cervical verts.	-	-	-	-	-	-	1	-	-	-	-	1	.5
TOTAL	2	2	16	8	21	46	59	2	5	18	6	185	

Pig: F664-9: humerus - 1; radius - 1.
F664-10: loose teeth - 1; humerus - 2; radius - 1.
TOTAL - 6.

Horse	F664-6	7	9	10	Total
Skull frags.	-	1	-	-	1
Mandible	-	-	-	-	1
Loose teeth	-	-	-	4	4
Humerus	-	-	1	-	1
Radius	-	-	1	1	2
Ulna	-	-	1	-	1
Os Coxae	1	1	3	-	5
Femur	-	-	1	1	2
Calcaneus	1	-	1	-	2
Astragalus	-	1	-	-	1
Metacarpal	-	-	-	1	1
1st Phalanx	-	1	-	-	1
Cervical verts.	-	-	3	-	3
TOTAL	2	4	11	8	25

Dog	F664-1	2	3	4	5	6	7	9	10	11	Total
Skull frags.	70	60	26	14	30	60	-	1	1	-	262
Mandible	15	25	11	3	13	18	-	-	2	-	87
Hyoid	-	3	1	-	-	1	-	-	-	-	5
Loose teeth	-	-	-	-	-	-	2	1	4	1	8
Scapula	14	16	11	2	8	23	-	-	3	-	77
Humerus	19	26	7	2	14	19	-	-	2	-	89
Radius	14	18	11	1	10	15	-	1	1	-	71
Ulna	19	17	11	2	10	15	-	-	1	-	75
Os Coxae	20	26	10	1	13	25	-	-	2	-	97
Femur	19	21	12	1	13	20	2	-	-	-	88
Patella	-	4	1	-	-	-	1	-	-	-	6
Tibia	17	23	15	1	13	10	-	1	1	-	81
Fibula	4	8	2	-	2	5	-	1	1	-	23
Calcaneus	-	4	2	-	-	4	-	1	1	-	12
Astragalus	-	4	2	-	-	4	-	1	1	-	12
Other tarsals	-	13	6	-	-	9	-	3	1	-	32
Metacarpal	-	18	10	-	-	13	7	-	1	-	49
Metatarsal	-	15	8	-	-	19	2	4	5	-	53
Metapodial	6	13	-	-	1	7	4	-	-	-	31
1st Phalanx	-	31	16	-	-	29	10	2	3	-	91
2nd Phalanx	3	24	14	-	-	21	7	1	1	-	71
3rd Phalanx	-	16	14	-	-	19	9	1	-	-	59
Ribs	120	148	48	10	89	160	2	20	19	-	616
Costal carts.	-	24	10	-	-	2	-	5	1	-	42
Sternebrae	-	2	1	-	-	9	-	1	1	-	14
Cervical verts.	-	13	-	-	-	22	-	7	2	-	44
Thoracic verts.	-	20	-	-	-	40	-	13	13	-	86
Lumbar verts.	-	13	3	-	-	17	-	5	7	-	45
Sacrum	-	2	1	-	-	2	-	1	1	-	7
Caudal verts.	-	29	17	-	-	13	-	12	-	-	71
Unid. verts.	66	83	8	4	40	37	-	-	-	-	238
Baculum	-	1	-	-	-	-	1	-	-	-	2
TOTAL	406	776	294	41	256	674	62	85	75	1	2670

Unid. Large Mammal	Total
Skull and mandible frags.	5
Ribs	17
Vertebrae	6
Longbone fragments	10
Unid. fragments	25
Total	63

Sheep-sized Mammal	Total
Skull and mandible frags.	-
Ribs	22
Vertebrae	1
Longbone fragments	32
Unid. fragments	5
Total	40

TABLE F679.1

Species represented in Feature 679 (Fragments)

Species	Layer 3	5	6	7	9	11	13	14	15	16	Total
Cattle	-	-	18	5	18	-	15	11	121	10	198
Sheep/Goat	1	3	3	5	13	1	6	9	73	10	124
Pig	-	-	5	3	6	-	1	1	32	4	52
Horse	-	-	3	1	1	1	-	4	15	2	27
Dog	-	-	11	1	5	-	-	3	4	1	25
Cat	-	-	-	-	2	-	-	-	-	-	2
Unid. Large Mammal	3	-	10	7	18	-	4	20	201	33	296
Sheep-sized Mammal	-	-	6	-	12	-	7	1	50	10	86
Unid. Mammal	-	1	3	-	1	1	-	-	4	2	12
Unid. Bird	-	-	-	-	-	-	-	-	-	1	1
Rook/Crow	-	-	-	-	-	-	-	-	2	-	2
TOTAL	4	4	59	22	76	3	33	49	502	73	825
Sheep	-	-	-	-	2	-	-	-	4	-	6

TABLE F679.2

Fragments of Major Species Represented in F679

Cattle	Layer F679-6	7	9	13	14	15	16	Total	%
Skull frags.	3	-	2	-	-	8	-	13	7
Mandible	2	2	6	3	3	21	2	39	20
Loose teeth	6	3	5	6	2	35	4	61	31
Scapula	1	-	-	-	-	10	1	12	6
Humerus	-	-	1	-	-	6	-	7	4
Radius	1	-	-	-	1	4	2	8	4
Ulna	-	-	-	-	-	4	-	4	2
Os Coxae	-	-	1	1	1	5	-	8	4
Femur	1	-	2	-	1	3	-	7	4
Patella	-	-	-	-	-	1	-	1	.5
Tibia	-	-	-	-	-	7	-	7	4
Carpals	-	-	-	1	-	2	-	3	2
Calcaneus	-	-	-	-	-	2	-	2	1
Astragalus	-	-	-	-	-	2	-	2	1
Centroquartal	-	-	-	1	-	-	-	1	.5
Other tarsals	1	-	-	-	-	1	-	2	1
Metacarpal	-	-	-	1	1	4	-	6	3
Metatarsal	-	-	-	-	1	3	-	4	2
1st Phalanx	-	-	-	1	-	1	-	2	1
2nd Phalanx	-	-	-	-	-	1	1	2	1
3rd Phalanx	-	-	-	-	1	-	-	1	.5
Ribs	1	-	-	-	-	-	-	1	.5
Cervical verts.	1	-	-	1	-	1	-	3	2
Thoracic verts.	-	-	1	-	-	-	-	1	.5
Lumbar verts.	1	-	-	-	-	-	-	1	.5
TOTAL	18	5	18	15	11	121	10	198	

Sheep/Gt.	F679-3	5	6	7	9	11	13	14	15	16	Total	%
	Layer											
Skull frags.	-	-	-	-	4	-	-	-	10	-	14	11
Mandible	-	-	-	-	2	-	3	1	7	2	15	12
Loose teeth	1	2	-	4	1	-	2	5	40	5	60	48
Humerus	-	-	-	-	-	-	-	-	2	1	3	2
Radius	-	-	-	-	1	-	1	1	4	-	7	6
Os Coxae	-	-	-	-	-	-	-	-	1	-	1	.8
Femur	-	1	-	-	1	-	-	1	-	-	3	2
Tibia	-	-	3	-	2	-	-	-	4	2	11	9
Calcaneus	-	-	-	-	-	-	-	-	1	-	1	.8
Astragalus	-	-	-	-	-	-	-	-	1	-	1	.8
Metacarpal	-	-	-	-	2	1	-	-	-	-	3	2
Metatarsal	-	-	-	-	-	-	-	1	3	-	4	3
Cervical verts.	-	-	-	1	-	-	-	-	-	-	1	.8
TOTAL	1	3	3	5	13	1	6	9	73	10	124	

Pig	F679-6	7	9	13	14	15	16	Total
Skull frags.	-	1	3	-	-	4	3	11
Mandible	2	-	1	-	-	5	-	8
Loose teeth	1	2	-	-	-	15	1	19
Scapula	-	-	-	-	-	1	-	1
Humerus	-	-	-	-	1	-	-	1
Os Coxae	-	-	-	-	-	1	-	1
Femur	2	-	-	-	-	1	-	3
Fibula	-	-	-	1	-	-	-	1
Astragalus	-	-	-	-	-	2	-	2
Metacarpal	-	-	1	-	-	-	-	1
Lat. Metapodial	-	-	1	-	-	-	-	1
Metapodial	-	-	-	-	-	1	-	1
1st Phalanx	-	-	-	-	-	1	-	1
2nd Phalanx	-	-	-	-	-	1	-	1
TOTAL	5	3	6	1	1	32	4	52

Horse	F679-6	7	9	11	14	15	16	Total
Mandible	-	-	-	-	-	1	-	1
Loose teeth	-	-	1	-	-	6	1	8
Scapula	-	1	-	-	-	-	1	2
Humerus	1	-	-	-	-	2	-	3
Radius	1	-	-	-	-	1	-	2
Ulna	1	-	-	-	-	-	-	1
Os Coxae	-	-	-	1	-	-	-	1
Femur	-	-	-	-	1	-	-	1
Astragalus	-	-	-	-	-	2	-	2
Metacarpal	-	-	-	-	-	1	-	1
Lat. Metapodial	-	-	-	-	1	-	-	1
Metapodial	-	-	-	-	1	-	-	1
1st Phalanx	-	-	-	-	-	2	-	2
Cervical verts.	-	-	-	-	1	-	-	1
TOTAL	3	1	1	1	4	15	2	27

Dog	F679-6	7	9	14	15	16	Total
	Layer						
Skull frags.	2	-	3	-	1	-	6
Mandible	-	-	-	1	1	1	3
Loose teeth	3	-	-	1	-	-	4
Ulna	-	-	-	1	-	-	1
Os Coxae	1	-	-	-	-	-	1
Femur	-	-	-	-	1	-	1
Tibia	-	-	-	-	1	-	1
Calcaneus	1	-	-	-	-	-	1
Metatarsal	-	1	-	-	-	-	1
Ribs	1	-	1	-	-	-	2
Cervical verts.	-	-	1	-	-	-	1
Thoracic verts.	1	-	-	-	-	-	1
Lumbar verts.	2	-	-	-	-	-	2
TOTAL	11	1	5	3	4	1	25

Unid. Large Mammal	Total
Skull and mandible frags.	29
Ribs	20
Vertebrae	14
Longbone fragments	63
Unid. fragments	170
Total	296

Sheep-sized Mammal	Total
Skull and mandible frags.	4
Ribs	15
Vertebrae	3
Longbone fragments	53
Unid. fragments	11
Total	86

TABLE F679.3

F679 Summary Statistics

	Layer										
	3	5	6	7	9	11	13	14	15	16	Total
Total Fragments	4	4	59	22	76	3	33	49	502	73	825
ex.rarer species									500	72	822
% Unid. Fragments									51		48
Erosion Index									.78		.81
Loose Teeth Index									.39		.36
% Gnawed Fragments									8		8
% Butchered Frags.									2		3
% Fragments of Major Species											
Cattle									49		46
Sheep/Goat									30		29
Pig									13		12
Horse									6		6
Dog									2		6
Cat									-		.5
Cattle Loose Teeth Index									.29		.31
Cattle Longbone Fragmentation I.											.33
Sheep/Goat Loose Teeth Index											.48
S/G Longbone Fragmentation Index											.32

TABLE F691.1

Feature 691 Animal Bone Fragments in all Layers and Sections

Section	Layer 1	2	3	4	5	Total
1		48	331	35		414
2		143		25	19	187
4				1		1
5	32	119		22		173
6	29	81		36		146
7		8		3		11
8	1					1
9		8		34		42
10				12		12
11				3		3
12		1				1
13		16		9		25
14				61		61
16	2			1		3
18				4		4
TOTAL	63	424	331	246	19	1084

TABLE F691.2

Species represented in Feature 691 (Fragments)

Species	Layer 1	2	3	4	5	Total
Cattle	7	48	8	19	1	83
Sheep/Goat	18	74	38	14	3	147
Pig	6	25	46	2	-	79
Horse	-	10	-	3	-	13
Dog	-	4	-	-	-	4
Unid. Large Mammal	9	103	83	164	14	373
Sheep-sized Mammal	18	126	113	26	1	284
Unid. Mammal	4	32	38	18	-	92
Unid. Bird	2	-	-	-	-	2
Unid. Rodent	-	2	4	-	-	6
Amphibian	-	-	1	-	-	1
TOTAL	64	424	331	246	19	1084
Sheep	-	1	1	-	-	2
Goat	2	1	-	-	-	3

TABLE F691.3

Fragments of Major Species Represented in F691

Cattle	F691-1	2	Layer 3	4	5	Total
Skull frags.	1	4	-	-	-	5
Mandible	1	5	2	2	-	10
Loose teeth	5	12	1	3	-	21
Scapula	-	3	-	1	-	4
Humerus	-	2	-	2	-	4
Radius	-	2	2	1	-	5
Ulna	-	1	-	1	-	2
Os Coxae	-	-	-	1	-	1
Femur	-	2	-	-	-	2
Tibia	-	1	-	4	-	5
Carpals	-	-	2	-	-	2
Calcaneus	-	1	-	1	1	3
Metacarpal	-	1	-	-	-	1
Metatarsal	-	4	1	-	-	5
Metapodial	-	1	-	-	-	1
1st Phalanx	-	3	-	1	-	4
2nd Phalanx	-	2	-	-	-	2
3rd Phalanx	-	1	-	-	-	1
Cervical verts.	-	3	-	-	-	3
Lumbar verts.	-	-	-	2	-	2
TOTAL	7	48	8.	19	1	83

Sheep/Goat	F691-1	2	3	4	5	Total	%
Skull frags.	2	5	1	-	-	8	5
Mandible	4	9	3	-	2	18	12
Hyoid	-	1	-	-	-	1	.7
Loose teeth	6	30	20	10	1	67	46
Scapula	1	2	1	-	-	4	3
Humerus	-	1	1	1	-	3	2
Radius	1	5	-	1	-	7	5
Ulna	-	1	1	-	-	2	1
Os Coxae	-	1	-	-	-	1	.7
Femur	-	1	2	-	-	3	2
Patella	1	-	-	-	-	1	1
Tibia	-	8	3	-	-	11	7
Calcaneus	-	1	1	-	-	2	1
Astragalus	-	1	1	1	-	3	2
Metacarpal	2	3	1	-	-	6	4
Metatarsal	-	3	1	1	-	5	3
1st Phalanx	1	1	2	-	-	4	3
Cervical verts.	-	1	-	-	-	1	.7
TOTAL	18	74	38	14	3	147	

Pig	F691-1	Layer 2	3	4	Total
Skull frags.	-	3	5	1	9
Mandible	2	3	7	-	12
Loose teeth	-	10	5	1	16
Scapula	-	1	-	-	1
Humerus	1	-	2	-	3
Radius	-	1	4	-	5
Ulna	-	-	3	-	3
Os Coxae	-	-	1	-	1
Femur	-	-	1	-	1
Tibia	2	1	1	-	4
Fibula	-	2	1	-	3
Carpals	-	-	1	-	1
Calcaneus	-	-	2	-	2
Other tarsals	-	-	1	-	1
Metatarsal	-	-	-	-	-
Lat. Metapodial	-	-	3	-	3
Metapodial	-	-	1	-	1
1st Phalanx	-	1	2	-	3
2nd Phalanx	-	2	1	-	3
3rd Phalanx	-	-	1	-	1
Ribs	-	-	1	-	1
Cervical verts.	1	-	3	-	4
Thoracic verts.	-	-	-	-	-
Lumbar verts.	-	1	-	-	1
TOTAL	6	25	46	2	79

Horse	F691-2	Layer 4	Total
Skull frags.	-	1	1
Mandible	1	-	1
Loose teeth	1	1	2
Scapula	-	-	-
Humerus	-	-	-
Radius	-	1	1
Ulna	-	-	-
Os Coxae	-	-	-
Femur	-	-	-
Tibia	1	-	1
Fibula	-	-	-
Carpals	1	-	1
Calcaneus	2	-	2
Other tarsals	-	-	-
Metatarsal	1	-	1
Lat. Metapodial	-	-	-
Metapodial	-	-	-
1st Phalanx	1	-	1
2nd Phalanx	1	-	1
3rd Phalanx	-	-	-
Ribs	-	-	-
Cervical verts.	-	-	-
Thoracic verts.	1	-	1
Lumbar verts.	-	-	-
TOTAL	10	3	13

Dog: Layer 2:- Metacarpal - 1; 1st Phalanx - 2; Tibia - 1; TOTAL - 4

Unid. Large Mammal	Total
Skull and mandible frags.	9
Ribs	39
Vertebrae	24
Longbone fragments	72
Unid. fragments	229
Total	373

Sheep-sized Mammal	Total
Skull and mandible frags.	6
Ribs	44
Vertebrae	13
Longbone fragments	157
Unid. fragments	64
Total	284

TABLE F691.4

F691 Summary Statistics

	Layer 1	2	3	4	5	Total
Total Fragments	64	424	331	246	19	1084
ex.rarer species	62	422	326			1075
% Unid. Fragments		62	72	85		70
Erosion Index		1.64	.87	2.47		1.60
Loose Teeth Index		.33	(.28)			.33
% Gnawed Fragments		12				9
% Butchered Frags.		.9				.9
% Burnt		5	8	.4		5
% Fragments of Major Species						
Cattle		30				25
Sheep/Goat		46				45
Pig		16				24
Horse		6				4
Dog		2				1

Cattle Loose Teeth Index	(.21)
Cattle Longbone Fragmentation I.	(.22)
Sheep/Goat Loose Teeth Index	(.46)
S/G Longbone Fragmentation Index	.34

TABLE F707.1

Species represented in Feature 707 (Fragments)

Species	Layer 1	2	3	4	5	6	7	8	9	Total
Cattle	17	8	24	-	9	9	36	118	24	245
Sheep/Goat	44	18	58	1	58	16	28	125	27	375
Pig	12	20	27	1	22	4	6	6	1	99
Horse	2	-	6	-	-	2	3	9	2	24
Dog	-	-	-	-	1	-	1	3	2	7
Unid. Large Mammal	19	8	27	-	10	14	36	188	90	392
Sheep-sized Mammal	87	73	85	3	32	18	15	74	17	404
Unid. Mammal	21	8	20	4	7	5	3	14	5	87
Unid. Bird	1	2	7	-	-	-	-	1	-	11
Weasel	-	-	-	-	1	-	-	-	-	1
Short-tailed Vole	3	-	3	-	-	-	-	-	-	6
Mouse sp.	1	-	-	-	2	-	-	1	-	4
Unid. Rodent	7	6	16	-	5	-	-	1	-	35
Frog	2	3	1	-	1	-	-	-	-	7
Toad	2	1	-	-	-	-	-	-	-	3
Amphibian	15	3	-	-	1	-	-	-	-	19
Domestic Fowl	-	-	-	-	1	-	-	-	1	2
Falcon sp.	-	2	1	-	-	-	-	-	-	3
Thrush sp.	-	-	1	-	1	-	-	1	-	3
Rook/Crow	-	1	3	-	-	-	-	-	-	4
TOTAL	233	153	279	9	151	68	128	541	169	1731
Sheep	3	1	6	-	3	-	-	1	-	14

TABLE F707.2

Fragments of Major Species Represented in F707

	Layer									
Cattle	F707-1	2	3	5	6	7	8	9	Total	%
Skull frags.	2	2	-	-	2	-	3	-	9	4
Mandible	1	2	6	2	1	2	11	2	27	11
Hyoid	-	-	-	-	-	-	1	-	1	.4
Loose teeth	5	3	7	-	3	6	12	4	40	16
Scapula	-	-	2	1	-	6	7	-	16	7
Humerus	-	-	-	1	-	2	6	2	11	4
Radius	-	-	-	-	-	-	6	3	9	4
Ulna	-	-	1	-	-	1	10	-	12	5
Os Coxae	-	-	1	-	-	-	7	-	8	3
Femur	2	-	-	2	-	-	3	1	8	3
Tibia	-	-	1	-	-	5	8	~~3~~ 2	16	7
Carpals	-	-	-	-	-	-	-	4	4	2
Calcaneus	-	-	-	-	-	1	5	-	6	2
Astragalus	-	-	-	-	1	3	3	1	8	3
Centroquartal	-	-	-	-	1	-	3	-	4	2
Other tarsals	-	-	-	-	1	-	3	-	4	2
Metacarpal	2	-	1	1	-	-	2	3	9	4
Metatarsal	-	-	1	-	-	-	3	-	4	2
1st Phalanx	1	-	-	-	-	4	1	1	7	3
2nd Phalanx	-	-	-	1	-	1	4	1	7	3
3rd Phalanx	-	-	1	-	-	-	1	-	2	.8
Sesamoids	1	1	-	1	-	-	-	-	3	1
Cervical verts.	3	-	3	-	-	3	11	-	20	8
Thoracic verts.	-	-	-	-	-	1	1	-	2	.8
Lumbar verts.	-	-	-	-	-	1	5	-	6	3
Sacrum	-	-	-	-	-	-	2	-	2	.8
TOTAL	17	8	24	9	9	36	118	24	245	

Sheep/Gt	F707-1	2	3	4	Layer 5	6	7	8	9	Total	%
Skull frags.	12	1	12	-	6	2	-	5	-	38	10
Mandible	6	-	5	-	3	2	3	12	2	33	9
Hyoid	-	1	-	-	-	-	-	-	-	1	.3
Loose teeth	11	2	20	1	26	9	18	83	19	189	50
Scapula	1	1	1	-	3	-	-	1	-	7	2
Humerus	1	1	2	-	2	-	-	3	2	11	3
Radius	2	1	2	-	3	-	-	6	2	16	4
Ulna	-	-	-	-	1	-	-	-	-	1	.3
Os Coxae	2	-	1	-	1	-	-	-	-	4	1
Femur	-	2	1	-	2	-	-	1	-	6	2
Patella	1	-	-	-	-	-	-	-	-	1	.3
Tibia	2	2	4	-	3	2	2	10	1	26	7
Carpals	2	1	-	-	1	-	-	-	-	4	1
Calcaneus	-	-	1	-	-	-	1	1	-	3	.8
Astragalus	1	-	1	-	-	1	-	-	-	3	.8
Metacarpal	1	2	1	-	1	-	1	-	1	7	2
Metatarsal	1	1	3	-	2	-	1	2	-	10	3
Metapodial	-	1	-	-	-	-	-	-	-	1	.3
1st Phalanx	-	1	1	-	-	-	-	1	-	3	.8
2nd Phalanx	-	-	-	-	1	-	-	-	-	1	.3
3rd Phalanx	-	-	-	-	1	-	-	-	-	1	.3
Sesamoids	1	-	-	-	-	-	-	-	-	1	.3
Cervical verts.	-	1	2	-	2	-	2	-	-	7	2
Lumbar verts.	-	-	1	-	-	-	-	-	-	1	.3
TOTAL	44	18	58	1	58	16	28	125	27	375	

Pig	F707-1	2	3	4	5	6	7	8	9	Total
Skull frags.	4	3	2	-	4	1	-	-	-	14
Mandible	-	1	3	-	2	1	1	-	1	9
Loose teeth	3	3	9	1	5	2	1	4	-	28
Scapula	-	-	1	-	1	-	-	-	-	2
Humerus	1	-	-	-	1	-	1	1	-	4
Ulna	-	1	-	-	-	-	-	-	-	1
Femur	-	-	-	-	-	-	1	-	-	1
Tibia	-	-	2	-	-	-	-	-	-	2
Fibula	-	1	-	-	-	-	-	-	-	1
Calcaneus	-	1	1	-	-	-	-	-	-	2
Astragalus	-	1	-	-	-	-	-	-	-	1
Metacarpal	-	-	-	-	1	-	-	-	-	1
Metatarsal	-	-	1	-	1	-	-	-	-	2
Lat.Metapodial	2	2	1	-	1	-	-	1	-	7
Metapodial	-	-	-	-	1	-	-	-	-	1
1st Phalanx	1	3	3	-	1	-	1	-	-	9
2nd Phalanx	-	1	1	-	2	-	1	-	-	5
3rd Phalanx	-	1	1	-	1	-	-	-	-	3
Ribs	-	1	2	-	-	-	-	-	-	3
Cervical verts.	1	-	-	-	-	-	-	-	-	1
Lumbar verts.	-	1	-	-	1	-	-	-	-	2
TOTAL	12	20	27	1	22	4	6	6	1	99

Horse	Layer F707-1	3	6	7	8	9	Total
Skull frags.	1	1	-	-	-	-	2
Hyoid	-	2	-	-	-	-	2
Loose teeth	-	2	1	1	3	-	7
Scapula	-	-	1	-	-	-	1
Radius	-	-	-	-	-	2	2
Femur	-	-	-	-	1	-	1
Carpals	-	-	-	-	1	-	1
Calcaneus	-	-	-	-	1	-	1
Astragalus	-	-	-	1	1	-	2
Metatarsal	-	-	-	1	-	-	1
Lat. Metapodial	-	-	-	-	1	-	1
3rd Phalanx	-	-	-	-	1	-	1
Sesamoids	1	-	-	-	-	-	1
Ribs	-	1	-	-	-	-	1
TOTAL	2	6	2	3	9	2	24

Dog	F707-5	7	8	9	Total
Mandible	-	-	1	-	1
Loose teeth	-	-	-	2	2
Scapula	-	1	-	-	1
Femur	-	-	1	-	1
Calcaneus	1	-	-	-	1
Metapodial	-	-	1	-	1
TOTAL	1	1	3	2	7

Unid. Large Mammal	Total
Skull and mandible frags.	17
Ribs	49
Vertebrae	69
Longbone fragments	57
Unid. fragments	200
Total	392

Sheep-sized Mammal	Total
Skull and mandible frags.	18
Ribs	78
Vertebrae	21
Longbone fragments	193
Unid. fragments	94
Total	404

TABLE F707.3

F707 Summary Statistics

	Layer 1	2	3	4	5	6	7	8	9	Total
Total Fragments	233	153	279	9	151	68	128	541	169	1731
ex.rarer species	202	135	247		139			537	168	1633
% Unid. Fragments	63	66	53		35		42	51	67	54
Erosion Index	.06	.11	.27		.16			.99	1.87	.72
Loose Teeth Index			.33		(.34)			.39		.36
% Gnawed Fragments								14		11
% Butchered Frags.								1		3
% Burnt Fragments	7	11	3		2			.6	-	3
% Fragments of Major Species										
Cattle			21		(10)			45		33
Sheep/Goat			50		(64)			48		50
Pig			23		(24)			2		13
Horse			5		(-)			3		3
Dog			-		(1)			1		.9
Cattle Loose Teeth Index								.12		.16
Cattle Longbone Fragmentation I.										.31
Sheep/Goat Loose Teeth Index										.50
S/G Longbone Fragmentation Index										.31

TABLE F724.1

Species represented in Feature 724 (Fragments)

Species	Layer 1	2	3	4	5	6	Total
Cattle	-	14	90*	9	182*	7	302
Sheep/Goat	1	90*	36	-	23	-	150
Pig	1	1	3	-	3	-	8
Horse	-	1	15*	-	3	2	21
Dog	-	176*	6	5	15	1	203
Red Deer	-	-	-	-	1	-	1
Unid. Large Mammal	1	23	60	55	462	14	615
Sheep-sized Mammal	-	15	25	1	29	1	71
Unid. Mammal	3	3	8	-	4	2	20
Unid. Bird	-	-	1	-	-	-	1
Short-tailed Vole	-	1	-	-	-	-	1
Frog	-	1	-	-	-	-	1
Amphibian	-	1	-	-	-	-	1
Domestic Fowl	-	-	-	-	2	-	2
Pigeon	-	-	-	-	1	-	1
House Sparrow	-	-	-	-	1	-	1
TOTAL	6	326	244	70	726	27	1399
Sheep	-	72*	-	-	1	-	73

* includes articulated bones.

TABLE F724.2

Fragments of Major Species Represented in F724

Cattle	F724-2	Art. 3	Oth. 3	4	Art. 5	Oth. 5	6	Total	%*
				Layer					
Skull frags.	-	-	4	-	-	13	-	17	8
Mandible	2	2	8	2	-	33	-	47	20
Hyoid	-	-	1	-	-	-	-	1	.4
Loose teeth	6	-	9	3	-	16	4	38	17
Scapula	-	1	-	-	-	5	1	7	3
Humerus	-	1	-	-	-	3	-	4	1
Radius	1	2	1	-	-	3	-	7	2
Ulna	-	2	-	-	-	3	-	5	1
Os Coxae	-	1	-	-	-	3	-	4	1
Femur	-	1	3	-	1	6	-	11	4
Patella	-	-	-	-	-	1	-	1	.4
Tibia	-	2	-	-	3	10	-	15	4
Carpals	1	-	-	-	-	2	-	3	1
Calcaneus	-	2	-	-	1	3	-	6	1
Astragalus	-	2	-	-	3	2	-	7	.9
Centroquartal	-	1	1	-	2	1	-	5	.9
Other tarsals	-	-	-	-	2	3	-	5	1
Metacarpal	-	-	1	-	-	-	2	3	1
Metatarsal	1	-	-	-	2	2	-	5	1
Metapodial	-	-	-	-	-	1	-	1	.4
1st Phalanx	1	2	1	2	2	4	-	12	4
2nd Phalanx	-	1	-	-	1	8	-	10	4
3rd Phalanx	-	-	-	-	1	4	-	5	2
Ribs	1	27	-	-	-	2	-	30	1
Cervical verts.	1	-	3	1	-	14	-	19	7
Thoracic verts.	-	4	-	1	3	10	-	18	5
Lumbar verts.	-	5	-	-	-	5	-	10	2
Sacrum	-	-	1	-	-	3	-	4	2
Caudal verts.	-	-	1	-	-	1	-	2	.9
TOTAL	14	56	34	9	21	161	7	302	

* excludes articulated bones.

Sheep/Goat	F724-1	Layer Art. 2	Oth. 2	3	5	Total
Skull frags.	-	7	-	6	-	13
Mandible	-	8	-	3	6	17
Loose teeth	-	-	11	15	4	30
Scapula	1	-	-	1	-	2
Humerus	-	-	1	1	1	3
Radius	-	-	-	2	2	4
Os Coxae	-	-	1	-	1	2
Femur	-	-	1	-	1	2
Tibia	-	-	2	2	5	9
Carpals	-	2	-	-	-	2
Astragalus	-	-	1	-	-	1
Centroquartal	-	3	-	-	-	3
Other tarsals	-	2	-	-	-	2
Metacarpal	-	3	1	1	1	6
Metatarsal	-	4	-	5	1	10
1st Phalanx	-	15	-	-	-	15
2nd Phalanx	-	11	-	-	-	11
3rd Phalanx	-	7	-	-	-	7
Sesamoids	-	10	-	-	-	10
Lumbar verts.	-	-	-	-	1	1
TOTAL	1	72	18	36	23	150

Pig	F724-1	2	3	5	Total
Skull frags.	-	-	1	-	1
Mandible	-	-	1	-	1
Loose teeth	1	-	-	1	2
Scapula	-	-	-	1	1
Humerus	-	1	-	-	1
Os Coxae	-	-	1	-	1
Femur	-	-	-	1	1
TOTAL	1	1	3	3	8

Horse	F724-2	3	5	6	Total
Loose teeth	-	-	1	1	2
Humerus	-	1	-	1	2
Tibia	-	-	1	-	1
Carpals	-	1	-	-	1
Astragalus	1	-	-	-	1
Lat. Metapodial	-	2	-	-	2
Ribs	-	1	-	-	1
Thoracic verts.	-	8+	1	-	9
Lumbar verts.	-	2	-	-	2
TOTAL	1	15	3	2	21

+ articulated bones.

Dog	Art. F724-2	Oth. 2	3	4	5	6	Total
			Layer				
Skull frags.	1	1	1	-	1	-	4
Mandible	-	-	-	1	2	-	3
Hyoid	1	-	-	-	-	-	1
Loose teeth	-	-	-	3	2	1	6
Scapula	1	-	-	-	-	-	1
Humerus	2	-	1	-	1	-	4
Radius	2	1	1	-	2	-	6
Ulna	2	-	-	-	-	-	2
Os Coxae	2	-	-	-	-	-	2
Femur	2	-	-	-	1	-	3
Patella	2	-	-	-	-	-	2
Tibia	2	1	1	1	2	-	7
Fibula	1	1	1	-	-	-	3
Carpals	10	-	-	-	-	-	10
Calcaneus	2	-	-	-	-	-	2
Astragalus	1	-	-	-	-	-	1
Other tarsals	5	-	-	-	-	-	5
Metacarpal	10	-	-	-	1	-	11
Metatarsal	4	1	-	-	-	-	5
Metapodial	-	-	-	-	1	-	1
1st Phalanx	14	1	-	-	-	-	15
2nd Phalanx	11	-	-	-	-	-	11
3rd Phalanx	14	-	-	-	-	-	14
Sesamoids	9	-	-	-	-	-	9
Ribs	24	-	1	-	-	-	25
Costal carts.	15	-	-	-	-	-	15
Sternebrae	1	-	-	-	-	-	1
Cervical verts.	6	-	-	-	1	-	7
Thoracic verts.	13	-	-	-	-	-	13
Lumbar verts.	5	-	-	-	1	-	6
Sacrum	1	-	-	-	-	-	1
Caudal verts.	7	-	-	-	-	-	7
TOTAL	170	6	6	5	15	1	203

Unid. Large Mammal	Total
Skull and mandible frags.	46
Ribs	157
Vertebrae	37
Longbone fragments	55
Unid. fragments	340
Total	615

Sheep-sized Mammal	Total
Skull and mandible frags.	1
Ribs	6
Vertebrae	2
Longbone fragments	40
Unid. fragments	22
Total	71

TABLE F724.3

F724 Summary Statistics

	Layer 1	2	3	4	5	6	Total
Total Fragments	6	326	244	70	726	27	1399
ex.rarer species		323	243		722		1391
+ ex.articulated bones		81	179		701		1064
% Unid. Fragments			53		71		66
Erosion Index							.44
Loose Teeth Index					.12		.22
% Gnawed Fragments							22
% Butchered Frags.							3
% Burnt Fragments							23
% Fragments of Major Species							
Cattle							63
Sheep/Goat							22
Pig							2
Horse							3
Dog							9
Red Deer							.3
Cattle Loose Teeth Index							.17
Cattle Longbone Fragmentation I.							.45

SECTION 3

ANIMAL BONES FROM OTHER PHASED FEATURES AT OWSLEBURY

19,146 animal bone fragments were recovered from 193 other contexts that had been provisionally dated. For the purposes of this analysis these assemblages were grouped by phase and context type. Table Section3.1 lists these divisions.

TABLE SECTION3.1

Other Phased Assemblages of Animal Bones from Owslebury

Date Range	Context Type	No. of Features	Total Fragments
3rd-1st B.C.	Pits	27	5132
Mostly 1st B.C.	Gullies	21	2495
3rd-1st B.C.	Quarries	15	428
3rd-1st B.C.	Other	5	71
1st B.C.-1st A.D.	All	5	344
1st A.D.	Pits	15	992
1st A.D.	Gullies	10	1793
1st A.D.	Quarries	14	1321
1st A.D.	Track Gullies	5	715
1st-2nd A.D.	All	8	714
2nd A.D.	Gullies	8	1087
2nd A.D.	Quarries	12	1061
2nd A.D.	Other(Cobbles)	1	592
2nd-3rd A.D.	All	4	113
3rd-4th A.D.	Pits	3	53
3rd-4th A.D.	Gullies	3	338
3rd-4th A.D.	Quarries	5	662
3rd-4th A.D.	Ovens	4	212
3rd-4th A.D.	Other	5	744
1st B.C.-1st A.D.	Burials	23	279
TOTAL		193	19146

The most important of these groups were those of the Iron Age pits and gullies which provided a significant proportion of the total Iron Age sample from the excavations. The sample sizes from the later Romano-British deposits were generally smaller than the Iron Age and early Romano-British ones.

The analyses employed in the study of these deposits were identical to those used on the major assemblages. However, sample size dictated that a layer by layer analysis was not practicable. The unit of comparison was the individual feature and this cannot take into account the variations encountered within different layers of thsoe features. The results therefore are less precise than those presented in the previous section. Apart from the bones associated with the human burials, which are considered separately at the end of this section, the assemblages will be examined in chronological order.

Other Iron Age Pits

5,132 fragments came from 27 other pits dated to the Iron Age. In general the numbers of bones in each pit was small. 15 pits produced less than 100 fragments. All of the 11 pits which produced over 200 fragments included a substantial proportion of articulated bones of small mammal or amphibian bones in their assemblages (Table IAPits.1).

1,016 of the bones belonged to a number of articulated skeletons (Table IAPits.2). The largest concentration of such bones was in F181-1, which produced 576 bones from at least four immature pigs. Three of the skeletons belonged to very young piglets, which had very porous bones. Their fourth deciduous premolar was just erupting. They would have been no more than a few weeks old. The fourth skeleton belonged to a slightly older animal. This had some wear on its mandibular deciduous premolars and the first molar was coming into wear. This therefore belonged to an animal aged between 6-12 months old.

F212-1 contained two sets of articulated sheep bones. The first consisted of 24 bones of the lower limbs; the second was a small group of five bones consisting of the metatarsus and the phalanges. Both sets of phalanges had unfused epiphyses and it is possible that both groups belonged to the same immature animal. 53 bones of an immature sheep were found in F212-4. The distal epiphysis of the humerus was just fusing and the bones of the os coxae were still unfused. It is likely therefore that the skeleton belonged to a lamb under a year old. Most bones of the trunk and upper limbs were recovered. In the same layer, pairs of mandibles and maxillae from a sheep/goat were found. The deciduous premolars were in wear, but the first molars were not fully erupted. The animal therefore probably lived for no more than a few weeks. F384-2 produced pairs of astragali, and the distal epiphyses of the adjacent tibiae, a calcaneus and a tarsal of another sheep. One of the astragali had knife cuts on it produced during disarticulation of the hindlimb. In the same pit, three unfused sheep/goat cervical vertebrae and the sacrum were recovered from layer 3. This may have belonged to the same immature animal.

F186 produced a substantially complete skeleton of a dog. F186-4 contained 142 bones of an animal whose latest-fusing epiphyses were unfused. 30 bones of the same animal were recovered from F186-5. Another largely complete skeleton (150 bones), of an adult dog was retrieved from F212-1. 16 of the hare bones were articulated. Nine belonged to a very young animal located in F139-2. Seven bones of an older but still immature hare were found in association in F384-2. The elements represented in these articulations are shown in Table IAPits.5.

1,697 bones of small mammals, amphibians and birds were recovered from these pits. The most frequently identified were short-tailed voles, woodmice, frogs, toads, common shrews and water voles, but several other species were also represented (Table IAPits.2). 10 of the weasel bones belonged to the partial skeleton of an adult male found in F181-1. F384-2 produced 17 bones of an unidentified species of snake. Most of the largest concentrations of small mammals and amphibians were located on the bottom or in the lower layers of the pits (Table IAPits.1). The animals had probably fallen into open pits and were unable to escape.

Excluding articulated bones, sheep/goat fragments (64%) were extremely well represented in Iron Age Pits. Cattle fragments (19%) were poorly represented compared to most other deposits and, apart from the dog skeletons discussed above, horse and dog bones (2% each) were also relatively rare. The only red deer and roe deer fragments were those of antler. This pattern was found consistently in most of the pits (Table IAPits.3). Only in the relatively small samples from F177 and F579 did cattle fragments outnumber those of sheep/goat. Pig fragments were more common in F674 and F675, but the samples from those 1st Century B.C. pits were very small and it is does not necessarily imply that pigs had become more important.

The relative abundance of unidentified large mammal and sheep-sized mammal fragments showed similar traits to the identified portion of the assemblage. The latter (844 fragments) consistently outnumbered the former, in some cases to a marked degree (Table IAPits.4).

The samples were reasonably well preserved. Table IAPits.6. shows the overall summary statistics for these pits. As usual bones in layers nearer to the ground surface were generally less well preserved than those buried lower in the pitfills. The erosion and loose teeth indices were however, moderately low. 12% of the bones of the major species bore evidence of gnawing and 5% evidence of butchery. A reasonably large number of bones (3%), showed evidence of burning.

Both cattle and sheep/goat assemblages included a relatively high percentage of skull fragments (Table IAPits.5). Although, the sheep/goat sample was biased toward the denser elements, the degree of bias was not as extreme as in many other features.

Other Iron Age Gullies

21 features came into this category. The majority were dated to the 1st Century B.C. but as in most of the features of this type at Owslebury, the pottery in the upper layers was often mixed and contained a large amount of later material. The assemblages were not as securely dated as those from the Iron Age pits. 2,495 were recorded, with reasonably large samples procured from from some deposits (Table IAGullies.1). The five largest assemblages were examined separately. Of these, F574 and F589 were dated to the 3rd Century B.C. The former was the "handle" of the banjo enclosure ditch; the latter was an early recut of the enclosure ditch, F55. The three other largest assemblages (F137, F570 and F673), were 1st Century B.C. in origin and were more typical of the remaining Iron Age gullies.

Most of the articulated bones belonged to pigs. 28 bones of an immature animal (under 1 year old), were found in F148-1-2. At least 32 of the pig bones F574-3-9 belonged to another skeleton of an immature animal. The bones represented in these two groups are listed in Table IAGullies.3. F137-1 contained seven ribs and vertebrae which probably belonged to the same adult horse.

The species represented in these features are given in Table IAGullies.2

Other Iron Age Quarries

15 such features contributed 428 animal bone fragments. Most of them were dated to the 1st Century B.C. although a few (F100, F140, F232 and F577), probably originated in the 3rd-2nd Centuries B.C. None of them contained a large assemblage (Table IAQuarries.1). No articulated bones were recovered. Overall, cattle fragments (40%) outnumbered those of sheep/goat (32%) with pig fragments (17%) well represented. Bones of horse, dog, toad and rook/crow completed the list of identified species. Neither goat or domestic fowl bones were identified (Table IAQuarries.2).

The assemblages, in general, were moderately preserved. The samples of the major species had few loose teeth, but were nevertheless biased towards the denser elements of the skeleton (Table IAQuarries.3). Gnawing and butchery marks were observed on most of the fragments (Table IAQuarries.4).

Other Iron Age Features

Five small assemblages are included in this group. F5, F41 and F47 were fills of trackways. F4 was a a buried soil horizon , and F190 possibly an oven dated to the 3rd Century B.C. Only 71 fragments were recovered from these features and only four of the major domestic species were identified (Table IAOther.1). The elements represented are given in Table IAOther.2.

Features dated to the 1st Century B.C.- 1st Century A.D.

Bones were recovered from five features provisionally assigned to this date. The only assemblage of any size came from the gully, F526 (344 fragments). The other features were F120 (another gully), F23 (track), F35 (quarry) and F600 (pit). The number of fragments recovered from all these features are given in Table 1BC1ADC.1.

Two small sets of articulated bones were recorded from F526. 11 associated rib fragments of cattle were recovered in F526-1-18 and four metacarpals of a dog's foot were found in F526-1-19. Apart from these bones, cattle fragments outnumbered those of sheep/goat in F526 and the small, poorly preserved sample from F120. Only bones from the five major species and rook/crow were identified. Neither goat nor domestic fowl were represented (Table 1BC1ADC.2).

The bones from F526 were well preserved but had suffered severely from canid scavenging. There were low percentages of loose teeth, unidentifiable fragments and eroded bones. This contrasted with the other assemblages of this date, which were severely eroded (Table 1BC1ADC.4). The bones represented in the samples of the major species are shown in Table 1BC1ADC.3.

Other 1st Century A.D. Pits

15 other pits provisionally dated to the 1st Century A.D. produced 992 animal bone fragments. Most of them produced assemblages of less than 100 fragments. F266 (373 fragments) and F383 (180 fragments) were treated separately in the following analysis. The numbers of fragments in each layer of the pits are given in Table 1CPits.1.

The only articulated bones belonged to a woodmouse skeleton in F383-2. This was probably a pitfall victim. Sheep/goat fragments dominated the identifiable portion of the assemblage, contributing 53% of the fragments of the major species. Only sheep bones were positively identified. Cattle (23%) were again poorly represented in pit deposits and in F266 only contributed 11% of the fragments. Pig fragments were very well represented in that pit and provided 19% of the fragments overall. Horse (3%) and dog (1%) were poorly represented. Only an antler fragment was identified to red deer. Single fragments of hare, hedgehog, domestic fowl and rook/crow were recorded. Sheep-sized fragments comfortably outnumbered large mammal fragments amongst the unidentifiable fragments, supporting the bias towards sheep/goat in these features (Tables 1CPits.2; 1CPits.4).

Preservation of bones was generally poor. Because of the shallowness of many of the pits, a great many of the bones were eroded. This is shown by the high erosion indices, particularly in F383. The loose teeth indices were also very high. In addition, 15% of the bones bore evidence of canid scavenging but only 1% had butchery marks visible on them (Table 1CPits.4). The assemblages of all the major species therefore displayed a marked bias towards loose teeth in particular and dense elements of the skeleton in general (Table 1CPits.3).

Other 1st Century A.D. Gullies

Ten contexts are included in this group. Dating the fill of these features was again problematic. These are believed to have been dug during the 1st Century A.D. but some of the upper fills contained later material. 1,793 fragments were recovered from them and the five largest samples (from F316, F149, F572, F627 and F737) have been analysed separately. The number of fragments in each layer of all these gullies is given in Table 1CGullies.1.

Articulated groups of bones of several species were recovered. F627-1-2 included at least 19 articulated cattle bones. These consisted of bones of the lower forelimb and hindlimb. It is possible that other cattle bones in this feature belonged to the same or other partial skeletons, since cattle fragments were unusually well represented and there were several complete or substantially complete limb bones (Tables 1CGullies.3; 1CGullies.4).

Both F136 and F149 contained partial pig skeletons. 44 bones, mainly ribs and vertebrae, belonged to an animal probably under six months old in F136-2. A pig of similar age was represented by at least 12 bones in F149-2-2. The bones represented are given in Table 1CGullies.3. F136-2 also contained six thoracic vertebrae and three ribs of a skeletally mature horse. F737-4-11 contained all seven cervical vertebrae of a younger horse and it is possible that other horse bones in that feature were articulated. This would explain their unusual abundance in that gully.

F627-2-1 produced at least 28 bones belonging to an immature dog. The articulated bones belonged mainly to the hindlimbs. F672-2-6 produced 24 bones, mostly ribs, of a skeletally mature dog (Table 1CGullies.3).

Excluding articulated bones, relative species abundance was quite variable. Overall, sheep/goat fragments (41%) outnumbered cattle (32%) but the percentage of sheep/goat varied between 29-55%. Pig fragments (10%) were moderately represented. Both horse and dog fragments (8%) were quite well represented. The hare and red deer bones were each restricted to a single context (Tables 1CGullies.2; 1CGullies.4). Occasional finds of domestic fowl and other species of bird, small mammals and amphibians were made. Only sheep was positively identified amongst the sheep/goat sample.

The preservation of the bones was also quite variable. Generally the erosion indices were high, indicating poor survival of the bones. F136, however, was an exception with a low erosion index of .16. In contrast, F737 produced one of the most eroded samples from the excavations (erosion index = 2.76). 12% of the bones of the major species were also recorded as gnawed, indicating the secondary disposal of much of the material. Relatively few butchery marks were recorded (Table 1CGullies.4). The cattle assemblage was generally better preserved than those of sheep/goat and pig, although all the samples were biased towards the sturdier elements. The sheep/goat assemblage in particular contained few fragile elements such as the scapula, ulna, femur, vertebrae and phalanges (Table 1CGullies.3).

Other 1st Century A.D. Quarries

14 small quarry features provisionally dated to the 1st Century A.D. produced a total of 1,321 animal bone fragments. Only five of the features contributed over 100 fragments. The three largest samples were obtained from F184, F145 and F366 (Table 1CQuarries.1). These samples were analysed separately from the others.

No articulated groups of bone were recorded. The relative representation of the major species varied markedly. Cattle fragments were the most common in F145 and F366 (43% in each) but ranked second behind sheep/goat in most of the other quarries. Sheep/goat fragments (45% overall) were the most commonly identified. Once again no goat bones were identified. Pig fragments (19%) were generally well represented but horse (4%) and dog fragments (2%) were uncommon. Single bones of hare, domestic fowl and toad were identified. Four intrusive rabbit bones were recovered (Tables 1CQuarries.2; 1CQuarries.4).

Erosion levels were generally quite high, apart from in F366, which appears to have preserved bones better. In addition to a low erosion index, this feature had exceptionally high percentages of gnawed and butchered bones and a low percentage of unidentifiable fragments (Table 1CQuarries.4).

The cattle sample was in general better preserved than those of the other major species. It contained a relatively high number of skull fragments, although a quarter of the assemblage consisted of loose teeth. The sheep/goat and pig assemblages as usual were much more heavily biased towards loose teeth (Table 1CQuarries.3).

Other 1st Century A.D. Tracks

The fills of five other track gullies dated to the 1st Century A.D. produced 715 animal bone fragments. F43, F46 and F51 all contributed over 150 fragments (Table 1CTracks.1). Two layers contained articulated bones. F43-2-2 included nine bones of the lower forelimb of an adult sheep. F51-2-2 contained articulated radii and ulnae and a set of phalanges and a sesamoid of a horse (Table 1CTracks.3).

Overall, cattle fragments (46%) were the most commonly identified, due mainly to their predominance in F43 (63%). Sheep/goat fragments outnumbered those of cattle in F46 and F51 and contributed 33% of the fragments of the major identified species. Horse fragments were well represented, particularly in F46. However, most of the horse bones in this feature consisted of skull fragments and loose teeth, many of which may have belonged to the same skull. Dog fragments were poorly represented. A single bone each of red deer and domestic fowl were identified. Only sheep were identified in the sheep/goat sample (Tables 1CTracks.2; 1CTracks.4).

F43 produced an assemblage almost completely devoid of eroded bones. As a result the sample contained a remarkably high proportion of gnawed (29%) and butchered (19%) bones. Indeed, all these features had low erosion indices but a high percentage of the bones had been gnawed, suggesting that many of the bones had been subjected to secondary disposal in these fills. It was this destruction by scavenging animals, as opposed to erosion, that produced the high loose teeth indices for sheep/goat (Tables 1CTracks.3; 1CTracks.4).

Features dated to the 1st-2nd Centuries A.D.

Eight features of this date provided 714 fragments. Most were found in the pit, F533, which contained several partial skeletons. The pit F635 was the only other feature in this group that contributed over 100 fragments. Two other pits (F540, F636), a hollow (F26), a posthole (F419), a quarry (F660) and a gully (F692) complete the list of contexts in this group Table 1st2ndC.1).

F533-2 produced a large number of bones of small mammals and amphibians. These consisted mainly of skeletons of water voles and frogs (Table 1st2ndC.2). The same layer also produced partial skeletons of cattle, sheep and dog. 47 vertebrae and ribs of at least two immature cattle were counted. A more complete skeleton of a sheep, probably belonging to an animal aged about one year old, was recovered in the same layer along with the skull and mandible of another sheep. Five other sheep bones from F533-1 may have belonged to one of these animals. 48 bones of a very young puppy were also recovered in F533-2. The bones represented in these groups and in the remainder of the samples are given in Table 1st2ndC.3 and the summary statistics in Table 1st2ndC.4.

Other 2nd Century A.D. Gullies

Relatively few deposits on the settlement had their origin in the 2nd Century A.D. Eight gullies are positively assigned to this date, although not all their layers necessarily were deposited in that Century. Most of the layers of F669, for example, contained pottery of late Roman date.

1,087 animal bone fragments were found in these deposits but only F368 and F717 produced over 100 fragments. The great majority of the fragments from the former feature were obtained from F368-3-2 (Table 2CGullies.1). That layer produced the only group of articulated bones - eight ribs and thoracic vertebrae of an immature pig. Amongst the identified portion of the assemblage, sheep/goat fragments were dominant in F368 and cattle fragments were the most common in F717. Overall, sheep/goat contributed 43% of the identified fragments and cattle 38%. No pig fragments were found in F717 but provided 20% of the fragments in F368. Horse fragments were well represented in F717, in which large mammal fragments were dominant. Bones of dog,red deer, domesticfowl, toad and house sparrow were also identified (Table 2CGullies.2; 2CGullies.4).

The variability of the species respectively may to a large extent be due to the differential preservation of bones from the two largest assemblages. The bones from F368 were quite well preserved, having relatively few eroded bones, unidentified bones and loose teeth. In contrast, F717 produced one of the most severly eroded samples from the excavations (erosion index = 2.42). Unidentifiable fragments and loose teeth formed a high proportion of the assemblage. No butchery marks and few gnawing marks could be recognised. The dominance of the bones of the large mammals (and the absence of pig bones), may be partly due to differential preservation of bones in these very poor conditions, in which only the sturdiest bones survived (Tables 2CGullies.3; 2CGullies.4).

Other 2nd Century A.D. Quarries

12 quarry features provisionally dated to the 2nd Century A.D. are included in this group. 1,061 animal bone fragments were recovered from them, but the only large group came from F248 (591 fragments). Of the others, only F246 produced over 100 fragments (Table 2CQuarries.1). The only articulated bones belonged to a substantially complete skeleton of a rook/crow in F613-1.

F248 was treated separately from the other contexts in this analysis. Cattle and sheep/goat fragments were found in equal numbers in it (34% each), with pig fragments well represented (22%). In the other features sheep/goat fragments outnumbered cattle (44% and 31% respectively), with pig (14%), less commonly identified. Horse and dog (6% and 4% overall), and the occasional fragment of roe deer, domestic fowl, weasel, short-tailed vole, frog , a species of the thrush family and a raven completed the species list (Tables 2CQuarries.2; 2CQuarries.4).

Preservation of the bones was better in F248 than in the other quarries, which had high erosion and loose teeth indices. Once again a large percentage of the bones had been gnawed (Table 2CQuarries.4). The types of elements represented of the major species are given in Table 2CQuarries.3).

Other 2nd Century A.D. Features

In fact, only one deposit is included under this heading. F349 was a single layer of track cobbles lying above F147 and beneath F150. 13 sections of this feature produced 592 animal bone fragments. Only sections 5 and 11 produced over 100 fragments (Table 2COther.1).

Sheep/goat (44% of the fragments of the major identified mammals) were the most common species represented, although no goat bones were identified. Cattle (32%) were the next most common species found. Horse (12%) was better represented than usual, but pig fragments (8%) were lower than their average. Red deer was represented only by a fragment of antler. No domestic fowl bones were identified (Tables 2COther.2; 2COther.4).

The assemblage was poorly preserved, with high erosion and loose teeth indices and a large percentage of unidentifiable fragments. Loose teeth were particularly prevalent in the sheep/goat and horse assemblages (Tables 2COther.3; 2COther.4).

Features dated to the 2nd-3rd Centuries A.D.

Four features assigned to this date produced animal bones, but only 113 fragments in all were recorded. 57 of these came from the track, F588. The other three features (F557, F558 and F620) were either small pits or quarries. (Table 2nd3rdC.1). 55% of the fragments were unidentifiable and only cattle, sheep/goat, pig and horse were identified (Table 2nd3rdC.2). The elements represented of these species are shown in Table 2nd3rdC.3.

Other Pits dated to the 3rd and 4th Centuries A.D.

Only three pits (F543, F544 and F639) were represented and contributed 53 bones, mainly from F544. Only four species were identified (Tables 4CPits.1; 4CPits.2). Sheep/goat fragments were the most common, represented by seven loose teeth, two mandible fragments, a metacarpal and a metatarsal. The six cattle fragments consisted of two teeth, two tibiae, a scapula and a radius. Pig was represented by two teeth only and horse by two astragali and a first phalanx.

Other 3rd-4th Century A.D. Gullies

Three gullies are included under this heading. F663 was dated to the 3rd Century A.D. and F668 and F671 to the 4th Century A.D. Altogether they produced 338 fragments (Table 4CGullies.1).

Of the identified fragments, those of sheep/goat outnumbered cattle. Only one bone, a goat's horn core could be identified to species in the sheep/goat sample. In the small sample, horse fragments were well represented, especially in F671 but pig fragments were comparatively rare. Two dog fragments and a single bone of cat were identified. The mole bones in F633-1 may have been intrusive (Table 4CGullies.2).

The assemblages were poorly preserved, particularly in F671, from where the majority of the bones were severely eroded. This resulted in high erosion and loose teeth indices (Table 4CGullies.4). The elements represented of the major species are given in Table 4CGullies.3. This again shows the dominance of loose teeth in the assemblages.

Other 3rd-4th Century A.D. Quarries

Five of the quarries provisionally dated to the later Roman period produced a total of 662 animal bone fragments. The five (F107, F154, F461, F465 and F742) all contributed between 100-200 fragments (Table 4CQuarries.1). This included nine bones of the lower hindlimb of an adult cow in F461-1. Some of the tarsals of this animal were fused pathologically. F742-1 included a partial skeleton of a house sparrow and the lower layers of this feature contained several amphibian and small mammal bones. F107 and F154 both produced rabbit bones, which were intrusive into the Roman deposits. Single fragments of red deer, a species of thrush, rook/crow and raven were identified but, as usual, the sample was dominated by the five major domestic species. Neither goat nor domestic fowl bones were identified (Table 4CQuarries.2).

Excluding articulated bones, fragments of sheep/goat and cattle were found in almost equal numbers. They each provided 40% of the identifiable fragments of the major species. Sheep/goat fragments outnumbered cattle fragments in F107, F154 and F465 but were ranked second in F461 and F742. However, the sample from these quarries were too small individually to indicate whether these variation were of any significance. Horse and pig (8% each) and dog (4%) completed the species list. The sample were poorly preserved with very high erosion indices in all features apart from F107. The percentages of loose teeth and unidentifiable fragments were also high. 14% of the bones of the major species bore evidence of scavenging - a high figure considering the amount of surface erosion on the bones (Table 4CQuarries.4). As is to be expected, the samples of the major species were heavily biased towards loose teeth and other dense elements (Table 4CQuarries.3).

3rd-4th Century A.D. Ovens

212 animal bones associated with the fills of abandoned

ovens were recovered from four features (F91, F204, F539 and F652). Only F204 produced over 100 fragments (Table 4COvens.1). F91 contained at least 39 bones of an immature cat. Most of its major limb bones were represented but many of the ribs, vertebrae and smaller bones were not recovered (Table 4COvens.3). F539 produced a few bones of amphibians and small mammals. Domestic fowl and a species of duck were identified in F91. Apart from these only cattle, sheep/goat (only sheep were definitely present) and pig were represented. Of these, cattle fragments were the least common and sheep/goat fragments dominated the sample. However the assemblages were much too small for detailed analysis (Table 4COvens.2). 51% of the bones were unidentifiable and the erosion index (.82) was quite high.

Other Features dated to the 3rd-4th Centuries A.D.

744 animal bone fragments were obtained from five features. Most of them came from the fills of the hollow ways, F566 and F606. The latter feature had been disturbed. Over 100 fragments were also obtained from a posthole, F372 and the cobbles feature, F607. F565, a trackway, produced just one fragment (Table 4COther.1).

Apart from the water vole bone in F566, only fragments of the major domestic mammals were identified. Sheep/goat fragments were dominant in all the features (59%) but particularly in F606. Cattle fragments (25%) were the next most common. Pig fragments were poorly represented in F606 and dog bones were rare throughout. A relatively high proportion of bones were unidentifiable (Tables 4Cother.2; 4COther.4).

Erosion on many of the bones was severe throughout these features and the loose teeth indices were extremely high, notably in F606. The dominance of loose teeth in the sheep/goat sample in particular is shown in Table 4COther.3.

Animal Bones Associated with Human Burials

23 of the human burials had animals in their associated fills. 279 fragments were recorded but no context produced more than 100 fragments (Table Burials.1). In most cases it is not clear whether most of these bones were deliberately buried with the bodies. Indeed the opposite may have been the case. 15 of the bones were gnawed, which suggests that at least some of the samples had been lying accessible to dogs. It is possible that some of the soils used to cover the bodies contained animal bones in them. Others may have subsequently been trampled into the fills. In addition, many of the bones were eroded (erosion index = .79) and there was the usual bias towards loose teeth (loose teeth index = .48).

The usual range of domestic species were represented with sheep/goat fragments (44%) the most commonly identified. No goat bones were noted. Cattle (28%), pig (21%), horse (3%) and dog (3%) completed the list of domestic mammals. One domestic fowl bones was found in B1. An intrusive rabbit bone was associated with B13. Most of the small mammal and amphibian bones were found in the fill of B42. 53% of the bones were unidentifiable

(Table Burials.2).

The types of bone element represented are shown in Table Burials.3. In general, this shows the usual range of material. Perhaps the only notable feature is the number of pig mandibles associated with the burials. However, the evidence for the direct association between these bones and the human burials is tentative.

TABLE IAPITS.1

Animal Bone Fragments in Other Iron Age Pits

Feature	Layer 1	2	3	4	5	6	7	8	Total
48	5		26						31
58	44	22	37	92					195
62	11								11
109	20	35							55
125	4	4							8
139		92*	108	24					224
174	1	4							5
177	6	13	67		11				97
180	197+	59	4						260
181	784*+	100	38	37+	56	83	15		1113
185	18	3		2	2	6			31
186	6+	194+	275+	145*	114*	9	15		758
189	27	5		11					43
191		1							1
212	327*+		16	80+	4	9	7	5	448
230	346+	17	7						370
293	181+	35		3					219
355	9								9
356	75	60							135
376	68+	223							291
384	64+	104*+	110*+	4	16+				298
409	327+	4	1						332
491		5	14	3					22
542	16	4	1						21
579	5	19	31						55
674	32	23	11						66
675	3	6	21	4					34
TOTAL									5132

* layer contains articulated bones of major species
+ layer contains a high proportion of small mammal or amphibian bones.

TABLE IAPITS.2

Species represented in Other Iron Age Pits (Fragments)

Species	Articulated	Other	Total
Cattle	-	225	225
Sheep/Goat	102	752	854
Pig	576	138	714
Horse	-	27	27
Dog	322	23	345
Red Deer	-	3	3
Roe Deer	-	2	2
Hare	16	5	21
Unid. Large Mammal	-	315	315
Sheep-sized Mammal	-	844	844
Unid. Mammal	-	85	85
Unid. Bird	-	3	3
Weasel			13
Pygmy Shrew			1
Common Shrew			34
Water Vole			23
Short-tailed Vole			168
Mouse sp.			43
Unid. Rodent			848
Snake sp.			17
Frog			128
Toad			121
Amphibian			279
Skylark			1
House Sparrow			16
Warbler sp.			1
Raven			1
TOTAL	1016		5132
Sheep	88	60	148
Goat	-	2	2

TABLE IAPITS.3

Major Species Represented in Other Iron Age Pits

Feature	Cattle	S/G	Pig	Horse	Dog	Red	Roe	Hare	Total
48	2	9	5	-	1	-	-	-	17
58	8	60	14	3	-	-	-	-	85
62	3	3	1	1	-	-	-	-	8
109	2	24	1	-	-	-	-	-	27
125	1	3	1	-	1	-	-	-	6
139	17	83	9	-	-	-	-	1	110
174	1	2	-	-	-	-	-	-	3
177	25	16	8	-	-	-	-	-	49
180	6	27	3	1	-	-	1	-	38
181	43	155	24	7	3	-	1	1	234
185	1	9	-	-	-	-	-	-	10
186	13	43	5	-	-	1	-	-	62
189	4	10	-	-	2	-	-	-	16
191	-	-	-	-	-	-	-	-	-
212	19	54	7	3	-	2	-	-	85
230	3	20	1	3	9	-	-	-	36
293	2	26	2	1	-	-	-	-	31
355	-	-	-	-	-	-	-	-	-
356	3	41	3	-	-	-	-	-	47
376	47	85	25	4	3	-	-	2	166
384	3	33	-	1	1	-	-	1	39
409	1	10	2	1	-	-	-	-	14
491	4	5	1	-	-	-	-	-	10
542	-	10	1	-	-	-	-	-	11
579	13	7	3	2	3	-	-	-	28
674	1	12	16	-	-	-	-	-	29
675	3	5	6	-	-	-	-	-	14
TOTAL	225	752	141	27	23	3	2	5	1178
%	19	64	12	2	2	.3	.2	.4	

Totals exclude articulated bones.

TABLE IAPITS.4

Unidentifiable Fragments in Other Iron Age Pits

Feature	Unid. Large Mammal	Sheep-sized Mammal
48	2	9
58	29	71
62	1	2
109	5	22
125	1	-
139	14	89
174	1	1
177	18	29
180	9	42
181	53	137
185	1	20
186	32	44
189	5	17
191	1	-
212	27	33
230	3	29
293	12	19
355	1	7
356	7	77
376	52	44
384	4	76
409	2	13
491	3	6
542	3	5
579	17	10
674	4	30
675	8	12
TOTAL	315	844

TABLE IAPITS.5

Fragments of Major Species Represented in Other Iron Age Pits

Cattle	Total	%	Sheep/Goat	Arts.	Other	Total	%*
Skull frags.	53	24	Skull frags.	2	73	75	10
Mandible	34	15	Mandible	2	57	59	8
Hyoid	1	.4	Hyoid	-	4	4	.5
Loose teeth	51	23	Loose teeth	-	219	219	29
Scapula	11	5	Scapula	2	12	14	2
Humerus	2	.9	Humerus	2	36	38	5
Radius	4	2	Radius	3	50	53	7
Ulna	2	.9	Ulna	2	21	23	3
Os Coxae	6	3	Os Coxae	2	16	18	2
Femur	5	2	Femur	2	37	39	5
Patella	-	-	Patella	-	1	1	.1
Tibia	13	6	Tibia	3	66	69	9
Carpals	1	.4	Carpals	9	2	11	.3
Calcaneus	1	.4	Calcaneus	2	5	7	.7
Astragalus	2	.9	Astragalus	3	11	14	1
Centroquartal	1	.4	Centroquartal	1	-	1	-
Other tarsals	1	-	Other tarsals	2	1	3	.1
Metacarpal	10	4	Metacarpal	2	24	26	3
Metatarsal	8	4	Metatarsal	1	44	45	6
Metapodial	1	.4	Metapodial	-	3	3	.1
1st Phalanx	3	1	1st Phalanx	6	15	21	2
2nd Phalanx	1	.4	2nd Phalanx	6	8	14	1
3rd Phalanx	1	.4	3rd Phalanx	2	1	3	.1
Ribs	2	.9	Ribs	15	16	31	2
Sternebrae	-	-	Sternebrae	-	3	3	.1
Cervical verts.	6	3	Cervical verts.	8	17	25	2
Thoracic verts.	2	.9	Thoracic verts.	12	5	17	.7
Lumbar verts.	3	1	Lumbar verts.	11	5	16	.7
Sacrum	-	-	Sacrum	2	-	2	-
TOTAL	225		TOTAL	102	752	854	

Iron Age Pits

Pig	Art.	Other	Total	%*	Horse	Total
Skull frags.	8	8	8	6	Skull frags.	3
Mandible	6	20	26	14	Mandible	1
Hyoid	-	1	1	.7	Hyoid	-
Loose teeth	-	31	31	22	Loose teeth	6
Scapula	8	8	16	6	Scapula	1
Humerus	6	8	14	6	Humerus	-
Radius	9	5	14	4	Radius	1
Ulna	8	2	10	1	Ulna	1
Os Coxae	18	3	21	2	Os Coxae	1
Femur	7	5	12	4	Femur	1
Patella	2	1	3	.7	Patella	-
Tibia	6	6	12	4	Tibia	1
Fibula	7	4	11	3	Fibula	-
Carpals	14	2	16	1	Carpals	-
Calcaneus	6	1	7	.7	Calcaneus	-
Astragalus	2	2	4	1	Astragalus	-
Other tarsals	7	1	8	.7	Other tarsals	-
Metacarpal	4	-	4	-	Metacarpal	2
Metatarsal	4	2	6	1	Metatarsal	3
Lat. Metapodial	23	3	26	2	Lat. Metapodial	1
Metapodial	23	3	26	2	Metapodial	-
1st Phalanx	41	6	47	4	1st Phalanx	1
2nd Phalanx	40	4	44	3	2nd Phalanx	-
3rd Phalanx	31	1	32	.7	3rd Phalanx	-
Sesamoids	14	-	14	-	Sesamoids	-
Ribs	113	6	119	4	Ribs	1
Sternebrae	4	-	4	-	Sternebrae	-
Cervical verts.	43	1	44	.7	Cervical verts.	3
Thoracic verts.	81	1	82	.7	Thoracic verts.	-
Lumbar verts.	32	1	33	.7	Lumbar verts.	-
Sacrum	7	1	8	.7	Sacrum	-
Caudal verts.	2	-	2	-	Caudal verts.	-
Unid. verts.	-	1	1	.7	Unid. verts.	-
TOTAL	576	138	714		TOTAL	27

* excluding articulated bones.

Iron Age Pits

Dog	Art.	Other	Total
Skull frags.	3	1	4
Mandible	4	3	7
Hyoid	1	-	1
Loose teeth	-	3	3
Scapula	4	1	5
Humerus	4	-	4
Radius	5	-	5
Ulna	5	-	5
Os Coxae	3	-	3
Femur	4	1	5
Patella	1	-	1
Tibia	3	1	4
Fibula	4	-	4
Carpals	17	1	18
Calcaneus	4	-	4
Astragalus	4	-	4
Other tarsals	4	-	4
Metacarpal	19	2	21
Metatarsal	16	-	16
Metapodial	-	3	3
1st Phalanx	28	1	29
2nd Phalanx	24	-	24
3rd Phalanx	17	-	17
Sesamoids	1	-	1
Ribs	51	2	53
Costal carts.	28	-	28
Sternebrae	2	-	2
Cervical verts.	13	1	14
Thoracic verts.	27	-	27
Lumbar verts.	14	-	14
Sacrum	1	-	1
Caudal verts.	11	3	14
TOTAL	322	23	345

Unid. Large Mammal	Total
Skull and mandible frags.	39
Ribs	47
Vertebrae	17
Longbone fragments	50
Unid. fragments	162
Total	315

Sheep-sized Mammal	Total
Skull and mandible frags.	23
Ribs	215
Vertebrae	45
Longbone fragments	388
Unid. fragments	173
Total	844

TABLE IAPITS.6

Iron Age Pits Summary Statistics

	Total
Total Fragments	5132
ex.rarer species	3435
+ ex.articulated bones	2419
% Unid. Fragments	51
Erosion Index	.35
Loose Teeth Index	.26
% Gnawed Fragments	12
% Butchered Frags.	5
% Burnt Fragments	3
% Fragments of Major Species	
Cattle	19
Sheep/Goat	64
Pig	12
Horse	2
Dog	2
Red Deer	.3
Roe Deer	.2
Hare	.4
Cattle Loose Teeth Index	.23
Cattle Longbone Fragmentation I.	.21
Sheep/Goat Loose Teeth Index	.29
S/G Longbone Fragmentation Index	.31

TABLE IAGULLIES.1

Animal Bone Fragments in Other Iron Age Gullies

Feature	1	2	3	4	5	6	Total
61	23						23
70	15	65	7	13			100
73	7						7
74	1						1
83	61	55					116
96	17						17
137	15*	213					228
148	61*	6					67
417	10	4	61				75
546	2						2
567	2	7	3	29	31	60	132
570	10	63	61	82		94	310
571	8						8
574	61	16	320*	173	8		578
575	5		14				19
589		1	6	90	51		148
656	23	45	21	27			116
667	14	71					85
673	65	168	113				346
680		11	86				97
693	1	19					20
TOTAL							2495

* includes groups of articulated bones.

TABLE IAGULLIES.2

Species represented in Other Iron Age Gullies

Species	Feature 137	570	574	589	673	Other	Total
Cattle	65	57	69	23	74	189	477
Sheep/Goat	41	63	96	20	87	171	478
Pig	4	27	110*	19	20	99*	279
Horse	15*	8	15	5	16	51	110
Dog	3	3	7	1	3	11	28
Red Deer	-	-	-	-	-	1	1
Roe Deer	-	-	2	-	-	-	2
Hare	1	-	-	-	-	-	1
Unid. Large Mammal	73	82	96	22	73	215	561
Sheep-sized Mammal	19	55	133	37	57	109	410
Unid. Mammal	7	13	23	8	12	23	86
Unid. Bird	-	-	1	3	1	-	5
Dog/Fox	-	-	-	-	-	1	1
Weasel	-	-	-	1	-	1	2
Unid. Rodent	-	-	8	-	1	-	9
Frog	-	-	6	-	1	3	10
Toad	-	-	-	-	-	1	1
Amphibian	-	-	1	-	-	6	7
Domestic Fowl	-	-	1	-	1	1	3
Rook/Crow	-	2	9*	-	-	-	11
Raven	-	-	1	-	-	-	1
Unid. Corvid	-	-	1	-	-	-	1
TOTAL	228	310	578	148	346	885	2495
Sheep	2	7	10	5	2	18	44

* includes articulated bones.

TABLE IAGULLIES.3

Fragments of Major Species Represented in Iron Age Gullies

Cattle	137	570	Feature 574	589	673	Other	Total	%
Skull frags.	9	9	6	1	19	23	67	14
Mandible	8	7	16	8	5	20	64	13
Loose teeth	9	10	13	3	20	48	103	22
Scapula	9	6	4	2	5	11	37	8
Humerus	5	4	1	1	1	8	20	4
Radius	3	1	3	-	3	11	21	4
Ulna	-	3	3	-	2	10	18	4
Os Coxae	2	4	2	-	1	14	23	5
Femur	3	-	2	2	3	4	14	3
Tibia	3	4	5	-	3	7	22	5
Carpals	-	1	3	-	-	-	4	.8
Calcaneus	-	-	1	-	1	1	3	.6
Astragalus	2	-	1	1	-	-	4	.8
Centroquartal	-	-	1	-	-	2	3	.6
Metacarpal	2	1	5	2	1	9	20	4
Metatarsal	3	1	1	1	1	5	12	3
Metapodial	-	1	-	-	1	1	3	.6
1st Phalanx	-	-	-	1	4	3	8	2
2nd Phalanx	1	1	-	1	-	2	5	1
Sesamoids	-	1	-	-	-	-	1	.2
Ribs	1	-	-	-	-	-	1	.2
Cervical verts.	2	-	-	-	3	7	12	3
Thoracic verts.	2	1	1	-	-	2	6	1
Lumbar verts.	1	1	1	-	-	-	3	.6
Sacrum	-	1	-	-	1	-	2	.4
Caudal verts.	-	-	-	-	-	1	1	.2
TOTAL	65	57	69	23	74	189	477	

			Feature					
Sheep/Goat	137	570	574	589	673	Other	Total	%
Skull frags.	2	10	11	2	2	12	39	8
Mandible	17	8	12	2	12	23	74	15
Loose teeth	12	17	17	4	45	72	167	35
Scapula	-	1	-	2	1	4	8	2
Humerus	1	2	-	1	5	3	12	3
Radius	-	4	5	-	4	6	19	4
Ulna	-	-	2	-	1	-	3	.6
Os Coxae	-	-	1	1	1	4	7	1
Femur	4	1	3	-	1	2	11	2
Tibia	2	4	17	1	6	20	50	10
Carpals	-	-	-	-	1	-	1	.2
Calcaneus	-	1	1	1	-	2	5	1
Astragalus	-	4	4	1	-	-	9	2
Centroquartal	-	-	-	-	-	1	1	.2
Metacarpal	1	2	2	1	2	5	13	3
Metatarsal	2	3	6	2	1	9	23	5
Metapodial	-	-	-	1	-	1	2	.4
1st Phalanx	-	3	6	1	2	1	13	3
2nd Phalanx	-	-	-	-	1	-	1	.2
3rd Phalanx	-	-	2	-	-	-	2	.4
Sesamoids	-	1	-	-	-	1	2	.4
Ribs	-	1	1	-	-	-	2	.4
Sternebrae	-	-	1	-	-	-	1	.2
Cervical verts.	-	-	-	-	1	3	4	.8
Thoracic verts.	-	-	1	-	-	1	2	.4
Lumbar verts.	-	1	4	-	1	1	7	1
TOTAL	41	63	96	20	87	171	478	

Pig	137	570	Art. 574	Oth. 574	589	673	Art. 148	Other	Total	%*
				Feature						
Skull frags.	1	4	1	11	-	2	1	4	24	10
Mandible	-	1	-	20	4	1	2	10	38	16
Loose teeth	-	4	-	9	-	10	-	26	49	22
Scapula	-	3	-	2	1	-	1	3	10	4
Humerus	2	4	-	4	1	2	1	4	18	8
Radius	-	-	1	-	-	1	-	-	2	.5
Ulna	-	2	1	2	-	-	-	1	6	2
Os Coxae	-	2	1	2	-	-	-	1	6	2
Femur	1	2	1	-	2	1	-	5	12	5
Patella	-	1	-	1	-	-	-	-	2	.9
Tibia	-	1	1	5	3	1	-	4	15	6
Fibula	-	-	2	-	-	-	-	1	3	.5
Calcaneus	-	-	2	2	1	-	-	1	6	2
Astragalus	-	-	1	1	-	1	-	1	4	1
Other tarsals	-	-	1	-	-	-	-	1	2	.5
Metacarpal	-	-	2	1	2	-	-	-	5	1
Metatarsal	-	-	3	-	1	-	1	1	6	.9
Lat.Metapodial	-	-	4	-	-	-	-	-	4	-
Metapodial	-	-	-	1	-	-	-	1	2	.5
1st Phalanx	-	-	2	3	2	-	2	1	10	3
2nd Phalanx	-	1	1	-	1	1	-	1	5	2
3rd Phalanx	-	1	2	-	-	-	-	-	3	.5
Ribs	-	-	3	6	-	-	10	-	19	3
Cervical verts.	-	-	2	2	-	-	1	2	7	2
Thoracic verts.	-	1	1	4	-	-	3	-	9	2
Lumbar verts.	-	-	-	1	1	-	1	2	5	2
Sacrum	-	-	-	1	-	-	-	-	1	.5
Unid. verts.	-	-	-	-	-	-	5	1	6	.5
TOTAL	4	27	32	78	19	20	28	71	279	

Horse	Art. 137	Oth. 137	570	574	589	673	Other	Total	%*
				Feature					
Skull frags.	-	1	-	-	-	-	5	6	6
Mandible	-	2	1	-	4	3	6	16	16
Loose teeth	-	-	2	2	-	1	21	26	25
Scapula	-	-	-	2	-	-	3	5	5
Humerus	-	-	1	-	-	-	-	1	1
Radius	-	-	-	2	-	2	-	4	4
Ulna	-	-	-	1	-	-	-	1	1
Os Coxae	-	-	1	-	-	-	-	1	1
Femur	-	-	-	-	-	2	-	2	2
Tibia	-	-	1	-	1	2	1	5	5
Calcaneus	-	-	-	1	-	2	1	4	4
Astragalus	-	-	-	-	-	-	1	1	1
Other tarsals	-	-	-	1	-	-	2	3	3
Metacarpal	-	1	-	-	-	-	2	3	3
Metatarsal	-	1	1	1	-	2	1	6	6
Lat.Metapodial	-	-	-	2	-	1	3	6	6
Metapodial	-	-	-	-	-	1	1	2	2
1st Phalanx	-	-	-	-	-	-	1	1	1
Ribs	3	-	-	2	-	-	-	5	2
Cervical verts.	2	1	-	-	-	-	2	5	3
Thoracic verts.	1	2	1	-	-	-	-	4	3
Lumbar verts.	1	-	-	1	-	-	1	3	2
TOTAL	7	8	8	15	5	16	51	110	

* excludes articulated bones

Dog	137	570	574	589	673	Other	Total
Skull frags.	1	-	1	-	1	1	4
Mandible	-	-	-	-	-	3	3
Loose teeth	-	-	-	-	1	4	5
Scapula	-	-	-	-	-	1	1
Humerus	-	-	4	-	-	-	4
Radius	-	-	1	-	-	-	1
Os Coxae	-	1	-	-	-	-	1
Femur	-	2	-	-	-	-	2
Tibia	-	-	1	-	-	1	2
Metacarpal	-	-	-	1	-	1	2
Metatarsal	1	-	-	-	-	-	1
Metapodial	1	-	-	-	-	-	1
Cervical verts.	-	-	-	-	1	-	1
TOTAL	3	3	7	1	3	11	28

Unid. Large Mammal	Total
Skull and mandible frags.	81
Ribs	79
Vertebrae	66
Longbone fragments	99
Unid. fragments	236
Total	561

Sheep-sized Mammal	Total
Skull and mandible frags.	25
Ribs	71
Vertebrae	29
Longbone fragments	210
Unid. fragments	75
Total	410

TABLE IAGULLIES.4

Other Iron Age Gullies Summary Statistics

	Feature						
	137	570	574	589	673	Other	Total
Total Fragments	228	310	578	148	346	885	2495
ex.rarer species		308	551	135	342	869	2433
+ ex.articulated bones	221		519			841	2366
% Unid. Fragments	45	49	49	50	42	41	45
Erosion Index	.26	.73	.17	.16	.76	.86	.56
Loose Teeth Index	.17	.21	.15		.39	.35	.27
% Gnawed Fragments	21	14	16		15	19	17
% Butchered Frags.	7	3	5		5	11	7
% Fragments of Major Species							
Cattle	53	36	26		37	38	36
Sheep/Goat	34	40	36		44	35	37
Pig	3	17	29		10	14	17
Horse	7	5	6		8	10	8
Dog	2	2	3		2	2	2
Red Deer	-	-	-		-	.2	.1
Roe Deer	-	-	.7		-	-	.2
Hare	.8	-	-		-	-	.1
Cattle Loose Teeth Index						.25	.22
Cattle Longbone Fragmentation I.							.25
Sheep/Goat Loose Teeth Index			(.18)		(.52)	.42	.35
S/G Longbone Fragmentation Index			(.51)				.40

TABLE IAQUARRIES.1

Other Iron Age Quarries Animal Bone Fragments in all Layers

	Layer								
Feature	1	2	3	4	5	6	7	8	Total
52	4	5	31	73					113
71	15								15
72	13	1							14
79	1	7	6	7	2	6	2	2	33
80	2	7							9
100	26								26
140	9								9
232	13								13
240	8	16	5	9	4				42
249	9	27	9						45
577		1							1
583	1	23	13	5					42
584	15	19	6						40
609	5								5
657			21						21
TOTAL									428

TABLE IAQUARRIES.2

Species represented in Other Iron Age Quarries (Fragments)

Species	Total
Cattle	105
Sheep/Goat	82
Pig	44
Horse	16
Dog	13
Unid. Large Mammal	74
Sheep-sized Mammal	76
Unid. Mammal	12
Unid. Bird	2
Unid. Rodent	1
Toad	1
Amphibian	1
Rook/Crow	1
TOTAL	428
Sheep	9

TABLE IAQUARRIES.3

Fragments of Major Species Represented in Other Iron Age Quarries

	Cattle	Sheep/G	Pig	Horse	Dog
Skull frags.	18	7	3	1	1
Mandible	16	8	8	-	1
Loose teeth	20	22	13	5	3
Scapula	8	-	2	-	-
Humerus	4	4	5	-	1
Radius	5	6	-	2	1
Ulna	1	-	2	1	-
Os Coxae	6	-	2	-	-
Femur	4	3	1	1	-
Tibia	6	10	4	1	-
Carpals	1	3	-	-	-
Calcaneus	2	-	-	-	-
Astragalus	1	-	-	2	-
Other tarsals	-	-	1	-	-
Metacarpal	-	7	-	-	-
Metatarsal	6	6	-	1	-
Lat. Metapodial	-	-	-	2	-
Metapodial	-	1	-	-	1
1st Phalanx	1	1	2	-	-
3rd Phalanx	-	-	1	-	1
Ribs	-	-	-	-	4
Cervical verts.	3	-	-	-	-
Thoracic verts.	-	1	-	-	-
Lumbar verts.	1	3	-	-	-
Sacrum	2	-	-	-	-
TOTAL	105	82	44	16	13

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull and mandible	5	Skull and mandible	4
Ribs	12	Ribs	12
Vertebrae	9	Vertebrae	8
Longbone frags.	8	Longbone frags.	10
Total	74	Total	76

TABLE IAQUARRIES.4

Other Iron Age Quarries Summary Statistics

	Total
Total Fragments	428
ex.rarer species	422
% Unid. Fragments	38
Erosion Index	.55
Loose Teeth Index	.24
% Gnawed Fragments	17
% Butchered Frags.	12
% Fragments of Major Species	
Cattle	40
Sheep/Goat	32
Pig	17
Horse	6
Dog	5
Cattle Loose Teeth Index	.19
Sheep/Goat Loose Teeth Index	(.27)

TABLE IAOTHER.1

Species represented in Other Iron Age Features

Species	Feature 4	5	41	47	190	Total
Cattle	4	-	3	-	2	9
Sheep/Goat	-	1	4	2	11	18
Pig	-	-	-	1	-	1
Horse	-	-	-	-	2	2
Unid. Large Mammal	2	-	10	-	10	22
Sheep-sized Mammal	1	-	5	-	13	19
TOTAL	7	1	22	3	38	71

TABLE IAOTHER.2

Fragments of Major Species Represented in Other Iron Age Features

	Cattle	Sheep/G	Pig	Horse
Skull frags.	1	2	-	-
Mandible	-	1	1	-
Loose teeth	4	7	-	-
Humerus	1	-	-	-
Radius	1	1	-	-
Ulna	1	-	-	-
Os Coxae	-	-	-	2
Tibia	-	1	-	-
Metacarpal	-	1	-	-
Metatarsal	1	4	-	-
Cervical verts.	-	1	-	-
TOTAL	9	18	1	2

Unid. Large Mammal	Total
Skull and mandible	1
Ribs	-
Longbone frags.	3
Unid. fragments	18
Total	22

Sheep-sized Mammal	Total
Skull and mandible	1
Ribs	2
Longbone frags.	12
Unid. fragments	4
Total	19

TABLE 1BC1ADC.1

Fragments in Features dated to 1st Century B.C.-1st Century A.D.

Feature/Section	Layer 1	Layer 2	Layer 3	Total
23	10	18		28
35	14			14
120/1	21	7		28
/2	23	26		49
/3	3	12		15
Total	47	45		92
526/18	48	81		129
/19	68	2		70
/21	4			4
Total	120	83		203
600	1	3		4
TOTAL				344

TABLE 1BC1ADC.2

Species in Features dated to 1st Century B.C.- 1st Century A.D.

Species	Feature 23	35	120	526	600	Total
Cattle	6	1	18	66*	1	92
Sheep/Goat	6	2	6	41	1	56
Pig	2	1	1	13	1	18
Horse	3	1	-	2	1	7
Dog	-	-	-	6*	-	6
Unid. Large Mammal	9	1	61	38	-	109
Sheep-sized Mammal	2	8	5	25	-	40
Unid. Mammal	-	-	1	7	-	8
Rook/Crow	-	-	-	5	-	5
TOTAL	28	14	92	203	4	341
Sheep	-	-	-	3	-	3

* includes articulated bones.

TABLE 1BC1ADC.3

Fragments of Major Species in 1st Cent. B.C.-1st Cent. A.D. Features

	Cattle	Sheep/G	Pig	Horse	Dog
Skull frags.	11	5	2	-	-
Mandible	7	5	6	-	-
Loose teeth	9	20	4	3	-
Scapula	5	1	1	-	-
Humerus	4	1	2	1	-
Radius	5	3	-	1	-
Ulna	4	-	-	-	1
Os Coxae	5	2	1	-	-
Femur	4	2	1	-	-
Tibia	4	3	-	-	-
Carpals	1	-	-	-	-
Calcaneus	1	2	-	1	-
Astragalus	-	1	-	1	-
Centroquartal	1	-	-	-	-
Metacarpal	-	-	-	-	4*
Metatarsal	4	7	-	-	1
Metapodial	1	2	-	-	-
1st Phalanx	1	1	-	-	-
Ribs	13*	-	-	-	-
Cervical verts.	3	2	1	-	-
Thoracic verts.	3	-	-	-	-
Lumbar verts.	2	-	1	-	-
Sacrum	1	-	-	-	-
Caudal verts.	3	-	-	-	-
TOTAL	92	57	19	7	6

* includes articulated bones.

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull and mandible	2	Skull and mandible	1
Ribs	15	Ribs	5
Vertebrae	15	Vertebrae	3
Longbone fragments	14	Longbone fragments	18
Unid. fragments	64	Unid. fragments	13
Total	110	Total	40

TABLE 1BC1ADC.4

1st Century B.C.- 1st Century A.D. Features Summary Statistics

	Features 526	Features Other	Total
Total Fragments	203	138	341
ex.rarer species	198	137	335
+ ex.articulated bones	183		320
% Unid. Fragments	38	64	49
Erosion Index	.13	1.56	.74
Loose Teeth Index	.17		.22
% Gnawed Fragments	(26)		22
% Butchered Frags.	(3)		3
% Fragments of Major Species			
Cattle	48		50
Sheep/Goat	36		34
Pig	11		11
Horse	2		2
Dog	2		1
Cattle Loose Teeth Index			(.10)

TABLE 1CPITS.1

Other 1st Century A.D. Pits Animal Bone Fragments in all Layers

Feature	Layer 1	2	3	4	Total
59	3				3
60	31	13	1		45
163	11	14			25
183	50	13	2		65
199	1	2	33	4	40
201	28	5			33
202	44	9			53
209	1		14		15
266	170	179	24		373
267	10	48	7		65
383	27	139	14		180
603	1	27		23	51
619	2				2
726		7	13	18	38
728		4			4
TOTAL					992

TABLE 1CPITS.2

Species represented in Other 1st Century A.D. Pits

Species	Feature 266	383	Other	Total
Cattle	18	12	67	97
Sheep/Goat	104	27	112	223
Pig	41	4	37	82
Horse	2	-	10	12
Dog	1	3	2	6
Red Deer	-	-	1	1
Hare	1	-	-	1
Unid. Large Mammal	59	30	93	182
Sheep-sized Mammal	117	56	103	276
Unid. Mammal	28	11	28	67
Unid. Bird	1	-	-	1
Hedgehog	-	-	1	1
Woodmouse	-	37*	-	37
Unid. Rodent	1	-	3	4
Domestic Fowl	-	-	1	1
Rook/Crow	-	-	1	1
TOTAL	373	180	439	992
Sheep	1	2	7	10

* articulated bones.

TABLE 1CPITS.3

Fragments of Major Species in Other 1st Century A.D. Pits

Cattle	Feature 266	383	Other	Total
Skull frags.	3	-	8	11
Mandible	1	1	12	14
Loose teeth	6	2	19	27
Scapula	-	1	1	2
Humerus	1	-	1	2
Radius	-	1	-	1
Ulna	3	1	-	4
Os Coxae	1	-	4	5
Femur	-	-	4	4
Tibia	1	-	3	4
Calcaneus	-	-	3	3
Other tarsals	-	1	-	1
Metacarpal	1	1	-	2
Metatarsal	-	2	4	6
Metapodial	-	-	1	1
1st Phalanx	1	1	2	4
2nd Phalanx	-	-	1	1
Ribs	-	1	-	1
Cervical verts.	-	-	4	4
TOTAL	18	12	67	97

Sheep/Goat	266	383	Other	Total	%
Skull frags.	1	-	3	4	2
Mandible	7	1	9	17	8
Loose teeth	69	9	49	127	57
Scapula	-	-	1	1	.4
Humerus	3	2	2	7	3
Radius	1	-	8	9	4
Ulna	1	1	1	3	1
Os Coxae	-	1	1	2	.9
Femur	2	1	-	3	1
Tibia	10	3	3	16	7
Calcaneus	1	1	-	2	.9
Astragalus	-	-	1	1	.4
Centroquartal	1	-	-	1	.4
Metacarpal	1	1	4	6	3
Metatarsal	4	5	7	16	7
1st Phalanx	2	-	1	3	1
3rd Phalanx	-	1	-	1	.4
Ribs	1	1	1	3	1
Thoracic verts.	-	-	1	1	.4
TOTAL	104	27	92	223	

TABLE 1CPITS.4

Other 1st Century A.D. Pits Summary Statistics

	Feature 266	383	Other	Total
Total Fragments	373	180	439	992
ex.rarer species	371	143	433	947
% Unid. Fragments	55	68	52	55
Erosion Index	.65	1.81	.99	1.00
Loose Teeth Index	.60		.41	.47
% Gnawed Fragments			19	15
% Butchered Frags.				1
% Fragments of Major Species				
Cattle	11		32	23
Sheep/Goat	62		54	53
Pig	25		18	19
Horse	1		5	3
Dog	.6		1	1
Red Deer	-		.5	.2
Hare	.6		-	.2
Cattle Loose Teeth Index				(.28)
S/Gt. Loose Teeth Index	.66		(.53)	.57
S/G Longbone Frag. Index				.33

Pig	Feature 266	383	Other	Total
Skull frags.	1	1	2	4
Mandible	6	-	8	14
Loose teeth	24	1	15	40
Humerus	1	-	3	4
Ulna	1	-	-	1
Os Coxae	1	-	-	1
Femur	1	-	1	2
Tibia	1	1	3	5
Calcaneus	2	-	1	3
Astragalus	1	-	1	2
Other tarsals	1	-	-	1
Metacarpal	-	-	1	1
1st Phalanx	1	-	1	2
2nd Phalanx	-	-	1	1
Cervical verts.	-	1	-	1
TOTAL	41	4	37	82

Horse	266	Other	Total
Mandible	-	-	-
Loose teeth	1	2	3
Scapula	-	-	-
Radius	-	1	1
Os Coxae	-	1	1
Fibula	-	-	-
Other tarsals	-	1	1
Metacarpal	-	2	2
1st Phalanx	1	1	2
2nd Phalanx	-	1	1
Cervical verts.	-	1	1
TOTAL	2	10	12

Dog	266	383	Other	Total
Mandible	-	-	1	1
Loose teeth	-	2	-	2
Scapula	1	-	-	1
Radius	-	1	-	1
Os Coxae	-	-	-	-
Fibula	-	-	1	1
Other tarsals	-	-	-	-
Metacarpal	-	-	-	-
1st Phalanx	-	-	-	-
2nd Phalanx	-	-	-	-
Cervical verts.	-	-	-	-
TOTAL	1	3	2	6

Unid. Large Mammal	Total
Skull and mandible frags.	8
Ribs	11
Vertebrae	9
Longbone fragments	45
Unid. fragments	109
Total	182

Sheep-sized Mammal	Total
Skull and mandible frags.	4
Ribs	21
Vertebrae	9
Longbone fragments	174
Unid. fragments	68
Total	276

TABLE 1CGULLIES.1

Other 1st Century A.D. Gullies Animal Bone Fragments

	Layer				
Feature/Section	1	2	3	4	Total
136	7	417			424
149/1	5				5
/2	3	57			60
/3	73	26			99
/4	7				7
/5	2				2
Total	90	83			173
522/16	4				4
/17		3			3
/18	4	34	27		65
/21	7				7
/22		9	3		12
/23		5			5
/24			2		2
Total	15	51	32		98
572/1	6	27			33
/2	20	6			26
/3	44	5			49
/5	10	14			24
/6	1	17			18
/7	57	51			108
/8	11	7			18
Total	149	127			276
627/1	37	46	17	10	110
/2	76	44	13		133
/3	12	78	55		145
Total	125	168	85	10	388
672/5	4				4
/6		70			70
Total	4	70			74
712/1	13	17		4	34
/3		3		12	15
/4		10		7	17
/5		4	1	15	20
/6				5	5
Total	13	34	1	43	91

Feature/Section	Layer 1	2	3	4	Total
713/3		9			9
/4	3				3
Total	3	9			12
715/1	1				1
/2	1				1
/3		6			6
Total	2	6			8
737/1				6	6
/2	14			5	19
/3		1	16		17
/4			12		12
/5			7	2	9
/9				39	39
/10				6	6
/11				67	67
/12			32		32
/13			33	4	37
Total	14	1	100	129	244
TOTAL ALL GULLIES					1793

TABLE 1CGULLIES.2

Species represented in Other 1st Century A.D. Gullies

Species	136	149	572	Feature 627	737	Other	Total
Cattle	56	32	46	97*	12	39	282
Sheep/Goat	106	39	78	53	18	39	333
Pig	69*	23*	9	22	4	11	138
Horse	22*	3	9	2	30*	12	78
Dog	9	1	1	54*	6	48*	119
Red Deer	-	1	-	-	-	-	1
Hare	5	-	-	-	-	-	5
Unid. Large Mammal	98	42	72	78	131	86	507
Sheep-sized Mammal	49	26	44	71	29	35	254
Unid. Mammal	6	3	16	8	14	12	59
Unid. Bird	2	-	1	1	-	2	6
Water Vole	-	-	-	1	-	-	1
Amphibian	-	1	-	-	-	-	1
Domestic Fowl	1	-	-	1	-	-	2
Dom. Duck/Mallard	-	1	-	-	-	-	1
Woodcock	1	-	-	-	-	-	1
Rook/Crow	-	1	-	-	-	4	5
TOTAL	424	173	276	388	244	288	1793
Sheep	5	1	9	4	-	2	21

* includes articulated bones.

TABLE 1CGULLIES.3

Fragments of Major Species in Other 1st Century A.D. Gullies

				Feature					
				Art.	Oth.				
Cattle	136	149	572	627	627	737	Other	Total	%*
Skull frags.	12	1	3	-	19	1	7	48	18
Mandible	4	4	8	-	6	-	4	26	10
Hyoid	-	-	-	-	-	-	1	1	.4
Loose teeth	14	7	5	-	14	2	8	50	19
Scapula	4	3	7	-	8	-	-	22	8
Humerus	4	2	-	-	1	2	3	12	5
Radius	3	2	1	-	1	1	3	11	4
Ulna	2	-	4	-	1	-	-	7	3
Os Coxae	1	-	1	-	1	1	-	4	2
Femur	2	1	2	-	3	-	3	11	4
Patella	-	-	1	-	1	-	-	2	.8
Tibia	1	3	1	1	4	1	3	14	5
Carpals	-	-	-	3	1	-	-	4	.4
Calcaneus	1	-	1	1	3	-	-	6	2
Astragalus	-	3	-	1	3	-	-	7	2
Centroquartal	-	-	2	1	-	-	-	3	.8
Other tarsals	-	-	-	2	-	-	-	2	-
Metacarpal	-	1	-	1	3	3	1	9	3
Metatarsal	4	3	2	1	2	1	2	15	5
Metapodial	-	-	-	-	1	-	-	1	.4
1st Phalanx	1	1	-	3	1	-	2	8	2
2nd Phalanx	1	-	-	3	1	-	-	5	.8
3rd Phalanx	-	-	-	2	2	-	-	4	.8
Sesamoids	-	1	-	-	-	-	-	1	.4
Cervical verts.	-	-	-	-	1	-	-	1	.4
Thoracic verts.	2	-	2	-	-	-	1	5	.2
Lumbar verts.	-	-	1	-	1	-	1	3	1
TOTAL	56	32	46	19	78	12	39	282	

* excluding articulated bones.

Sheep/Goat	Feature 136	149	572	627	737	Other	Total	%
Skull frags.	7	-	17	4	-	4	32	10
Mandible	30	8	5	6	1	3	53	16
Hyoid	-	-	1	-	-	-	1	.3
Loose teeth	39	20	35	19	13	17	143	43
Scapula	-	-	1	1	-	-	2	.6
Humerus	5	2	-	-	-	1	8	2
Radius	3	2	2	1	-	3	11	3
Ulna	-	-	2	-	-	-	2	.6
Os Coxae	1	1	2	1	-	-	5	2
Femur	2	-	1	-	1	-	4	1
Tibia	7	3	3	8	3	8	32	10
Calcaneus	-	-	1	1	-	-	2	.6
Astragalus	-	-	1	-	-	1	2	.6
Metacarpal	4	2	3	3	-	1	13	4
Metatarsal	3	-	3	6	-	-	12	4
Metapodial	-	1	-	-	-	-	1	.3
1st Phalanx	2	-	1	-	-	-	3	.9
2nd Phalanx	1	-	-	1	-	-	2	.6
Cervical verts.	1	-	-	-	-	1	2	.6
Thoracic verts.	-	-	-	1	-	-	1	.3
Lumbar verts.	1	-	-	1	-	-	2	.6
TOTAL	106	39	78	53	18	39	333	

Pig	Art. 136	Oth. 136	Art. 149	Oth. 149	572	627	737	Other	Total
Skull frags.	1	4	-	-	-	1	-	2	8
Mandible	2	6	-	-	2	4	-	-	14
Loose teeth	-	7	-	3	2	10	4	3	29
Scapula	2	-	-	2	-	1	-	3	8
Humerus	2	1	-	-	1	1	-	-	5
Radius	2	-	-	-	-	-	-	-	2
Ulna	2	-	-	1	-	-	-	1	4
Os Coxae	1	-	1	-	-	1	-	-	3
Femur	1	-	1	2	-	-	-	-	4
Tibia	-	2	2	1	1	1	-	1	8
Fibula	-	-	1	1	-	-	-	-	2
Calcaneus	-	-	1	-	-	-	-	-	1
Astragalus	-	-	1	-	-	1	-	-	2
Other tarsals	-	1	1	-	-	1	-	-	3
Metacarpal	1	-	-	-	2	1	-	-	4
Metatarsal	-	-	2	-	-	-	-	-	2
Lat. Metapodial	-	-	2	-	-	-	-	1	3
Metapodial	1	-	-	-	-	-	-	-	1
1st Phalanx	2	-	-	-	-	-	-	-	2
2nd Phalanx	1	1	-	-	-	-	-	-	2
Ribs	10	-	-	1	1	-	-	-	12
Sternebrae	1	-	-	-	-	-	-	-	1
Cervical verts.	2	2	-	-	-	-	-	-	4
Thoracic verts.	13	-	-	-	-	-	-	-	13
Lumbar verts.	-	1	-	-	-	-	-	-	1
TOTAL	44	25	12	11	9	22	4	11	138

Horse	Art. 136	Oth. 136	149	572	627	Art. 737	Oth. 737	Other	Total
				Feature					
Skull frags.	-	2	-	2	-	-	1	-	5
Mandible	-	2	-	-	-	-	2	-	4
Loose teeth	-	5	-	2	-	-	8	8	23
Scapula	-	1	-	-	-	-	2	1	4
Humerus	-	-	1	-	-	-	-	-	1
Radius	-	1	-	-	-	-	1	1	3
Os Coxae	-	1	-	-	-	-	2	-	3
Femur	-	-	-	2	-	-	1	-	3
Tibia	-	-	-	-	-	-	1	1	2
Calcaneus	-	-	1	-	1	-	-	-	2
Metacarpal	-	-	-	1	-	-	1	-	2
Metatarsal	-	-	-	-	-	-	1	1	2
1st Phalanx	-	-	-	1	-	-	1	-	2
Ribs	3	-	-	-	-	-	1	-	4
Cervical verts.	-	-	1	1	-	7	-	-	9
Thoracic verts.	6	1	-	-	1	-	1	-	9
TOTAL	9	13	3	9	2	7	23	12	78

Dog	136	149	572	627	627	737	672	Other	Total
				Feature					
Skull frags.	-	-	-	-	5	-	-	1	6
Mandible	1	1	-	-	2	2	2	-	8
Loose teeth	3	-	-	-	9	-	-	1	13
Scapula	1	-	-	-	1	-	-	1	3
Humerus	-	-	-	-	1	-	-	2	3
Radius	-	-	-	-	1	-	-	4	5
Ulna	-	-	-	-	2	-	-	2	4
Os Coxae	-	-	-	-	-	-	-	1	1
Femur	-	-	-	1	-	-	-	2	3
Tibia	-	-	-	2	-	-	-	3	5
Fibula	-	-	-	1	-	-	-	1	2
Calcaneus	-	-	-	2	-	-	-	1	3
Astragalus	-	-	-	1	-	-	-	-	1
Other tarsals	-	-	-	1	-	-	-	1	2
Metacarpal	2	-	-	-	-	-	-	-	2
Metatarsal	-	-	-	6	-	-	3	1	10
Metapodial	1	-	-	-	-	4	-	-	5
1st Phalanx	-	-	-	5	1	-	2	-	8
2nd Phalanx	-	-	-	1	-	-	-	-	1
3rd Phalanx	-	-	-	-	-	-	-	1	1
Ribs	-	-	1	4	2	-	13	-	20
Cervical verts.	-	-	-	-	2	-	2	-	4
Thoracic verts.	-	-	-	-	-	-	2	1	3
Lumbar verts.	1	-	-	1	-	-	-	-	2
Caudal verts.	-	-	-	3	-	-	-	-	3
Unid. verts.	-	-	-	-	-	-	-	1	1
TOTAL	9	1	1	28	26	6	24	24	119

Unid. Large Mammal	Total
Skull and mandible frags.	37
Ribs	57
Vertebrae	40
Longbone fragments	80
Unid. fragments	293
Total	507

Sheep-sized Mammal	Total
Skull and mandible frags.	19
Ribs	42
Vertebrae	14
Longbone fragments	112
Unid. fragments	67
Total	254

TABLE 1CGULLIES.4

Other 1st Century Gullies Summary Statistics

	Feature 136	149	572	627	737	Other	Total
Total Fragments	424	173	276	388	244	288	1793
ex.rarer species	420	170	275	385		282	1776
+ ex.articulated bones	367	158		338	237	258	1663
% Unid. Fragments	42	45	48	46	73	52	50
Erosion Index	.16	.75	.80	.79	2.76	1.63	1.08
Loose Teeth Index	.32	(.34)	.29	.29		.30	.31
% Gnawed Fragments	12		11	12		(11)	12
% Butchered Frags.	2		2	5		(1)	3
% Fragments of Major Species							
Cattle	26	(37)	32	43		31	32
Sheep/Goat	50	(45)	55	29		31	41
Pig	12	(13)	6	12		9	10
Horse	6	(3)	6	1		10	8
Dog	4	(1)	.7	14		19	8
Red Deer	-	(1)	-	-		-	.1
Hare	2	-	-	-		-	.6
Cattle Loose Teeth Index							.19
Cattle Longbone Frag. I.							.29
S/G Loose Teeth Index	.37						.43
S/G Longbone Frag. Index							.38

TABLE 1CQUARRIES.1

Other 1st Century A.D. Quarries Animal Bone Fragments

Feature	Layer 1	2	3	4	5	6	Total
49	3						3
63	4	2	12				18
64	16						16
145	54	104	60	2			220
175		44	55				99
184		129	6	232	132		499
205	2	5	6				13
351	60	76					136
366	18	10	18	68	69		183
523	5						5
525	1						1
628	39	7	77				123
629	1					1	2
630	3						3
TOTAL							1321

TABLE 1CQUARRIES.2

Species represented in Other 2nd Century A.D. Quarries

Species	Feature 145	184	366	Other	Total
Cattle	47	56	50	53	206
Sheep/Goat	37	139	37	95	308
Pig	15	57	24	32	128
Horse	9	4	3	8	24
Dog	2	-	2	9	13
Hare	-	-	-	1	1
Unid. Large Mammal	81	101	25	96	303
Sheep-sized Mammal	22	115	33	104	274
Unid. Mammal	4	25	6	20	55
Unid. Bird	-	-	1	-	1
Unid. Rodent	-	-	1	-	1
Toad	-	-	1	-	1
Amphibian	-	1	-	-	1
Domestic Fowl	-	1	-	-	1
Rabbit (Intrusive)	3	-	-	1	4
TOTAL	220	499	183	419	1321
Sheep	1	10	4	5	20

TABLE 1CQUARRIES.3

Fragments of Major Species in Other 1st Century A.D. Quarries

Cattle	Feature 145	184	366	Other	Total	%
Skull frags.	6	7	12	4	29	14
Mandible	11	3	9	8	31	15
Loose teeth	17	12	11	12	52	25
Scapula	1	1	4	3	9	4
Humerus	-	3	3	-	6	3
Radius	-	4	3	2	9	4
Ulna	1	2	1	2	6	3
Os Coxae	2	2	1	6	11	5
Femur	1	2	1	2	6	3
Tibia	2	-	2	4	8	4
Carpals	1	-	-	-	1	.5
Calcaneus	2	-	-	-	2	1
Astragalus	1	-	-	-	1	.5
Centroquartal	-	1	-	-	1	.5
Other tarsals	-	1	-	-	1	.5
Metacarpal	1	2	1	1	5	2
Metatarsal	-	1	-	4	5	2
Metapodial	-	2	-	-	2	1
1st Phalanx	-	-	-	2	2	1
Ribs	1	2	-	-	3	1
Cervical verts.	-	8	1	2	11	5
Thoracic verts.	-	3	-	-	3	1
Sacrum	-	-	1	1	2	1
TOTAL	47	56	50	53	206	

Sheep/Goat	Feature 145	184	366	Other	Total	%
Skull frags.	1	12	5	4	22	7
Mandible	9	21	4	8	42	14
Loose teeth	16	65	11	37	129	42
Scapula	1	1	1	2	5	2
Humerus	3	4	-	4	11	4
Radius	1	8	1	1	11	4
Ulna	-	1	-	-	1	.3
Os Coxae	-	-	1	-	1	.3
Femur	-	5	1	5	11	4
Tibia	3	10	2	10	25	8
Calcaneus	-	1	-	2	3	1
Astragalus	-	-	-	1	1	.3
Centroquartal	-	-	-	2	2	.6
Metacarpal	1	3	1	4	9	3
Metatarsal	1	4	1	5	11	4
1st Phalanx	-	1	4	2	7	2
2nd Phalanx	-	2	3	1	6	2
3rd Phalanx	-	-	1	1	2	.6
Ribs	-	-	-	1	1	.3
Cervical verts.	1	-	1	1	3	1
Thoracic verts.	-	-	-	3	3	1
Lumbar verts.	-	1	-	-	1	.3
Caudal verts.	-	-	-	1	1	.3
TOTAL	37	139	37	95	308	

Pig	145	184	366	Other	Total	%
Skull frags.	1	6	1	5	13	10
Mandible	3	14	9	8	34	27
Loose teeth	2	20	10	9	41	32
Scapula	1	6	-	1	8	6
Humerus	-	1	-	-	1	.8
Ulna	1	1	-	-	2	2
Femur	1	-	2	-	3	2
Tibia	1	2	2	3	8	6
Fibula	1	-	-	-	1	.8
Calcaneus	1	-	-	-	1	.8
Astragalus	1	1	-	-	2	2
Metacarpal	1	-	-	1	2	2
Metatarsal	-	1	-	-	1	.8
Lat. Metapodial	1	-	-	1	2	2
1st Phalanx	-	-	-	1	1	.8
2nd Phalanx	-	2	-	-	2	2
3rd Phalanx	-	1	-	-	1	.8
Cervical verts.	-	2	-	-	2	2
Thoracic verts.	-	-	-	2	2	2
Lumbar verts.	-	-	-	1	1	.8
TOTAL	15	57	24	32	128	

Horse	Feature 145	184	366	Other	Total
Skull frags.	1	1	-	-	2
Mandible	2	-	-	2	4
Loose teeth	1	-	2	-	3
Scapula	-	-	-	2	2
Humerus	1	-	-	1	2
Radius	1	-	1	-	2
Os Coxae	-	1	-	1	2
Patella	-	1	-	1	2
Astragalus	2	-	-	-	2
Metacarpal	-	-	-	1	1
Metatarsal	1	-	-	-	1
1st Phalanx	-	1	-	-	1
TOTAL	9	4	3	8	24

Dog	145	366	Other	Total
Skull frags.	-	-	2	2
Loose teeth	-	1	1	2
Scapula	-	-	1	1
Radius	-	-	1	1
Os Coxae	-	-	1	1
Tibia	1	1	-	2
Metatarsal	-	-	1	1
1st Phalanx	-	-	1	1
2nd Phalanx	1	-	-	1
Thoracic verts.	-	-	1	1
TOTAL	2	2	9	13

Unid. Large Mammal	Total
Skull and mandible frags.	34
Ribs	20
Vertebrae	11
Longbone fragments	54
Unid. fragments	184
Total	303

Sheep-sized Mammal	Total
Skull and mandible frags.	20
Ribs	24
Vertebrae	13
Longbone fragments	148
Unid. fragments	69
Total	274

TABLE 1CQUARRIES.4

Other 1st Century A.D. Quarries Summary Statistics

	Feature 145	184	366	Other	Total
Total Fragments	220	499	183	419	1321
ex.rarer species	217	497	180	418	1312
% Unid. Fragments	49	48	36	53	48
Erosion Index	.92	.68	.10	.79	.68
Loose Teeth Index	.33	.38	.30	.30	.33
% Gnawed Fragments		19	(21)	17	17
% Butchered Frags.		1	(16)	7	6
% Fragments of Major Species					
Cattle	43	22	43	27	30
Sheep/Goat	34	54	32	48	45
Pig	14	22	21	16	19
Horse	8	2	3	4	4
Dog	2	-	2	5	2
Hare	-	-	-	.5	.1

Cattle Loose Teeth Index					.25
Cattle Longbone Frag. I.					.29
Sheep/Goat Loose Teeth Index		.47		(.39)	.42
S/G Longbone Frag. Index		.26			.32

TABLE 1CTRACKS.1

Other 1st Century A.D. Tracks Animal Bones in All Layers

Feature	Layer 1	Layer 2	Layer 3	Total
15		2		2
16	1			1
43	7	165	40	212
46	8	31	114	153
51	7	271		278
TOTAL				715

TABLE 1CTRACKS.2

Species represented in Other 1st Century A.D. Tracks

Species	Feature 43	46	51	Other	Total
Cattle	90	21	80	1	192
Sheep/Goat	41*	27	81	-	149
Pig	17	5	34	-	56
Horse	4	24	26*	1	55
Dog	2	-	2	-	4
Red Deer	-	1	-	-	1
Unid. Large Mammal	44	41	84	1	170
Sheep-sized Mammal	11	23	37	-	71
Unid. Mammal	2	9	2	-	13
Dog/Fox	-	2	-	-	2
Unid. Rodent	1	-	-	-	1
Domestic Fowl	-	-	1	-	1
TOTAL	212	153	347	3	695
Sheep	12*	2	1	-	15

* includes articulated bones.

TABLE 1CTRACKS.3

Fragments of Major Species in Other 1st Century A.D. Tracks

Cattle	43	46	51	Other	Total	%
	Feature					
Skull frags.	20	2	24	-	46	24
Mandible	14	-	3	-	17	9
Loose teeth	16	4	19	-	39	20
Scapula	7	1	4	-	12	6
Humerus	5	2	3	-	10	5
Radius	2	1	2	1	6	3
Ulna	2	1	2	-	5	3
Os Coxae	3	1	2	-	6	3
Femur	2	-	1	-	3	2
Tibia	2	2	6	-	10	5
Carpals	2	-	1	-	3	2
Calcaneus	2	-	1	-	3	2
Astragalus	1	-	-	-	1	.5
Centroquartal	-	-	1	-	1	.5
Metacarpal	5	1	5	-	11	6
Metatarsal	4	-	4	-	8	4
1st Phalanx	-	3	1	-	4	2
2nd Phalanx	1	1	-	-	2	1
Cervical verts.	-	-	1	-	1	.5
Thoracic verts.	-	1	-	-	1	.5
Lumbar verts.	1	-	-	-	1	.5
Sacrum	1	1	-	-	2	1
TOTAL	90	21	80	1	192	

Sheep/Goat	Art. 43	Oth. 43	46	51	Total	%*
Skull frags.	-	5	-	1	6	4
Mandible	-	1	2	11	14	10
Loose teeth	-	16	8	45	69	50
Scapula	-	1	-	1	2	1
Humerus	-	1	1	3	5	4
Radius	-	2	3	5	10	7
Os Coxae	-	5	-	-	5	4
Femur	-	1	3	2	6	4
Tibia	-	2	3	4	9	6
Carpals	2	-	-	-	2	1
Calcaneus	-	-	-	1	1	.7
Metacarpal	1	1	-	1	3	2
Metatarsal	-	-	1	5	6	4
1st Phalanx	2	-	-	2	4	3
2nd Phalanx	2	-	-	-	2	1
3rd Phalanx	2	-	-	-	2	1
Sesamoids	1	-	-	-	1	.7
Cervical verts.	-	1	1	-	2	1
TOTAL	10	31	27	81	149	

* excluding articulated bones.

Pig	Feature 43	46	51	Total
Skull frags.	2	–	–	2
Mandible	4	1	6	11
Loose teeth	3	2	11	16
Scapula	1	–	–	1
Humerus	1	–	4	5
Radius	2	–	1	3
Ulna	–	1	2	3
Os Coxae	–	–	1	1
Femur	–	–	1	1
Tibia	1	–	1	2
Calcaneus	–	–	1	1
Astragalus	–	–	2	2
Metatarsal	1	–	2	3
2nd Phalanx	1	–	–	1
3rd Phalanx	–	1	–	1
Ribs	–	–	1	1
Cervical verts.	–	–	1	1
Lumbar verts.	1	–	–	1
TOTAL	17	5	34	56

Horse	Feature 43	46	Art. 51	Oth. 51	Other	Total
Skull frags.	–	7	–	1	–	8
Mandible	–	–	–	1	–	1
Loose teeth	–	16	–	3	–	19
Scapula	1	–	–	–	–	1
Humerus	–	–	–	2	–	2
Radius	1	–	2	3	–	6
Ulna	–	~~–~~ 1	2	4	–	~~6~~ 7
Femur	1	–	–	1	–	2
Tibia	1	–	–	–	–	1
Other tarsals	–	–	–	1	–	1
1st Phalanx	–	–	1	–	–	1
2nd Phalanx	–	–	1	–	–	1
3rd Phalanx	–	–	1	–	–	1
Sesamoids	–	–	1	1	–	2
Cervical verts.	–	–	–	1	1	2
TOTAL	4	24	8	18	1	55

Dog: F43: 1 skull fragment, 1 ulna; F51: 2 ribs; TOTAL - 4.

Unid. Large Mammal	Total
Skull and mandible frags.	25
Ribs	20
Vertebrae	6
Longbone fragments	44
Unid. fragments	75
Total	170

Sheep-sized Mammal	Total
Skull and mandible frags.	1
Ribs	5
Vertebrae	4
Longbone fragments	48
Unid. fragments	13
Total	71

TABLE 1CTRACKS.4

Other 1st Century A.D.Tracks Summary Statistics

	Feature 43	46	51	Other	Total
Total Fragments	212	153	347	3	695
ex.rarer species	211	151	346		691
+ ex.articulated bones	199		338		674
% Unid. Fragments	29	48	36		38
Erosion Index	.01	.27	.12		.13
Loose Teeth Index	.25		.36		.34
% Gnawed Fragments	29		17		24
% Butchered Frags.	19		4		9
% Fragments of Major Species					
Cattle	63		37		46
Sheep/Goat	21		38		33
Pig	12		16		13
Horse	3		8		11
Dog	1		.9		1
Red Deer	-		-		.2

Cattle Loose Teeth Index (.18)	.20
Cattle Longbone Frag. I.	.27
Sheep/Goat Loose Teeth Index	.50
S/G Longbone Fragmentation Index	.30

TABLE 1ST2NDC.1

Fragments Represented in Features dated to 1st-2nd Centuries A.D.

Feature/Section	Layer 1	2	3	4	Total
26	1				1
419	2				2
533	23	419	6	5	453
540	6				6
635	1			128	129
636	11	11			22
660	8	4	45	1	58
692/2	1				1
/3	14	28			42
Total	15	28			43
TOTAL					714

TABLE 1ST2NDC.2

Species represented in Features dated to 1st-2nd Centuries A.D.

Species	Feature 533	635	Other	Total
Cattle	62*	22	12	96
Sheep/Goat	68*	21	38	127
Pig	2	12	13	27
Horse	3	4	1	8
Dog	59*	6	-	65
Red Deer	-	-	1	1
Roe Deer	1	-	-	1
Hare	-	1	-	1
Unid. Large Mammal	14	49	16	79
Sheep-sized Mammal	39	12	43	94
Unid. Mammal	3	1	6	10
Dog/Fox	3	-	-	3
Water Vole	51*	-	-	51
Short-tailed Vole	2	-	-	2
Mouse sp.	2	-	-	2
Unid. Rodent	25	-	-	25
Frog	52*	-	1	53
Toad	2	-	-	2
Amphibian	65	-	-	65
Woodcock	-	-	1	1
Raven	-	1	-	1
TOTAL	453	129	132	714
Sheep	52*	1	7	60

* includes articulated bones.

TABLE 1ST2NDC.3

Fragments of Major Species in 1st-2nd Century Features

Cattle	Feature Art. 533	Oth. 533	635	Other	Total
Skull frags.	-	3	8	-	11
Mandible	-	-	7	-	7
Hyoid	-	2	-	-	2
Loose teeth	-	6	4	2	12
Scapula	-	2	-	2	4
Ulna	-	1	1	-	2
Os Coxae	-	-	-	2	2
Femur	-	1	-	2	3
Centroquartal	-	-	-	1	1
Metacarpal	-	-	-	1	1
Metatarsal	-	-	1	1	2
Ribs	14	-	-	-	14
Cervical verts.	12	-	1	-	13
Thoracic verts.	13	-	-	-	13
Lumbar verts.	5	-	-	1	6
Caudal verts.	3	-	-	-	3
TOTAL	47	15	22	12	96

Hyoid —

Sheep/Goat	Art. 533	Oth. 533	635	Other	Total
Skull frags.	1	2	4	1	8
Mandible	3	-	3	5	11
Loose teeth	-	4	4	14	22
Scapula	1	1	-	1	3
Humerus	1	-	1	4	6
Radius	1	-	-	2	3
Ulna	1	-	-	2	3
Os Coxae	3	-	-	-	3
Femur	1	3	-	1	5
Tibia	1	4	3	5	13
Carpals	1	-	-	-	1
Calcaneus	-	-	-	1	1
Metacarpal	1	-	2	-	3
Metatarsal	1	2	1	2	6
1st Phalanx	1	-	1	-	2
2nd Phalanx	2	-	-	-	2
Ribs	10	1	-	-	11
Sternebrae	1	-	-	-	1
Cervical verts.	6	-	-	-	6
Thoracic verts.	10	-	1	-	11
Lumbar verts.	5	-	-	-	5
TOTAL	51	17	21	38	127

Pig	533	635	Other	Total
Skull frags.	-	2	2	4
Mandible	1	2	1	4
Loose teeth	-	2	3	5
Scapula	-	1	1	2
Humerus	-	-	2	2
Ulna	-	1	1	2
Os Coxae	-	2	-	2
Femur	1	1	-	2
Metatarsal	-	-	2	2
Lat. Metapodial	-	1	-	1
Ribs	-	-	1	1
TOTAL	2	12	13	27

Horse	533	635	Other	Total
Skull frags.	-	2	-	2
Loose teeth	-	2	1	3
Scapula	1	-	-	1
Humerus	-	-	-	-
Ulna	-	-	-	-
Os Coxae	-	-	-	-
Femur	-	-	-	-
Tibia	1	-	-	1
Metatarsal	-	-	-	-
Metapodial	-	-	-	-
1st Phalanx	-	-	-	-
Ribs	-	-	-	-
Thoracic verts.	1	-	-	1
Unid. verts.	-	-	-	-
TOTAL	3	4	1	8

Dog	Art. 533	635	Total
Skull frags.	2	-	2
Loose teeth	10	2	12
Scapula	-	-	-
Humerus	1	-	1
Ulna	1	-	1
Os Coxae	2	1	3
Femur	1	1	2
Tibia	-	-	-
Metatarsal	-	1	1
Metapodial	1	1	2
1st Phalanx	2	-	-
Ribs	19	-	19
Thoracic verts.	-	-	-
Unid. verts.	20	-	20
TOTAL	59	6	65

Unid. Large Mammal	Total
Skull and mandible frags.	10
Ribs	12
Vertebrae	11
Longbone fragments	6
Unid. fragments	40
Total	79

Sheep-sized Mammal	Total
Skull and mandible frags.	3
Ribs	20
Vertebrae	10
Longbone fragments	38
Unid. fragments	23
Total	94

TABLE 1ST2NDC.4

Features dated to 1st-2nd Centuries A.D. Summary Statistics

	Layer 533	635	Other	Total
Total Fragments	453	129	132	714
ex.rarer species	251	128	130	509
+ ex.articulated bones	94			352
% Unid. Fragments	(60)	48	50	52
Erosion Index				.55
Loose Teeth Index				.32
% Gnawed Fragments				24
% Butchered Frags.				5
% Fragments of Major Species				
Cattle				29
Sheep/Goat				45
Pig				16
Horse				5
Dog				4
Red Deer				.6
Roe Deer				.6
Hare				.6

TABLE 2CGULLIES.1

Other 2nd Century Gullies Animal Bone Fragments in all Layers

Feature	Layer 1	2	3	4	Total
368/1	13	62			75
/3		294			294
Total	13	355			369
631/1		1		10	11
Total		1		10	11
640/1		15			15
/2		6			6
/3		8			8
/4		1			1
/5	12	16			28
Total	12	46			58
658/1	10	3			13
Total	10	3			13
659/1		2			2
Total		2			2
669/2	5	11	40		56
/3	5	11			16
/4	1				1
/5	4	17	5		26
/6	1				1
Total	16	39	45		100
716/1			31		31
/2			8		8
/3			8		8
Total			47		47
717/1	22	27	101	23	173
/2		31	144	31	206
/3		12	61	35	108
Total	22	70	306	89	487
TOTAL					1087

TABLE 2CGULLIES.2

Species represented in Other 2nd Century A.D.Gullies

Species	Feature 368	717	Other	Total
Cattle	57	86	32	175
Sheep/Goat	109	56	33	198
Pig	51*	-	17	68
Horse	6	14	6	26
Dog	2	-	1	3
Red Deer	-	1	-	1
Unid. Large Mammal	50	272	91	413
Sheep-sized Mammal	83	28	33	144
Unid. Mammal	7	21	17	45
Unid. Bird	-	8	1	9
Unid. Rodent	1	-	-	1
Toad	1	-	-	1
Domestic Fowl	1	1	-	2
House Sparrow	1	-	-	1
TOTAL	369	487	231	1087
Sheep	15	1	4	20

TABLE 2CGULLIES.3

Fragments of Major Species in Other 2nd Century A.D. Gullies

Cattle	Feature 368	717	Other	Total	%
Skull frags.	10	-	3	13	7
Mandible	8	20	2	30	17
Hyoid	1	-	-	1	.6
Loose teeth	6	32	5	43	25
Scapula	3	3	3	9	5
Humerus	1	1	2	4	2
Radius	4	3	5	12	7
Ulna	1	2	1	4	2
Os Coxae	4	3	2	9	5
Femur	1	3	-	4	2
Tibia	3	2	2	7	4
Carpals	1	3	-	4	2
Calcaneus	2	2	-	4	2
Astragalus	-	2	-	2	1
Centroquartal	-	1	1	2	1
Metacarpal	2	1	-	3	2
Metatarsal	4	2	1	7	4
Metapodial	2	-	-	2	1
1st Phalanx	1	2	2	5	3
2nd Phalanx	1	-	1	2	1
Cervical verts.	-	2	2	4	2
Thoracic verts.	-	1	-	1	.6
Lumbar verts.	2	1	-	3	2
TOTAL	57	86	32	175	

Sheep/Goat	368	717	Other	Total	%
Skull frags.	21	-	6	27	14
Mandible	14	5	-	19	10
Loose teeth	23	45	12	80	40
Scapula	1	-	-	1	.5
Humerus	4	-	1	5	3
Radius	7	-	4	11	6
Ulna	1	-	-	1	.5
Os Coxae	5	-	-	5	3
Femur	5	1	2	8	4
Tibia	10	1	4	15	8
Calcaneus	1	-	-	1	.5
Astragalus	1	-	-	1	.5
Metacarpal	6	1	2	9	5
Metatarsal	3	3	1	7	4
1st Phalanx	3	-	-	3	2
3rd Phalanx	1	-	-	1	.5
Cervical verts.	1	-	1	2	1
Thoracic verts.	1	-	-	1	.5
Lumbar verts.	1	-	-	1	.5
TOTAL	109	56	33	198	

Pig	Feature Art. 368	Oth. 368	Other	Total
Skull frags.	-	6	1	7
Mandible	-	9	-	9
Loose teeth	-	9	7	16
Scapula	-	7	-	7
Humerus	-	-	1	1
Radius	-	2	-	2
Ulna	-	1	1	2
Os Coxae	-	2	1	3
Femur	-	2	-	2
Tibia	-	2	-	2
Metatarsal	-	1	1	2
Lat. Metapodial	-	-	1	1
Metapodial	-	1	-	1
1st Phalanx	-	-	3	3
2nd Phalanx	-	1	-	1
Ribs	6	-	-	6
Thoracic verts.	2	-	-	2
Lumbar verts.	-	-	1	1
TOTAL	8	43	17	68

Horse	368	717	Other	Total
Skull frags.	-	-	1	1
Mandible	-	4	-	4
Loose teeth	2	2	3	7
Radius	2	-	-	2
Ulna	2	-	-	2
Os Coxae	-	2	-	2
Tibia	-	1	1	2
Calcaneus	-	1	-	1
Astragalus	-	1	-	1
Other tarsals	-	1	-	1
Metatarsal	-	-	1	1
1st Phalanx	-	1	-	1
2nd Phalanx	-	1	-	1
TOTAL	6	14	6	26

Dog: F368: humerus -1, rib - 1; Other: fibula - 1; TOTAL - 3.

Unid. Large Mammal	Total
Skull and mandible frags.	11
Ribs	36
Vertebrae	28
Longbone fragments	63
Unid. fragments	275
Total	413

Sheep-sized Mammal	Total
Skull and mandible frags.	16
Ribs	19
Vertebrae	6
Longbone fragments	75
Unid. fragments	28
Total	144

TABLE 2CGULLIES.4

Other 2nd Century Gullies Summary Statistics

	Feature 368	717	Other	Total
Total Fragments	369	487	231	1087
ex.rarer species	365	478	230	1073
+ ex.articulated bones	357			1065
% Unid. Fragments	39	67	61	57
Erosion Index	.29	2.42	1.99	1.59
Loose Teeth Index	.18	.50	.30	.32
% Gnawed Fragments	10	(4)		9
% Butchered Frags.	8	(-)		5
% Fragments of Major Species				
Cattle	26	55	(36)	38
Sheep/Goat	50	36	(37)	43
Pig	20	-	(19)	13
Horse	3	9	(7)	6
Dog	.9	-	(1)	.6
Red Deer	-	.6	(-)	.2
Cattle Loose Teeth Index		(.32)		.25
Cattle Longbone Frag., I.				.32
S/Gt. Loose Teeth Index	.21	(.80)		.40
S/G Longbone Frag. Index	.33			.32

TABLE 2CQUARRIES.1

2nd Century A.D. Quarries Animal Bone Fragments in all Layers

	Layer				
Feature	1	2	3	4	Total
61	23				23
131	4	7	4		15
231	90	5			95
238	4				4
244		1			1
246		144			154
247	9	14	65		88
248	1	185	369	36	591
610	1				1
611	11	7			18
613	62				62
654	9				9
TOTAL					1061

TABLE 2CQUARRIES.2

Species Represented in Other 2nd Century A.D. Quarries

Species	Feature 248	Feature Other	Total
Cattle	111	62	173
Sheep/Goat	111	88	199
Pig	73	28	101
Horse	20	10	30
Dog	12	10	22
Roe Deer	-	3	3
Unid. Large Mammal	142	80	222
Sheep-sized Mammal	112	101	213
Unid. Mammal	6	22	28
Unid. Bird	1	3	4
Weasel	-	1	1
Short-tailed Vole	-	1	1
Unid. Rodent	1	1	2
Frog	-	1	1
Domestic Fowl	1	3	4
Thrush sp.	1	-	1
Rook/Crow	-	55*	55
Raven	-	1	1
TOTAL	591	470	1061
Sheep	6	3	9

* articulated bones.

TABLE 2CQUARRIES.3

Fragments of Major Species in Other 2nd Century A.D. Quarries

Cattle	Feature 248	Other	Total	%
Skull frags.	11	-	11	6
Mandible	15	8	23	13
Loose teeth	20	22	42	24
Scapula	9	8	17	10
Humerus	-	3	3	2
Radius	9	-	9	5
Ulna	6	4	10	6
Os Coxae	4	1	5	3
Femur	3	5	8	5
Tibia	2	3	5	3
Carpals	-	1	1	.6
Calcaneus	6	1	7	4
Astragalus	1	1	2	1
Centroquartal	1	-	1	.6
Metacarpal	5	-	5	3
Metatarsal	5	1	6	3
Metapodial	1	-	1	.6
1st Phalanx	2	-	2	1
Ribs	3	-	3	2
Cervical verts.	4	3	7	4
Lumbar verts.	4	1	5	3
TOTAL	111	62	173	

Sheep/Goat	Feature 248	Other	Total	%
Skull frags.	3	3	6	3
Mandible	8	13	21	11
Hyoid	1	-	1	.5
Loose teeth	37	48	85	43
Scapula	3	-	3	2
Humerus	7	1	8	4
Radius	5	3	8	4
Ulna	1	1	2	1
Os Coxae	1	-	1	.5
Femur	2	-	2	1
Tibia	19	12	31	16
Calcaneus	1	1	2	1
Astragalus	2	-	2	1
Other tarsals	1	-	1	.5
Metacarpal	4	1	5	3
Metatarsal	7	3	10	5
1st Phalanx	1	1	2	1
2nd Phalanx	2	-	2	1
3rd Phalanx	2	-	2	1
Ribs	1	-	1	.5
Thoracic verts.	2	-	2	1
Lumbar verts.	-	1	1	.5
Sacrum	1	-	1	.5
TOTAL	111	88	199	

Pig	248	Other	Total
Skull frags.	6	2	8
Mandible	20	8	28
Loose teeth	22	12	34
Humerus	5	-	5
Ulna	-	1	1
Os Coxae	2	-	2
Femur	3	-	3
Tibia	4	-	4
Fibula	1	-	1
Carpals	2	-	2
Astragalus	1	-	1
Other tarsals	-	1	1
Metatarsal	1	-	1
Lat. Metapodial	-	1	1
1st Phalanx	3	-	3
2nd Phalanx	2	-	2
Cervical verts.	-	2	2
Thoracic verts.	-	1	1
Lumbar verts.	1	-	1
TOTAL	73	28	1~~1~~1

Horse	Feature 248	Other	Total
Skull frags.	-	1	1
Mandible	1	-	1
Loose teeth	4	2	6
Scapula	1	-	1
Humerus	1	-	1
Radius	2	-	2
Ulna	-	1	1
Os Coxae	-	2	2
Femur	3	-	3
Patella	-	1	1
Carpals	1	-	1
Astragalus	-	1	1
Metacarpal	2	-	2
1st Phalanx	-	1	1
2nd Phalanx	-	1	1
Ribs	1	-	1
Thoracic verts.	4	-	4
TOTAL	20	10	30

Dog	248	Other	Total
Skull frags.	1	-	1
Mandible	-	1	1
Loose teeth	8	-	8
Os Coxae	1	-	1
Tibia	-	1	1
1st Phalanx	1	-	1
Ribs	-	6	6
Cervical verts.	1	1	2
Lumbar verts.	-	1	1
TOTAL	12	10	22

Unid. Large Mammal	Total
Skull and mandible frags.	15
Ribs	36
Vertebrae	18
Longbone fragments	35
Unid. fragments	118
Total	222

Sheep-sized Mammal	Total
Skull and mandible frags.	7
Ribs	28
Vertebrae	10
Longbone fragments	119
Unid. fragments	49
Total	213

TABLE 2CQUARRIES.4

Other 2nd Century A.D. Quarries Summary Statistics

	Feature 248	Other	Total
Total Fragments	591	470	1061
ex.rarer species	587	404	991
% Unid. Fragments	44	50	47
Erosion Index	.21	1.05	.54
Loose Teeth Index	.28	.42	.33
% Gnawed Fragments	19	9	16
% Butchered Frags.	5	-	3
% Fragments of Major Species			
Cattle	34	31	33
Sheep/Goat	34	44	38
Pig	22	14	19
Horse	6	5	6
Dog	4	5	4
Roe Deer	-	1	.6
Cattle Loose Teeth Index	.18		.24
Cattle Longbone Fragmentation I.			.36
Sheep/Goat Loose Teeth Index	.33	(.55)	.43
S/G Longbone Fragmentation Index	.39		.39

TABLE 2COTHER.1

Feature 349 Animal Bone Fragments in all Sections

Section	N	Section	N	Section	N
5	148	11	111	17	31
6	13	12	7	18	39
7	54	14	25	19	46
8	9	15	22		
10	33	16	54	TOTAL	592

TABLE 2COTHER.2

Species represented in Feature 349 (Fragments)

Species	Total
Cattle	71
Sheep/Goat	96
Pig	17
Horse	27
Dog	8
Red Deer	1
Unid. Large Mammal	228
Sheep-sized Mammal	114
Unid. Mammal	26
Unid. Bird	2
Unid. Rodent	1
Rook/Crow	1
TOTAL	592
Sheep	6

TABLE 2COTHER.3

Fragments oF Major Species Represented in Feature 349

	Cattle	Sheep/G	Pig	Horse	Dog
Skull frags.	4	2	3	1	1
Mandible	11	5	1	-	-
Loose teeth	14	47	3	11	2
Scapula	4	1	1	1	-
Humerus	3	3	5	3	-
Radius	2	6	1	2	1
Ulna	5	-	-	1	-
Os Coxae	7	1	-	1	-
Femur	3	2	1	-	-
Tibia	3	11	1	-	-
Carpals	2	-	-	-	-
Calcaneus	2	1	-	-	-
Astragalus	2	-	-	-	-
Centroquartal	1	-	-	-	-
Other tarsals	1	-	-	-	-
Metacarpal	3	4	-	2	-
Metatarsal	3	8	-	2	1
Lat. Metapodial	-	-	-	2	-
Metapodial	1	1	-	-	-
1st Phalanx	-	3	-	-	-
2nd Phalanx	-	1	-	-	-
Ribs	-	-	1	-	2
Cervical verts.	-	-	-	1	-
Lumbar verts.	-	-	-	-	1
TOTAL	71	96	17	27	8

Unid. Large Mammal	Total	Sheep-sized Mammal	Total
Skull and mandible	8	Skull and mandible	3
Ribs	8	Ribs	13
Vertebrae	19	Vertebrae	2
Longbone fragments	56	Longbone fragments	62
Unid. fragments	137	Unid. fragments	34
Total	228	Total	114

TABLE 2COTHER.4

F349 Summary Statistics

	Total
Total Fragments	592
ex.rarer species	588
% Unid. Fragments	63
Erosion Index	1.36
Loose Teeth Index	.35
% Gnawed Fragments	9
% Butchered Frags.	3
% Fragments of Major Species	
Cattle	32
Sheep/Goat	44
Pig	8
Horse	12
Dog	4
Red Deer	.5
Sheep/Goat Loose Teeth Index	(.49)
S/G Longbone Fragmentation Index	.34

TABLE 2ND3RDC.1

2nd-3rd Century A.D. Features Animal Bone Fragments in all Layers

Feature	Layer 1	Layer 2	Total
557	36	1	37
558	11		11
588	57		57
620	8		8
TOTAL			113

TABLE 2ND3RDC.2

Species represented in 2nd-3rd Century Features (Fragments)

Species	Layer 557	558	588	620	Total
Cattle	2	1	13	4	20
Sheep/Goat	11	5	4	1	21
Pig	4	1	3	-	8
Horse	-	-	-	2	2
Unid. Large Mammal	4	1	24	1	30
Sheep-sized Mammal	15	1	5	-	21
Unid. Mammal	1	2	8	-	11
TOTAL	37	11	57	8	113

TABLE 2ND3RDC.3

Species Represented in 2nd-3rd Centuries A.D. Features

	Cattle	Sheep/G	Pig	Horse
Skull frags.	2	4	1	-
Mandible	4	2	3	-
Loose teeth	7	8	2	1
Scapula	2	-	-	-
Humerus	1	-	-	-
Ulna	-	-	1	-
Femur	1	-	-	-
Tibia	-	1	1	-
Metacarpal	1	3	-	1
Metatarsal	2	2	-	-
Cervical verts.	-	1	-	-
TOTAL	20	21	8	2

Unid. Large Mammal	Total
Ribs	3
Vertebrae	2
Longbone fragments	4
Unid. fragments	21
Total	30

Sheep-sized Mammal	Total
Ribs	1
Vertebrae	1
Longbone fragments	13
Unid. fragments	6
Total	21

TABLE 4CPITS.1

Other 3rd-4th Century Pits Animal Bone Fragments in all Layers

Feature	Layer 1	Layer 2	Layer 3	Total
543		1		1
544	17	16	14	47
639	5			5
TOTAL				53

TABLE 4CPITS.2

Species represented in Other 3rd-4th Century Pits (Fragments)

Species	Feature 543	Feature 544	Feature 639	Total
Cattle	1	2	3	6
Sheep/Goat	-	10	1	11
Pig	-	2	-	2
Horse	-	3	-	3
Unid. Large Mammal	-	12	1	13
Sheep-sized Mammal	-	17	-	17
Unid. Mammal	-	1	-	1
TOTAL	1	47	5	53

TABLE 4CGULLIES.1

Other 3rd-4th Cent. A.D. Gullies Fragments in all Layers and Sections

Feature/Section	Layer 1	Layer 2	Layer 3	Total
663	88			88
668/1		4	2	6
/2	8	5	12	25
/3		10	6	16
/4	3	6	8	17
/5		23	1	24
/6		11	9	20
/7		8	5	13
Total	11	67	42	121
671/1	31	38	9	78
/2		11		11
/3		10		10
/4		6	18	24
/5			6	6
Total	31	65	33	129
TOTAL				338

TABLE 4CGULLIES.2

Species Represented in Other 3rd-4th Centuries A.D. Gullies

Species	Feature 663	668	671	Total
Cattle	21	14	19	54
Sheep/Goat	14	31	17	62
Pig	3	8	-	11
Horse	3	4	17	24
Dog	1	-	1	2
Cat	1	-	1	1
Unid. Large Mammal	23	20	50	93
Sheep-sized Mammal	10	39	19	68
Unid. Mammal	3	5	6	14
Mole	7	-	-	7
Unid. Rodent	2	-	-	2
TOTAL	88	121	129	338
Goat	-	-	1	1

TABLE 4CGULLIES.3

Major Species Represented in Other 3rd-4th Century Gullies

	Cattle	Sheep/G	Pig	Horse	Dog
Skull frags.	2	2	1	1	-
Mandible	4	7	-	-	-
Loose teeth	15	39	7	14	-
Scapula	5	-	1	1	-
Humerus	4	4	-	2	-
Radius	4	-	-	-	-
Ulna	2	-	-	-	1
Os Coxae	-	-	-	1	-
Femur	4	1	-	-	-
Tibia	4	5	1	-	1
Carpals	1	-	-	-	-
Calcaneus	3	-	1	-	-
Astragalus	-	1	-	-	-
Metacarpal	1	-	-	2	-
Metatarsal	1	1	-	-	-
3rd Phalanx	-	-	-	1	-
Cervical verts.	1	2	-	2	-
Thoracic verts.	1	-	-	-	-
Lumbar verts.	1	-	-	-	-
Sacrum	1	-	-	-	-
TOTAL	54	62	11	24	2

Unid. Large Mammal	Total
Skull and mandible	1
Ribs	3
Vertebrae	4
Longbone fragments	29
Unid. fragments	56
Total	93

Sheep-sized Mammal	Total
Skull and mandible	-
Ribs	6
Vertebrae	-
Longbone fragments	44
Unid. fragments	18
Total	68

TABLE 4CGULLLES.4

Other 3rd-4th Century A.D. Gullies Summary Statistics

	Feature 663	668	671	Total
Total Fragments	88	121	129	338
ex.rarer species	79			329
% Unid. Fragments		53	58	53
Erosion Index				1.90
Loose Teeth Index				.48
% Gnawed Fragments				(12)
% Butchered Frags.				(1)
% Fragments of Major Species				
Cattle				35
Sheep/Goat				40
Pig				7
Horse				15
Dog				1
Cat				.6

TABLE 4CQUARRIES.1

Animal Bone Fragments in Other 3rd-4th Century A.D. Quarries

Feature	Layer 1	2	3	4	5	6	7	Total
107	9	45	64	2	12			132
154	1	48	2	38	57			146
461	46	59						105
465	152							152
742	45			24	42	10	6	127
TOTAL								662

TABLE 4CQUARRIES.2

Species represented in Other 3rd-4th Century Quarries (Fragments)

Species	Feature 107	154	461	645	742	Total
Cattle	8	18	35*	26	19	106
Sheep/Goat	16	24	12	32	12	96
Pig	5	3	6	2	2	18
Horse	1	8	3	-	7	19
Dog	5	1	1	-	2	9
Red Deer	-	-	-	1	-	1
Unid. Large Mammal	59	44	21	58	17	199
Sheep-sized Mammal	30	37	25	33	19	144
Unid. Mammal	4	5	2	-	4	15
Short-tailed Vole	-	-	-	-	2	2
Mouse sp.	-	-	-	-	2	2
Unid. Rodent	-	-	-	-	13	13
Amphibian	-	-	-	-	1	1
Thrush sp.	-	-	-	-	1	1
House Sparrow	-	-	-	-	26*	26
Rook/Crow	-	1	-	-	-	1
Raven	1	-	-	-	-	1
Rabbit (Intrusive)	3	5	-	-	-	8
TOTAL	132	146	105	152	127	662
Sheep	-	2	1	1	1	5

* includes articulated bones.

TABLE 4CQUARRIES.3

Fragments of Major Species in Other 3rd-4th Century A.D. Quarries

Cattle	107	154	Feature Art. 461	Oth. 461	465	742	Total
Skull frags.	-	1	-	8	2	2	13
Mandible	-	5	-	3	2	2	12
Loose teeth	-	8	-	10	16	2	37
Scapula	-	-	-	1	1	1	3
Humerus	-	-	-	-	-	1	1
Radius	-	1	-	1	-	-	2
Ulna	-	-	-	-	1	-	1
Os Coxae	4	-	-	-	-	-	4
Femur	-	-	-	2	2	1	5
Tibia	2	-	-	-	-	2	4
Calcaneus	-	1	-	-	-	-	1
Astragalus	1	-	-	-	-	1	2
Centroquartal	-	-	1	-	1	-	2
Other tarsals	-	-	1	-	-	-	1
Metacarpal	1	-	-	-	-	1	2
Metatarsal	-	1	1	1	-	3	6
Metapodial	-	1	-	-	-	-	1
1st Phalanx	-	-	2	-	-	-	2
2nd Phalanx	-	-	2	-	1	-	3
3rd Phalanx	-	-	2	-	-	-	2
Thoracic verts.	-	-	-	-	-	2	2
TOTAL	8	18	9	26	26	19	106

Sheep/Goat	107	154	461	465	742	Total
Skull frags.	-	-	3	1	1	5
Mandible	2	3	3	-	1	9
Loose teeth	5	12	-	27	2	46
Scapula	1	1	-	-	-	2
Humerus	-	-	-	1	1	2
Radius	2	2	2	-	2	8
Os Coxae	2	-	-	-	-	2
Femur	-	1	1	-	-	2
Tibia	1	3	-	-	2	6
Metacarpal	-	-	-	1	-	1
Metatarsal	1	2	1	2	1	7
1st Phalanx	1	-	-	-	-	1
2nd Phalanx	-	-	1	-	-	1
Ribs	1	-	-	-	-	1
Cervical verts.	-	-	1	-	-	1
Thoracic verts.	-	-	-	-	2	2
TOTAL	16	24	12	32	12	96

Pig	Feature 107	154	461	465	742	Total
Mandible	2	-	1	-	-	3
Loose teeth	1	2	-	2	-	5
Humerus	1	-	1	-	1	3
Os Coxae	-	-	1	-	-	1
Femur	-	1	-	-	-	1
Tibia	1	-	-	-	-	1
Fibula	-	-	-	-	1	1
Lat. Metapodial	-	-	1	-	-	1
Metapodial	-	-	1	-	-	1
Sacrum	-	-	1	-	-	1
TOTAL	5	3	6	2	2	18

Horse	107	154	461	742	Total
Skull frags.	1	-	-	-	1
Mandible	-	1	-	1	2
Loose teeth	-	3	1	5	9
Scapula	-	-	-	1	1
Radius	-	-	1	-	1
Ulna	-	-	1	-	1
Femur	-	2	-	-	2
1st Phalanx	-	2	-	-	2
TOTAL	1	8	3	7	19

Dog: F107: loose teeth - 5;
F154: loose teeth - 1;
F461: humerus - 1;
F742: skull fragment - 1, scapula - 1;
TOTAL - 9.

Unid. Large Mammal	Total
Skull and mandible frags.	15
Ribs	15
Vertebrae	6
Longbone fragments	39
Unid. fragments	124
Total	199

Sheep-sized Mammal	Total
Skull and mandible frags.	4
Ribs	31
Vertebrae	1
Longbone fragments	87
Unid. fragments	21
Total	144

TABLE 4CQUARRIES.4

Other 3rd-4th Century A.D. Quarries Summary Statistics

	Feature 107	154	461	465	742	Total
Total Fragments	132	146	105	152	127	662
ex.rarer species	128	140			82	607
+ ex.articulated bones			96			598
% Unid. Fragments	73	61	(50)	60	(49)	60
Erosion Index	.40	1.10	(1.18)	1.76	(.88)	1.05
Loose Teeth Index						.43
% Gnawed Fragments						14
% Butchered Frags.						3
% Fragments of Major Species						
Cattle						40
Sheep/Goat						40
Pig						8
Horse						8
Dog						4
Red Deer						.4
Cattle Loose Teeth Index						.38
Sheep/Goat Loose Teeth Index						.48

TABLE 4COVENS.1

3rd-4th Century A.D. Ovens Animal Bone Fragments in all Layers

Feature	Layer 1	2	3	4	7	Total
91	3	13	70		1	87
204	4	34	63	6		107
539		5	9	3		17
652	1					1
TOTAL						212

TABLE 4COVENS.2

Species represented in 3rd-4th Century A.D. Ovens (Fragments)

Species	Feature 91	204	539	652	Total
Cattle	2	7	-	-	9
Sheep/Goat	29	25	4	-	58
Pig	1	10	-	-	11
Cat	39*	-	-	-	39
Unid. Large Mammal	2	22	1	-	25
Sheep-sized Mammal	8	36	3	1	48
Unid. Mammal	1	7	1	-	9
Unid. Bird	-	-	1	-	1
Unid. Rodent	-	-	4	-	4
Toad	-	-	1	-	1
Amphibian	-	-	2	-	2
Domestic Fowl	4	-	-	-	4
Duck species	1	-	-	-	1
TOTAL	87	107	17	1	212
Sheep	8	1	1	-	10

* articulated bones.

TABLE 4COVENS.3

Fragments of Major Species in 3rd-4th Century A.D. Ovens

	Cattle	Sheep/G	Pig	Cat*
Skull frags.	1	7	1	1
Mandible	-	4	3	2
Loose teeth	2	16	3	-
Scapula	-	2	1	2
Humerus	1	2	-	2
Radius	-	3	-	2
Ulna	-	-	-	2
Os Coxae	-	-	-	1
Femur	-	3	-	1
Tibia	-	4	-	2
Fibula	-	-	1	1
Calcaneus	-	-	-	1
Astragalus	1	1	-	-
Metacarpal	-	3	-	1
Metatarsal	2	2	-	5
1st Phalanx	-	1	1	-
3rd Phalanx	-	1	-	-
Ribs	1	5	1	3
Cervical verts.	-	2	-	4
Thoracic verts.	-	-	-	4
Lumbar verts.	1	2	-	4
Caudal verts.	-	-	-	1
TOTAL	9	58	11	39

* articulated bones.

Unid. Large Mammal	Total
Skull and mandible	1
Ribs	3
Vertebrae	-
Longbone fragments	7
Unid. fragments	14
Total	25

Sheep-sized Mammal	Total
Skull and mandible	1
Ribs	11
Vertebrae	2
Longbone fragments	22
Unid. fragments	12
Total	48

TABLE 4COTHER.1

Other 3rd-4th Cent. A.D. Features Fragments in all Layers and Sections

Feature/Section	Layer 1	2	3	Total
372	1	5	109	115
565	1			1
566/1	35	66		101
/2	69	28		97
/3	1			1
Total	105	94		199
606/1	52	73	20	145
/2	18	115	39	172
/4			5	5
Total	70	188	64	322
607	94	2	11	107
TOTAL				744

TABLE 4COTHER.2

Species represented in Other 3rd-4th Century Features (Fragments)

Species	Feature 566	606	Other	Total
Cattle	15	34	31	80
Sheep/Goat	44	102	47	193
Pig	12	5	14	31
Horse	8	8	3	19
Dog	1	2	-	3
Unid. Large Mammal	57	85	74	216
Sheep-sized Mammal	53	69	48	170
Unid. Mammal	8	17	6	31
Water Vole	1	-	-	1
TOTAL	199	322	223	744

TABLE 4COTHER.3

Fragments of Major Species in Other 3rd-4th Century A.D. Features

Cattle	Feature 566	606	Other	Total
Skull frags.	1	-	1	2
Mandible	1	-	2	3
Loose teeth	5	21	13	39
Scapula	2	2	3	7
Humerus	1	1	2	4
Radius	-	2	-	2
Ulna	1	-	2	3
Os Coxae	-	-	1	1
Femur	-	-	1	1
Tibia	2	-	-	2
Centroquartal	-	1	-	1
Metacarpal	-	1	2	3
Metatarsal	-	5	2	7
Metapodial	1	-	1	2
1st Phalanx	-	1	-	1
Sesamoids	1	-	-	1
Thoracic verts.	-	-	1	1
TOTAL	15	34	31	80

Sheep/Goat	566	606	Other	Total	%
Skull frags.	1	-	-	1	.5
Mandible	-	2	9	11	6
Loose teeth	32	84	28	144	75
Scapula	1	-	1	2	1
Humerus	-	2	2	4	2
Radius	2	2	1	5	3
Ulna	1	1	-	2	1
Os Coxae	-	1	-	1	.5
Femur	-	-	1	1	.5
Tibia	3	5	4	12	6
Carpals	-	-	1	1	.5
Astragalus	1	-	-	1	.5
Metatarsal	1	4	-	5	3
Metapodial	1	-	-	1	.5
1st Phalanx	1	-	-	1	.5
Ribs	-	1	-	1	.5
TOTAL	44	102	47	193	

Pig	Feature 566	606	Other	Total
Skull frags.	-	1	1	2
Mandible	2	-	4	6
Loose teeth	6	3	3	12
Scapula	1	-	3	4
Humerus	1	-	-	1
Radius	1	-	-	1
Tibia	-	-	1	1
Fibula	1	-	1	2
Calcaneus	-	-	1	1
1st Phalanx	-	1	-	1
TOTAL	12	5	14	31

Horse	566	606	Other	Total
Skull frags.	-	-	1	1
Mandible	-	1	-	1
Loose teeth	4	7	-	11
Calcaneus	1	-	-	1
Astragalus	1	-	-	1
Metacarpal	-	-	1	1
1st Phalanx	1	-	1	2
Sesamoids	1	-	-	1
TOTAL	8	8	3	19

Dog: F566: loose teeth - 1;
F606: tibia - 1, metapodial - 1;
TOTAL - 3.

Unid. Large Mammal	Total
Skull and mandible frags.	14
Ribs	9
Vertebrae	16
Longbone fragments	68
Unid. fragments	109
Total	216

Sheep-sized Mammal	Total
Skull and mandible frags.	1
Ribs	12
Vertebrae	2
Longbone fragments	118
Unid. fragments	37
Total	170

TABLE 4COTHER.4

Other 3rd-4th Century Features Summary Statistics

	Feature 566	606	Other	Total
Total Fragments	199	322	223	744
ex.rarer species	198			743
% Unid. Fragments	60	53	57	56
Erosion Index	1.70	1.89	1.55	1.72
Loose Teeth Index	(.60)		.23	.63
% Gnawed Fragments				10
% Butchered Frags.				2
% Fragments of Major Species				
Cattle		23	(33)	25
Sheep/Goat		68	(49)	59
Pig		3	(15)	10
Horse		5	(3)	6
Dog		1	(-)	.9
Cattle Loose Teeth Index		(.62)		(.49)
Sheep/Goat Loose Teeth Index		.82		.75
S/G Longbone Fragmentation Index				.33

TABLE BURIALS.1

Animal Bone Fragments associated with Burials

Burial	N	Burial	N	Burial	N	Burial	N
1	18	13	2	30	20	62	5
3	1	21	2	41	7	63	15
5	30	24	10	42	18	64	4
6	1	26	65	47	23	65	1
7	5	27	2	57	41	69	3
8	1	28	4	60	1		
TOTAL							279

TABLE BURIALS.2

Species represented in Burials (Fragments)

Species	Total
Cattle	33
Sheep/Goat	52
Pig	25
Horse	4
Dog	3
Unid. Large Mammal	67
Sheep-sized Mammal	63
Unid. Mammal	25
Unid. Rodent	2
Toad	2
Amphibian	1
Domestic Fowl	1
Rabbit (Intrusive)	1
TOTAL	279

Sheep 1

TABLE BURIALS.3

Fragments of Major Species Associated with Burials

	Cattle	Sheep/G	Pig	Horse	Dog
Skull frags.	1	2	-	-	-
Mandible	4	5	9	1	-
Hyoid	-	1	-	-	-
Loose teeth	12	29	11	2	1
Scapula	1	1	-	-	-
Humerus	1	3	1	-	-
Radius	2	-	-	-	-
Os Coxae	1	2	-	-	-
Femur	1	2	1	-	-
Tibia	-	3	2	-	-
Calcaneus	1	-	-	-	-
Astragalus	-	1	-	-	-
Centroquartal	-	1	-	-	-
Other tarsals	-	-	1	-	-
Metacarpal	-	1	-	1	1
Metatarsal	3	1	-	-	1
Cervical verts.	1	-	-	-	-
Thoracic verts.	2	-	-	-	-
Lumbar verts.	2	-	-	-	-
Sacrum	1	-	-	-	-
TOTAL	33	52	25	4	3

Unid. Large Mammal	Total
Skull and mandible	2
Ribs	6
Vertebrae	11
Longbone fragments	5
Unid. fragments	43
Total	67

Sheep-sized Mammal	Total
Skull and mandible	2
Ribs	14
Vertebrae	-
Longbone fragments	33
Unid. fragments	14
Total	63

SECTION 4

DISCUSSION OF INTRA-SITE VARIABILITY

INTRODUCTION

Sections 2 and 3 have examined in detail the faunal assemblages from the major features and from smaller contexts grouped by feature type and date. In this section the results from those analyses will be discussed in broader terms to give an assessment of how the assemblages varied both through time and within the same chronological period.

Chronological Subdivision of the Assemblage

Grouping of the faunal assemblage was done taking into account the major changes in the settlement's layout but was handicapped in some cases by the lack of precise dating and by the problems of residuality of earlier material in later fills. It was finally decided to analyse the material from the following five chronological phases:-

a) Deposits dated to the 3rd-2nd Centuries B.C.

These consisted of material from the banjo enclosure ditch (F55), its early recuts (F380), and other comtemporary ditches (F574, F589). Most of the Iron Age pits were included in this group along with the quarry, F236. Table Section4.1 shows that the majority of the bones came from the pits and ditch sections and that about 12,000 fragments, including articulated bones, were included in this group.

b) Deposits dated to the 1st Century B.C.

These produced a smaller sample of 6,393 fragments. In this case, most of the material came from quarry features (F377, F378 and other smaller assemblages). The sample also included the contents of the pit, F400 and the various gullies which were dug at this time (Table Section4.1).

c) Deposits dated to the 1st Century A.D.

This was a period of major reorganisation of the layout of the settlement at Owslebury. Unfortunately, although the pottery and other artefactual material was able to date some of the deposits more precisely within that timespan, the majority contained material which could have been deposited both in either the pre- or post- conquest periods. As far as the animal bones are concerned, it was found to be impossible to further subdivide this sample.

The assemblage of over 28,000 fragments was derived principally from the various major ditch deposits (F36, F75, F132, F133, F367, F370 and F642). In most cases only the bones from the lower fills from the above features were included. However, in the smaller ditch assemblages, material from all fills was included and it is possible that those samples contained a greater proportion of bone deposited at a later date, particularly in their upper fills. However, it is believed that the vast majority of the fragments were of 1st Century A.D. date. Various track gullies contained a relatively large amount of bone (F42, F147 and other smaller contexts). Bones from the pits and quarries, however, formed only a small proportion of the assemblage of this period.

d) Deposits dated to the 1st-2nd Centuries A.D.

This produced a sample of 13,889 fragments but from a more limited number of deposits. A great proportion of the bones was found in fills of the major ditches, F133 and F642 and from other ditches (Table Section4.1). Most of the material was of 2nd Century A.D. date.

e) Deposits dated to the 3rd-4th Centuries A.D.

These produced the largest sample of bones (39,824) but from an unusual mixture of contexts. Nearly all the 8,759 fragments from the pits came the four cess pits (F632, F646, F650 and F664). These, together with the quarry, F724 produced samples dominated by articulated bones and specific butchery waste. These were so different from the rest of the faunal assemblages that they were treted separately in this analysis.

The majority of the bones again came from ditch fills. These included ditches constructed in the 3rd-4th Centuries A.D., particularly F634, but most of the material was found in the upper fills of many of the earlier ditches, particularly F75, F133 and F642). These contained a fair amount of residual pottery but most of the material does appear to have been of 3rd-4th Century A.D. date. Most of the bones of the track fills came from F150, which replaced F147. The number of fragments in each feature type are shown in Table Section4.1.

The samples from these five periods amounted to 100,365 fragments. For the following analysis material from deposits with very mixed fills (in particular F135 and F633) were excluded together with bones associated with the burials. In addition, a few contexts had fills dated to the 1st Century B.C.-1st Century A.D. (mainly from F369). The small size of the sample of bones of this date meant that they were also excluded. Details of fragments found in these features can be found in Sections 2-3. In total, however, only 3,694 fragments from the features examined in depth were omitted from the analysis. About another 7,000 fragments were recorded but not studied further. These records are stored in the archive.

The sample, therefore, is one of the largest to be studied in Britain. It was derived from a variety of context types and presented an unparalleled opportunity to study variability in the faunal assemblage from a substantial part of one settlement through time.

The analysis also concentrated mainly on the remains of the identified fragments of the major domestic species:- cattle, sheep/goat, pig, horse and dog. Unidentifiable fragments were considered only for certain aspects of the study and a fuller discussion of the rarer identified species contained in the assemblage can be found in Section 9. The analysis of variability relied to a great extent on the study of the relative representation of the different skeletal elements of the major species in the assemblage. Tables CowFrag.1, S/GFrag.1, PigFrag.1, HorFrag.1 and DogFrag.1 list the number of fragments represented in each of the five major chronological groups for the major species. Within each period, the results are further subdivided into groups. The totals exclude articulated bones in all the samples apart from those from the cess pits and F724. Although the groupings in the above tables form the basic units for comparative analysis, some of the analyses will further subdivide these groupings. These will be explained when they occur.

RETRIEVAL BIAS

All samples recovered by hand excavation are liable to be biased against the retrieval of the smallest bones. This has been discussed in detail by several authors (for example Barker 1975; Levitan 1982; Payne 1975). Although it is not usually practicable to sieve all deposits, a sieving programme does often give some indications of what may have been overlooked. However, there was no such programme at Owslebury and we have to rely on the analysis of the recovered material to assess what effects retrieval bias may have had.

It should be emphasised from the outset that the collection of a good faunal sample was one of the major priorities of the excavation and the workforce was specifically encouraged to ensure that they retrieved every fragment of bone they saw. The intuitive impression gained during identification and recording was that this policy had been successful, since there was a high proportion of small fragments in the assemblage. However, a complication arises here in that increased fragmentation is also related to poorer preservation. Some very well excavated assemblages can still contain a high percentage of large fragments, especially if they are well preserved.

In most archaeological assemblages, it is the smaller bones such as loose teeth, carpals, tarsals and phalanges that tend to be overlooked, and indeed this would appear to have been the case at Owslebury. However, it is not very easy to obtain a reliable statistical assessment of how great the bias may have been. Generally the smaller bones in the skeleton occur in greater numbers than the major limb bones. Theoretically, therefore, archaeological samples should contain seven times as many cattle and sheep/goat carpals than radii or metacarpi, for example. Similarly they should contain twice as many cattle and sheep/goat first, second and third phalanges than metacarpi or metatarsi. In the pig skeleton there should be, including the lateral foot bones, four times as many metapodials and phalanges than other limb bones. This is counterbalanced to a variable extent by the fact that most of the smaller bones survived whole or substantially complete, whereas the major limb bones tend to broken into several fragments. Direct comparison of the number of fragments of different bones is therefore fraught with uncertainties. The problem is compounded by the fact that different bones have variable survival potentials and differential disposal of the bones from different areas of the skeleton may also bias the sample.

The best bones to compare to test the degree of retrieval bias are those which are likely to have been usually dumped together, have similar survival potential and are usually found whole or substantially complete. They also, of course, should be of different sizes. Maltby (1985a: 37-40) examined the relative number of cattle and sheep/goat first and second phalanges in 31 samples examined by 17 different archaeozoologists. It was suggested that these bones were probably the most useful to compare, since they are likely to have been dumped together, and are thought to have similar survival qualities. They are also often found whole in archaeological samples. At Owslebury, however, the scavenging and other attritional agents had even caused the fragmentation of a substantial number of these bones. Although a greater proportion were recovered complete than the major limb bones or mandibles, for example, many of them had been reduced in size.

If the bones are complete, the second phalanx is about half the size of the first phalanx in the species. Therefore retrieval bias is likely to affect the second phalanges more than first phalanges. It is also likely that the bias will be more marked in the sheep/goat sample because the bones are substantially smaller than those of cattle.

Figure Section4.1 compares the relative numbers of cattle and sheep/goat second phalanges expressed as a percentage of the number of first phalanges recovered for the respective species. The Owslebury assemblage was divided into five samples and these were compared with some samples obtained from contemporary sites in Wessex. Generally in these samples (and in others - Maltby 1985a: 38-39) the percentage of second phalanges represented in both the cattle and sheep/goat assemblages show a positive correlation. In the majority of cases, a higher percentage of cattle second phalanges were recovered than sheep/goat second phalanges. At Owslebury, the highest proportions of second phalanges were found in the cess pits and F724. This is not surprising since the sheep/goat sample was dominated by articulated groups of foot bones and these bones were probably often closely associated in those deposits. The Iron Age and 1st Century A.D. samples from Owslebury fell within the expected pattern. However, the samples from the 1st Century A.D. and other 3rd-4th Century A.D. deposits contained unexpectedly high percentages of sheep/goat second phalanges. The reasons for this discrepancy are not clear. It is possible that relatively more cattle second phalanges were destroyed by scavenging or erosion than was the case in the sheep/goat sample, in which all the phalanges may have been affected equally badly by taphonomic factors. It is also conceivable that the second phalanges may have been more often separated with the cattle hides than the first phalanges, although this is not supported by the butchery evidence (see Section 7).

Nevertheless, the evidence does suggest that the smaller phalanges of both species were commonly overlooked and, by implication, this means that the smaller bones of all the major species are likely to be under-represented.

This is supported to an extent by an analysis of the rank order of representation of various skeletal elements of cattle and sheep/goat (Table Section4.2). The rank order of the number of fragments of 23 selected elements from 28 samples was estimated. The mean of such ranks was then calculated for each element. These results do not take into account fragmentation or the number of a particular element type in the skeleton. However, apart from loose teeth which were dominant in all the samples, the bones near the bottom of the rankings in both the assemblages tended to be the smallest elements, such as the smaller tarsals, carpals and smaller phalanges. The same trends were apparent in the assemblages of the other major species.

Generally it is believed that retrieval standards were better in the later seasons of excavation. For example, there are some indications, particularly from F75, which was excavated over several years, that retrieval bias may have been greater in sections excavated in the early seasons. Material from the sites dug in those years must be treated with greater caution.

Consequently, retrieval biases tended to favour the reecovery of fragments of the larger bones of all species but it seems likely that the cattle and horse samples were less affected than sheep/goat, pig and dog. It is also probable that the bones of immature animals were overlooked more often. Such biases are normal from excavations. The results from Owslebury would suggest that retrieval rates were in fact of a high standard, comparable with those from Winnall Down, Danebury and Groundwell Farm and better than those from Balksbury 1973, Portchester Castle and Staple Gardens, Winchester (Figure Section4.1).

PRESERVATION OF BONES

Without doubt, erosion, weathering and scavenging destroyed the majority of the animal bones dumped at Owslebury. This resulted in the bias towards sturdier elements in all species. This can be monitored in several ways.

Loose Teeth Indices

Loose teeth are the sturdiest elements of all skeletons. In certain poor preservation conditions they become separated from the jaws and can be incorporated into deposits in large numbers. At Owslebury there was a strong positive correlation between the amount of surface erosion observed on the bones and the loose teeth index. Figure Section4.2 plots the results obtained from 94 contexts, where the samples were large enough to allow the loose teeth and erosion indices to be calculated. The indices increased in a moderately strong positive linear relationship (Erosion Index = .16 Loose Teeth Index + .23: r = .58). It was also clear that most of the samples with the highest erosion and loose teeth indices were of 3rd-4th Century A.D. date. Apart from the bones in the cess pits and F724, the majority of the samples from the deposits of this date were poorly preserved. The analysis of vertical variability of the major assemblages (Section 2) consistently showed that the erosion and loose teeth indices increased in the upper fills. Since most of the 3rd-4th Century A.D. samples were situated close to the ground surface, they tended to be less well preserved. Wilson (1985) has demonstrated how depth of burial significantly affects the survival of bones in archaeological deposits. His findings are supported by these results from Owslebury.

It follows that if the state of bone preservation can be monitored to an extent by the proportion of loose teeth in the assemblage, it should be possible to compare the state of preservation of the samples of different species by comparing the proportion of loose teeth in their assemblages. It was noted during the analysis of the major assemblages that the sheep/goat samples consistently contained more loose teeth than the cattle samples. This is shown in Figure Section4.3 which plots the percentages of loose teeth in the cattle and sheep/goat assemblages in 55 contexts in which the samples were sufficiently large. The percentages of loose teeth of these species rose in a linear fashion, but all the samples contained a greater proportion of sheep/goat loose teeth. As expected, the assemblages with most loose teeth were mainly dated to the 3rd-4th Centuries A.D.. In 16 of the most badly preserved assemblages, loose teeth constituted over half of the sheep/goat assemblage. They never formed over 50% of any cattle assemblage. Considering that it is almost certain that retrieval bias has resulted in the under-representation of sheep/goat loose teeth in comparison to cattle, it is clear that the sheep/goat bones survived less well than those of cattle throughout the deposits.

Table Section4.3 shows the percentage of loose teeth in the cattle, sheep/goat, pig and horse assemblages in the major subgroups. Some of the results should be treated with caution since they are derived from fairly small samples. However, the results show some consistent trends. Sheep/goat produced the highest proportion of loose teeth. The samples of cattle, pig and horse tended to have roughly equal percentages of loose teeth except in the 3rd-4th Century A.D. samples, in which the proportion of pig teeth rose at a greater rate than the others.

Gnawing Indices

It has been established that erosion and weathering, especially in contexts close to the modern ground surface, have destroyed much of the assemblage. These factors, however, did not account for all of the destruction . It is clear that most of the deposits conatined animal bones which had been partially damaged by scavenging animals, especially dogs. The high proportion of partially damaged bones suggests that a substantial amount of the bones originally dumped may have been totally destroyed. Unfortunately, subsequent surface erosion must have destroyed many of the chewing marks and this resulted, as Figure Section4.4 shows, in an inverse relationship between the Gnawing and Erosion Indices.

Detailed analysis of the specific effects on canid scavenging was therefore handicapped by the subsequent erosion of many of the assemblages. The results do show, however, that in many of the best preserved samples, over 20% of the fragments of the major identified species bore gnawing marks. Only a few deposits, in particular the cess pits, contained samples that had not been subjected to a substantial degree of disturbance by dogs. In addition, it was possible to show whether the deposits contained a greater or lesser proportion of gnawed fragments than expected given the degree of erosion. For example, four of the layers in F370 contained relatively few gnawed fragments in those well preserved samples. This supports the impression gained both from the study of the faunal and pottery assemblages that this

1st Century A.D. ditch contained substantial dumps of primary refuse.

Survival of Articular Surfaces

Differential preservation of the assemlages has already been indicated by the analysis of the numbers of loose teeth. Another guideline to the state of preservation of the assemblages, is the study of the survival of the articular surfaces. Binford and Bertram (1977) have shown that canid scavenging destroys bones differentially and that shaft fragments are more likely to survive than articular surfaces. Certain bones with low densities are likely to be subjected to greater destruction. For example, the low numbers of vertebrae of all species in the deposits is undoubtedly a direct reflection of the activity of dogs. Nearly all archaeological samples contain fewer articular surfaces with late fusion ages than those with early fusion ages. This again is largely a density-related phenomenon.

Table Section4.4 shows the percentage of shaft fragments of limb bones of the major species by period. The number of shaft fragments represented can also be dependent on butchery practices and on the fact that the bones of the larger mammals would break into more identifiable shaft fragments than those of smaller mammals. The results show, however, that it was the articualr surfaces of cattle and horse that survived in greater numbers than those of sheep/goat and pig. Sheep/goat in particular had very few articular surfaces represented. Horse bones tended to have the greatest proportion of articular surfaces. This is partially the result of good preservation but it was also apparent that they were more rarely broken open for marrow than cattle bones (see Section 7). Consequently, fewer shaft fragments of horse were probably originally deposited.

In all cases, the samples were biased against late-fusing articulations. Tables Section4.5 and Section4.6 show that the later-fusing articulations of cattle and sheep/goat were consistently less well represented than the opposite ends of the bones. The biases were greater for the humeri, radii and tibiae than for the metapodia. This is because the distal ends of the metapodia are more robust than the later-fusing articulations of the other bones.

The degree of fragmentation and the relative survival of the proximal and distal ends of the sheep/goat tibia can be compared to other samples. At Owslebury, shaft fragments consistently contributed over 80% of the tibiae. Such figures place the samples amongst the most poorly preserved assemblages that can be directly compared (Maltby 1985a: 46-48). The best preserved samples were recovered from the Iron Age pits but even these consisted mainly of shaft fragments.

Discussion of Preservation

The analyses have shown that the majority of the Owslebury faunal assemblage was poorly preserved. Apart from the cess pits, most of the assemblages had been badly disturbed by canid scavenging and erosion. The preservation of bones was better in deeper fills but this deteriorated markedly in deposits closer to the modern ground surface. Consequently most of the 3rd-4th

Century A.D. assemblages were less well preserved than bones recovered from earlier deposits. In general, the best preserved samples were found in the lower fills of the pits and the deeper ditches.

The evidence suggests that cattle and horse bones survived better than those of other species. The sheep/goat sample appears to have been the most severely affected by taphonomic factors. Consequently the sheep/goat assemblage consistently included more loose teeth, a greater proportion of shaft fragments and fewer later-fusing articular surfaces than cattle. The pig assemblage survived better than the sheep/goat assemblage in the earlier periods but became as badly affected by the poorer preservation conditions encountered in the 3rd-4th Century A.D. deposits.

The loss of bones through differential preservation allied to retrieval bias has resulted in the recovery of only a fraction of the bones originally deposited. Estimates of bone loss are difficult but they were probably of an order of over 80% in all assemblages apart from those from the cess pits.

EVIDENCE OF DISPOSAL PRACTICES

The subsequent taphonomic biases have sadly limited any detailed analysis of intra-site disposal practices. Theoretically, it should be possible to analyse the contents of the faunal assemblages in different deposits and suggest that the bones were, for example, principally derived from kitchen, table or primary butchery waste (Halstead et al. 1978; Maltby 1985a: 49-57). Such analyses rely heavily on the study of the relative distribution of anatomical parts, butchery and ageing evidence. However, it is clear that the Owslebury sample has been severly damaged by scavenging and erosion and the variations in element representation can largely be most easily explained by differential preservation.

The problems that are encountered are best demonstrated by the analysis of a few specific examples. In some urban Romano-British deposits, large numbers of skull fragments and limb extremities of cattle have been found dumped together. Such assemblages probably represent large-scale butchery waste (Maltby 1984d). Although we should not expect those practices to have been performed on such a large scale at Owslebury, it is possible that primary butchery activities may have been localised in certain areas of the settlement. Consequently, certain deposits may contain a greater proportion of of such bones. Most of the cess pits, for example, contained only the feet and heads of sheep. The major meat-bearing bones were not represented. This is a classic example of differential disposal of certain bones. However, it is much more difficult to pick out such activities amongst assemblages which have been subjected to secondary disposal and scavenging.

In general, skull fragments were recovered in greater numbers in contexts that preserved bones well. The relative proportion of such fragments declined markedly in poorly preserved assemblages. Figure Section4.5 shows how the percentage of sheep/goat skull fragments fell in more poorly preserved deposits. In the best preserved assemblages (defined as those containing the lowest number of loose teeth), skull fragments outnumbered mandible fragments. However, as loose teeth indices increased, the proportion of skull fragments decreased in relation to the more robust mandibles. As a result, the 3rd-4th Century A.D. deposits generally contained the lowest proportion of skull fragments (see also Table Section4.7). Similarly, the cattle and horse assemblages also contained fewer skull fragments in the 3rd-4th Century A.D. deposits. The pig assemblage showed rather less variation and this may be partially due to the fact that pig skulls are relatively more robust than those of the other species.

Consequently, the proportion of skull fragments was largely dependent on the preservation conditions. The presence of large numbers of skull fragments in a particular deposit, therefore, may simply suggest that the survival of bones was good in that feature. Similarly it is difficult to compare the bones such as the mandible with good meat-bearing bones such as the humerus and the femur because these bones have differing survival potentials. In the sheep/goat sample, for example, it was notable how fragile bones, such as the vertebrae, scapula and femur, were more rarely encountered in the poorly preserved assemblages.

Nevertheless, despite all these problems it was possible to recognise some trends directly associated with differential disposal practices.

The Cess Pits and Feature 724

These 3rd-4th Century A.D. features were the only ones in which substantial amounts of primary refuse were recorded. Unfortunately, the very nature of the deposits makes them atypical and difficult to compare with the other assemblages. They were all depositories for a number of whole or partial carcases. The minimum number of major domestic mammals represented in the articulated groups within these features are given in Table Section4.8. At least 98 carcases of domestic animals were represented. These included at least 55 bodies of newborn (or in some cases foetal) puppies. 42 of these were found in F664. These probably represented litters put down at birth. These pit deposits were also used to dispose of at least 11 older dogs. The evidence may suggest that the population of dogs needed to be controlled.

F650 produced most of the skeleton of a neonatal pig. The articulated groups of cattle and horse consisted of smaller numbers of bones. These consisted either of parts of the vertebral column or bones of the hind limbs. The cattle sample from the lower layers of these deposits, however, did also include substantial parts of several skulls and some intact limb bones. These too had been thrown directly into the fills.

At least 24 sheep were represented by groups of bones of the limb extremities and the head. Butchery marks supported the fact that these had been cut off from the rest of the carcase and dumped in the pits. It is possible that they were originally separated with the skins. In any case, the major meat-bearing bones were absent and taken for further processing and consumption elsewhere, although not necessarily away from the settlement. F650 also contained several partial sets of vertebral columns, some of which bore clear evidence of butchery. The method of butchery of sheep carcases appears to have remained consistent throughout the life of the settlement (see Scetion 7). In this process the flanks of the animals were often removed from the vertebrae. Consequently the vertebrae can also be regarded as primary butchery waste.

Other Articulated Bones

Apart from the large number of skeletons in the cess pits, a further 90 articulated groups contributed 3,719 bones of the major species. These figures exclude the numerous recorded occurrences of pairs of associated bones. Only groups of five bones and above are included here. The details of these articulated groups were given in Sections 2-3. Table Section4.9 summarises the numbers of groups involved for each species. The number of bones in these groups were compared to the number of unarticulated bones in the assemblage. In the cases of cattle and sheep/goat, the two major species exploited at Owslebury, such groups contributed only a small fraction of the total assemblages. No complete skeletons were found. Most of the groups of cattle bones consisted of sections of the vertebrae and ribs, many of which may have been dumped during carcase processing. The largest group of articulated bones of sheep/goat in fact belonged to the substantially complete skeleton of a goat in the 3rd Century B.C. quarry, F236. Most of the articulated bones of sheep consisted of small groups of vertebrae and ribs and sometimes more substantial groups of bones of lambs, particularly in the Iron Age pits.

Where they occurred, articulated groups of pig bones tended to be larger. In nearly all cases they belonged to animals under a year old, and mostly under six months old. Several of the carcases may not have been large enough to have been considered as food. They may have been natural mortalities, although this does not rule out possible ritual connotations in some cases.

The groups of articulated horse bones were generally of a similar size to cattle and often consisted of similar types of bones, such as the vertebrae and ribs. Such articulated groups, however, formed a much larger proportion of the horse assemblage and it is probable that horses were not as intensively utilised for meat as cattle. This is also supported by the butchery and fragmentation evidence (see Section 7).

The dog assemblage was, in contrast to the others, dominated by articulated groups. At least 33 such groups were represented, often incorporating complete or substantially complete skeletons. Most of the dogs may therefore have been deliberately buried without any use being made of their carcases. This being said, at least one articulated skeleton from F42-2-4 bore substantial numbers of skinning cuts. It is also possible that much of the remainder of the dog assemblage consisted of much more disturbed articulated remains of dog carcases, which had become disarticulated through a series of taphonomic factors and secondary deposition.

The evidence of the articulated bones, therefore, gives some important clues as to how the carcases of animals were exploited.

Apart from a very few immature animals, cattle, sheep/goat and pig carcases were generally heavily utilised. Horse carcases may not have been intensively exploited and most bodies of dogs were simply buried or left lying on the rubbish heap.

OTHER INTRA-SITE VARIABILITY

a) The Iron Age

This period was one in which there was sufficient variety in context type to study the possible effects of intra-site variability. Unfortunately, contexts of different types tend to produce samples that have diverse standards of preservation and are thus difficult to compare. However, in the 3rd-2nd Century B.C. contexts at least, many of the bones from the major enclosure ditch F55 and the pits were buried sufficiently deeply to survive well and be directly comparable in terms of preservation. Both samples had been substantially affected by canid scavenging, however, and the ditch assemblage seems to have been more severly modified.

Nevertheless, the relative abundance of major species represented in the pits was quite different to that in F55 (Table Scetion4.10). Sheep/goat fragments were much better represented in the pits. Cattle and horse bones were more common in the enclosure ditch. Although the pits and F55 may not be exactly contemporary, it does show a pattern that has been observed elsewhere. At Winnall Down, cattle were much better represented in the Early Iron Age enclosure ditch fills than in most of the contemporary pits (Maltby 1985b: 98-99). Indeed, the contrast there was more marked than at Owslebury. At the Iron Age site of Minges Ditch, Oxfordshire, Wilson (1985) has concluded that bones of larger animals were better represented in deposits on the periphery of the settlement than near the centre, irrespective of preservation biases.

The implication of such variability is that the butchery of larger mammals may more often have taken place in locations away from the main area of habitation and consequently more of the butchery waste was deposited in peripheral areas. The pits were situated closer to the area of main habitation and these, once they were no longer used for storage purposes, were more likely to include kitchen and table waste. Consequently, since more pigs and sheep may have been butchered nearby, their bones were found in greater numbers in the pits. As will be demonstrated in Section 5, more young animals were represented in the pits than in other Iron Age features and this seems to reflect the fact that carcases of older animals were more often butchered away from the centre of the settlement.

In this respect, it is also interesting to note that while F55 produced a number of goat bones (some of them butchered) and the quarry F236 contained a substantially complete skeleton of the same species, goat bones were almost entirely absent from the Iron Age pits.

In the 1st Century B.C. deposits, the pit F400 contained an unusual group of bones. Although the assemblage was dominated by sheep/goat fragments, the upper layers contained unusually large numbers of cattle and horse skull fragments, together with a relatively large number of sheep/goat mandibles. The interpretation of such an assemblage is difficult. The dumping of the skulls may be associated with ritual, although it could also have been the result of the processing of these skulls during normal butchery practice.

Once again cattle bones were better represented in the gully features of this date, whereas the contemporary quarries were dominated by sheep/goat and also had higher percentages of pig bones (Table Section4.10). Although there were greater discrepancies in the preservation of bones from these context types, such differences cannot fully account for the variability in species representation. It is probable, therefore, that there were variations in the locations used for the processing of carcases of different species in this period as well.

b) Romano-British Deposits

The Romano-British deposits were dominated by ditches. The combination of secondary disposal, residuality, scavenging and contamination have meant that discrete dumps of carcase waste representing specific localised activities were extremely difficult to detect. Indeed, in most cases only vague trends could be monitored. By comparing the amount of material recovered from different sections of the ditch, it was possible to gain some impression of the areas where the greatest amounts of rubbish were deposited. This in turn may imply that these sections were located closer to areas where more carcase processing took place. This of course assumes that the bones in the ditch were generally derived either directly or indirectly from activities located nearby.

If such an assumption is correct, it is possible to suggest, for example, that Sections 14-21 of F133 were closest to areas of such processing than other sections of that ditch, because they contained the greater amount of bones. Similarly Sections 9-25 of the track gully F147 consistently contained a denser concentration of bones than Sections 1-8. Similar observations could be made for all such linear features. However, such comparisons between sections assume that the assemblages were obtained from similar volumes of fill and this was not invariably the case. It also assumes that retrieval standards were of a similar order in different sections but, as the results from F75 have suggested, this may not aways have been the case (see above).

Localised primary dumps of animal bone were rarely encountered in the Romano-British deposits. The best examples were from the major ditches F133; F370 and F642. F370 in particular, appears to have been infilled quite rapidly in places. Several sections had discrete concentrations of bones of various species. Sections 10-12, for example, had large numbers of pig bones including partial skeletons. Section 2 appears to have been used as a depository of several cattle carcases. The low incidence of gnawed bones supports the impression that much of the material in this ditch was primary refuse. Such refuse was more restricted in most of the other features, although the bottom layers of F133 and F642 may have contained a larger proportion of such material. In the lower layers of F642 the average size of the cattle bones was quite large (as indicated by the high Cattle Fragmentation Index - Table F642.4) and this may reflect such dumping. Section 17 of that ditch consistently contained high percentages of cattle and horse fragments, suggesting that these species may have been butchered nearby.

Apart from the cess pits and quarry F724, discrete patterns of carcase dumping were even more difficult to monitor in the 3rd-4th Century A.D. deposits because of the poor state of bone preservation. F634, although it preserved bones generally poorly, did, in addition to several groups of articulated bones, produce a comparatively large number of complete or substantially complete cattle and horse bones in several of its sections. Interpretation of this can be made difficult by the fact that it is clear that sheep/goat and pig bones did not survive well in this feature, and are consequently under-represented. There was also some contamination from the quarry F633 in some sections. However, the evidence would suggest that F634 was in places used for the dumping of cattle and horse carcases.

Evidence for differential disposal of carcases is therefore limited at Owslebury, apart from in the Iron Age deposits. The lack of large concentrations of specific types of butchery waste is not surprising since it is unlikely that a large number of animals would have been processed at once. Most butchery waste does not appear to have been deliberately buried and most of the fragments in the ditch fills were probably either amongst midden material which was eventually used in infilling parts of the ditches or were simply thrown into the ditches and left lying uncovered until subsequent dumping took place. In both cases, weathering and scavenging animals would have severly modified and disturbed the assemblage.

It is thought therefore, that biases in the representation of different elements can largely be explained by differential preservation and retrieval rates. There is no clear evidence that dressed carcases were imported into the settlement, the one exception could be pig. The low number of metapodials in the pig assemblage could indicate that some pigs were not butchered at Owslebury. The dumping of large numbers of pigs trotters has been encountered on some Romano-British settlements (Maltby 1981a: 167). The possibility that some of the pig bones were imported as dressed carcases cannot be entirely ruled out. However, these bones may also have been poorly preserved and the smaller bones in the trotters overlooked during excavation. Consequently the case for such importation of pork is not proven.

CHANGES IN SPECIES REPRESENTATION

Estimates of species importance is very difficult to assess from samples such as Owslebury, where it can be demonstrated that factors such as differential preservation and disposal practices had a major bearing on the relative number of bones of different species recovered.

The overall number of fragments identified to species can be used as a rough guide to the relative importance of the animals. Table Section4.10 lists the percentage of fragments represented for each of the major species by period and context type. In every sample, cattle and sheep/goat were the best represented species. To take the overall figures from each period, sheep/goat fragments were the more numerous, ranging from 39% in the 1st Century A.D. deposits to 48% in the 1st Century B.C. sample. Cattle were best represented (38%) in the 1st-2nd Century A.D. sample but contributed only 29% of the fragments in the 1st Century B.C. deposits. Pig fragments were ranked third in all samples apart from F634 where they were outnumbered by horse. Overall, pig fragments contributed only 9% of the identified sample in the 3rd-4th Century A.D. deposits but formed 14-17% in the earlier assemblages. Horse fragments consistently contributed 4-6% of the samples from each period and unarticulated dog bones between 2-4%. Other species such as deer and hare were found extremely rarely in comparison with the major domestic species.

Although such figures probably do give a broad indication that cattle and sheep/goat were the most important species exploited for food throughout the history of the settlement, they cannot be expected to provide an accurate correlation of exactly what proportion of animals were present. The samples varied too much in their composition for that. Table Section4.10 shows how much such percentages varied within each period. In general, sheep/goat were better represented in pits than in other features. In the Iron Age deposits in particular, the overall relative representation of the species appears to be mainly dependent on the sizes of the samples obtained from different feature types.

Exactly the same pattern of variability was observed at Winnall Down (Maltby 1985b) and at tne banjo enclosure of Micheldever Wood (Griffiths AML Report 2647; Coy AML Report 3288). At both sites cattle bones were better represented in the enclosure ditches than in the pits. As discussed above, this may partially be the result of differential preservation but there were probably also variations in disposal practices for cattle and sheep/goat on these sites.

General comparisons of species representation are beset by problems of incompatability between the samples. The calculations used above simply employed the total number of fragments identified to each species excluding articulated bones. They do not take into account the changes in composition of the assemblages. For example, loose teeth formed a much greater proportion of most 3rd-4th Century A.D. samples and a greater proportion of these belonged to sheep/goat and pig (Table Section4.3; Figure Section4.3). Given the problems of such variations, it is perhaps better to examine the relative representation of pairs of species rather than to attempt to explain changes by examination of them all together.

Cattle and Sheep/Goat

It is unfortunate that the two most important species exploited are the hardest to compare. It has been shown that retrieval standards and preservation conditions favoured the recovery of cattle bones. In addition, it appears that their carcases may often have been butchered in different locations, resulting in substantial variability in their relative representation in different contexts, particularly in Iron Age deposits. Comparisons of the total number of fragments suggested that sheep/goat may have become more important in the late Romano-British period. However, as Figure Section4.6 shows, the increase in the proportion of sheep/goat fragments in those layers was largely due to the presence of a much larger proportion of loose teeth.

It is clear that comparisons of the overall assemblages of cattle and sheep/goat cannot be expected to provide an accurate assessment of the possible ratio of cattle to sheep represented or eaten at the settlement. Calculations based on counts of articular surfaces only - a method used alongside others at Portchester Castle (Grant 1975: 379) and Danebury (Grant 1984a: 498) - are also infeasible at Owslebury since it has been shown that sheep/goat articular surfaces survived less well than cattle and indeed most did not survive at all (Table Section4.4).

In order to obtain more realistic comparisons, only bones of good survival quality, particularly in the sheep/goat sample, have to be considered. As demonstrated in Table Section4.2, the mandible and tibia were preserved consistently in the greatest numbers in the sheep/goat samples and were among the best represented bones in the cattle assemblages. The relative percentages of these bones and those of the radius and metatarsus - two other elements which survived reasonably well in both species - are given in Table Section4.11.

Although the relative percentages of these bones varied, the Iron Age assemblages consistently showed that the pits produced higher percentages of sheep/goat in comparison to cattle than other context types. The tibia sample consistently was made up of over 70% sheep/goat fragments in most samples prior to those of the 3rd-4th Century A.D. Even in those they contributed 67% of the cattle and sheep/goat fragments overall. The radius and metatarsus, on the other hand, both generally produced lower percentages of sheep/goat fragments in the Romano-British samples than in the Iron Age deposits. These figures again may reflect changes in sample preservation and deposition rather than changes in the relative number of animals of these species eaten. Sheep/goat tibia and mandible fragments nearly always survived in greater numbers and these may have been less prone to destruction in the more poorly preserved Romano-British assemblages.

Taking the results from the tibia, which appears to be the most consistently represented element in the deposits, assuming that each tibia fragment represented a different animal, the ratio of sheep/cattle represented was in the order of 3:1 in the earlier periods and 2:1 in the late Romano-British deposits. Such figures should obviously be treated with caution, since it is a major assumption that all the tibiae fragments belonged to different animals. Even these figures may underestimate the real proportion of sheep/goat, since there is some evidence to suggest that sheep/goat tibiae survived less well than cattle tibiae. Certainly more of their articular surfaces had failed to survive (Table Section4.6).

Mandible fragments of sheep/goat and cattle were found in roughly equal numbers, apart from in the 1st Century B.C. deposits, in which sheep/goat dominated, particularly in the pit, F400 (Table Section4.11). However, cattle fragments tended to be more fragmented than those of sheep/goat. Consequently, the figures were to some extent biased towards cattle. Table Section4.12 provides two alternative methods of assessing the relative abundance of these bones in the assemblages. The first method involved the calculation of whole bone equivalents, by adding up the fragment sizes (complete, 75%, 50%, 25%, 10% of the bone). This technique should decrease the problems of differential fragmentation. Percentages of sheep/goat mandibles now increased to 52-72%, with most samples producing figures of less than 60%. The highest percentage of sheep/goat was still obtained from the 1st Century B.C. deposits and the Iron Age deposits continued to display marked variation in the figures obtained from different context types. The percentage of sheep/goat mandible whole bone equivalents decreased slightly in the 3rd-4th Century A.D. deposits.

The second method of calculation involved counting only those mandible fragments which still possessed one or more of the cheek teeth. This method increased the percentage of sheep/goat to 63-82%. The less fragmented sheep/goat mandibles more frequently still possessed teeth. These figures therefore are comparable to those obtained for the tibia. If they do accurately reflect the proportion of sheep/goat and cattle represented, the former outnumbered the latter by 2:1. As Cribb (1985) has illustrated, such figures reflect only the numbers of dead animals represented and do not necessarily indicate that twice as many sheep were kept than cattle.

It appears therefore that sheep were the most common species eaten at Owslebury throughout its history. However, cattle would have provided the most meat, because of their larger carcase size. The results may suggest that sheep were most important during the 1st Century B.C. and that gradually during the Romano-British period, cattle became relatively more important. However, it could be argued that factors of differential disposal and preservation were the major reasons for fluctuations in these figures. If that is the case, there may have been little change in the relative dependence upon cattle and sheep for meat by the inhabitants throughout the life of the settlement.

Comparisons can be made with some other Iron Age and Romano-British collections in Wessex. Since tibiae were comparatively well-preserved, particularly in the sheep/goat samples - albeit usually only as shaft fragments - it was decided that these were the most reliable bones to compare. Table Section4.13 gives the results from a number of samples investigated at the Southampton Faunal Remains Unit. In nearly all cases sheep/goat fragments outnumbered those of cattle. The percentage of sheep/goat tibiae fragments from the Iron Age deposits at Old Down Farm, Balksbury and Winnall Down were comparable with the figures from Owslebury. Some Iron Age and Romano-British assemblages, however, produced figures of over 80% sheep/goat (Little Somborne, Groundwell Farm, Cowdery's Down, Chilbolton Down, Rope Lake Hole, Balksbury - Romano-British deposits). It is possible, therefore that the inhabitants of these settlements relied more heavily on sheep/goat for meat (in a ratio of at least 4:1) than at Owslebury. However, it again should be stressed that even these figures do not take factors of differential disposal, preservation and recovery fully into account.

Only two sites produced more cattle than sheep/goat tibiae. These were the small, and therefore possibly unreliable sample from the late Romano-British levels at Little Somborne and the Phase 12 deposits at Staple Gardens, Winchester (Maltby in prep.). There, sheep/goat fragments formed only 23% of the assemblage. However, this is at least partially the result of differential disposal practices. These deposits included a concentration of cattle upper limb bone fragments that bore distinctive filleting marks. These therefore biased the sample towards cattle. In the remainder of the late Romano-British assemblages at Staple Gardens, 54% of the tibiae fragments belonged to sheep/goat. This figure was still lower than those obtained from other assemblages in Hampshire and it is possible that cattle provided a larger proportion of the meat in the town. However, a much broader series of samples is required from Winchester before this can be confirmed.

Unfortunately it was impossible to compare other sites in Wessex directly with these, either because the samples were too small or because different methods of analysis were used. However, at Danebury it seems that the relative proportion of sheep/goat represented was probably greater than at Owslebury (Grant 1984a: 545). In contrast, the Romano-British deposits at Portchester Castle produced a much higher proportion of cattle bones than usually encountered on contemporary sites in Hampshire (Grant 1975: 379-383).

Cattle and Horse

These species are easier to compare since they are animals of similar size and are thus less susceptible to biases created by differential preservation and recovery. However, some caution must still be paid because it is clear that cattle carcases were generally more heavily exploited for meat. This resulted in the greater fragmentation of their bones than horse (see Section 7).

However, as Table Section4.4 shows, the proportion of loose teeth in the cattle and horse assemblages was fairly similar throughout the deposits, with the larger horse teeth being slightly better represented. This would suggest that their skeletons had suffered similar degrees of destruction from erosion and scavenging. The effects of the variations of the numbers of loose teeth had little effect on the relative percentages of cattle and horse fragments represented. Table Section4.14 compares the percentage of horse fragments against cattle on the basis of the total fragments and the totals excluding loose teeth. The differences were usually only in the order of 1%. The overall percentages of horse ranged from 11-15% including loose teeth and 10-14%, if teeth were excluded. These totals disguise some fluctuations between contemporary deposits but generally the relative proportion of horse was consistently over 10% but less than 20%, using either method of calculation.

Such figures fall within the range commonly recorded from Iron Age sites in Britain, although several sites of that date have produced over 20% horse fragments (Figure Section4.7). In the Romano-British period there is a clear contrast between the amount of horse bones encountered on rural as opposed to urban or military sites. On the latter, horse fragments usually comprise less than 5% of the total number of cattle and horse fragments.

In contrast, nearly all the samples from villas and other rural settlements have produced over 6% horse fragments and usually over 10%. The Owslebury samples fall nicely into this range with a peak of between 10-15% (Figure Section4.7). This reflects an interesting contrast in the redistribution of meat. The towns and the military sites concentrated on the acquisition of cattle as their principal source of meat. Horses appear rarely to have been involved in this trade and this resulted in their low representation on urban and military sites. Horse carcases seem to have been less heavily exploited for meat than cattle in all periods at Owslebury. Meat production was seemingly considered to be of secondary importance to the horse's working qualities.

Cattle and Pig

There were again greater problems in comparing these species because of differential preservation and disposal. Generally loose teeth provided a greater proportion of the pig assemblage than cattle but there were quite a number of samples which did not fall into this pattern (Table Section4.3). The impression gained was that the pig assemblage survived relatively consistently apart from many of the 3rd-4th Century A.D. deposits, in which there was a marked decline in the survival of many of the more fragile elements, particularly the limb bone articular surfaces (Table Section4.4).

Table Section4.15 compares the relative number of pig and cattle fragments including and excluding loose teeth. Differences in the calculations were usually less than 3% with cattle generally being better represented when loose teeth were omitted from the totals. Excluding loose teeth, pig fragments contributed 32-33% of the overall total of cattle and pig fragments in the Iron Age and 1st Century A.D. deposits. This figure fell to 28% in the 1st-2nd Century A.D. deposits and dramatically to 17% in the 3rd-4th Century A.D. contexts.

There were, however, significant variations in these figures between different contexts. Pigs were usually better represented in the pits and quarries than in contemporary ditches, although this was not true for the 3rd-4th Century A.D. deposits. Also some ditches, notably F370, contained a higher proportion of pig bones (especially in Sections 10-12) than others. These variations may reflect the fact that the carcases of these animals of different sizes were sometimes butchered in different locations and this resulted in a greater degree of intra-site variability.

Tables Section4.16-17 show the results of calculations of the comparative representation of mandibles and humeri of pig and cattle. Simple comparison of the number of fragments brought an overall range of 22-46% pig mandibles (Table Section4.16). Calculations of whole bone equivalents generally increased the proportion of pig (24-49%). Counts of only those mandibles with some surviving cheek teeth saw an increase in the percentage of pig to 46-66% (Table Section4.17). In each case the lowest figure for pig was obtained from the 3rd-4th Century A.D. deposits and the highest from the 1st Century B.C. deposits. The latter figures were at least 10% higher than any of the equivalent calculations for any of the periods. They reflect the unusually high representation of pig mandibles in quarry contexts and the low number of cattle mandibles in the pit, F400.

The higher proportion of pig mandibles with cheek teeth may be a reflection of the fact that that particular area of the bone is probably more robust in the pig than cattle. Consequently pig cheek teeth tend to be retained more frequently. The whole bone equivalent may provide a closer reflection of the true relative abundance of pig and cattle present. If so, cattle were represented in a ratio of over 2:1 in most of the Iron Age and Romano-British samples but this increased to 3:1 in the 3rd-4th Century A.D. deposits.

The apparent decline in the relative abundance of pig in the late Romano-British period is also reflected by other bones. Table Section4.16 also compares the number of cattle and pig humeri fragments. Pig fragments ranged from 39-44% in the overall totals from the Iron Age and Early Romano-British deposits. This figure decreased to 24% in the 3rd-4th Century A.D. contexts. Most of the other pig elements did not survive in sufficient quantities to make similar comparisons but most appear to have been less well represented in the late deposits. Some of this decline could be the result of much poorer preservation of pig bones in the later features (Table Section4.4) but even the sturdiest bones, such as the mandible showed a similar decrease. Consequently there is some support for the view that pigs became less important at Owslebury in the late Romano-British period.

Table Section4.18 compares the number of fragments identified to cattle and pig on various sites in Wessex. Comparisons of such figures must be treated with caution since the preservation and constitution of pig samples can be so variable (Coy 1985). For example, the figures from Danebury include bones from articulated skeletons. Relatively few of the samples produced more than 30% pig fragments and therefore they were comparatively well represented at Owslebury. None of the samples from Hampshire rural sites produced as high a figure, apart from Danebury. Even there, the relative proportion of pig fragments had declined in the Late Phase (b) to levels comparable with the contemporary 3rd-2nd Century B.C. levels at Owslebury.

A few Wessex sites have, however, produced high levels of pig, notably Groundwell Farm, Wiltshire, Cleavel Point, Dorset, Fishbourne, Sussex and some of the samples from Silchester and Winchester. In the case of the first three settlements, the high percentage of pig may be explained by ecological conditions that were favourable to pigs - i.e. sufficient amounts of suitable woodland - (Coy 1985). High levels of pig in some urban samples may suggest that more emphasis was placed on pork by the inhabitants of towns. On most of the sites where samples dated both to the early and late Romano-British periods were encountered the proportion of pig declined in relation to cattle in the latter period, as at Owslebury. It is not as yet clear how much of this change can be ascribed to factors of differential preservation or disposal at these sites. However, we may tentatively suggest that relatively fewer pigs were eaten in the late Romano-British period in the area.

Sheep/Goat and Pig

Table Section4.19 shows the percentages of pig amongst the total pig and sheep/goat fragments from the various periods at Owslebury. Generally sheep/goat assemblages contained more loose teeth and pig was usually better represented if these were omitted from the calculations. The results showed that pigs were best represented in the 1st Century A.D. deposits and least well in the 3rd-4th Century A.D. contexts. There was comparatively little variation in the relative abundance of these species in different context types apart from in the 3rd-2nd Century B.C. where pig bones were less common in the pits and F55 than in other features. The similarities in the sizes of pig and sheep carcases may have resulted in similar butchery processes often practised in the same locations.

However, once again overall fragment totals do not provide the most reliable guide to changes in the relative abundance of these species through time. Certain pig bones were consistently more poorly represented (e.g. radii and metapodials) than other bones. This tended to produce low overall figures for pig since the equivalent bones were well represented in the sheep/goat assemblages. The relative percentages of the three best represented pig elements (excluding skull fragments and loose teeth) are given in Table Section4.20. In each case pig fragments were identified most frequently in the 1st Century A.D. deposits and then declined in the later deposits. Pig tibiae fragments were consistently more poorly represented than humeri and mandibles. It is not clear why. One possibility is that sheep/goat tibiae fragments are more easily identifiable, although this cannot explain all the discrepancy. It is not thought that differential preservation could be a major cause since the shafts of pig tibiae are also quite sturdy. It is perhaps possible that since more pig tibiae survived as small fragments (40% consisted of <25% of the bone) than sheep/goat (only 25% consisted of <25% of the bone), a greater proportion may have been overlooked during excavation. There is also the possibility that the lower limbs of pigs were under-represented because dressed carcases were sometimes imported. However, although pig metapodials were poorly represented, their phalanges were reasonably common and certainly not under-represented in comparison to sheep/goat phalanges. Grant (1975a: 514-515) found the same discrepancy at Danebury.

The relative percentages of pig mandibles derived from calculations of whole bone equivalents and by counts of specimens with surviving cheek teeth are given in Table Section4.21. Both methods showed pig percentages to be at their highest in samples of early Romano-British date. These figures again decresed in the 3rd-4th Century A.D. deposits.

The various calculations therefore all suggest that pigs became less important in relation to sheep at Owslebury in the latter half of the Romano-British period. The greatest proportion of pork appears to have been consumed in the 1st Century A.D. Comparisons of the total number of fragments of sheep/goat and pig were made with the same Wessex assemblages studied in Table Section4.18. (Table Section4.22). Once again such comparisons are open to biases created by many factors and should only be treated as a general guide. The percentage of pig fragments from Iron Age deposits at Owslebury (23-25% overall) was greater than most of the contemporary chalkland samples, most of which produced figures for pig fragments of under 20%. The proportion of pig in the 1st Century A.D. deposits at Owslebury (31%) was comparable with the sample obtained from phases 3-4 at the banjo enclosure at Micheldever Wood but substantially higher than other contemporary rural settlements in Hampshire including Winnall Down. Indeed it is not until the 3rd-4th Century A.D. deposits than pig (16%) fell to a level comparable with many of the other sites.

Most samples from Romano-British urban sites in the area and elsewhere have produced greater proportions of pig. They were also extremely well represented in relation to sheep/goat at Fishbourne, Portchester Castle and Cleavel Point. King (1978; 1984) has shown that "Romanised" settlements tend to produce a greater proportion of pig bones. The influence of the urban meat markets may have resulted in the greater demand for pork than lamb or mutton in towns.

Sheep and Goat

It was possible to distinguish sheep from goat by examining morphological differences present on several elements of the skeleton (Boessneck et al. 1964). The most frequently distinguished bones were the metapodia, skull fragments (particularly the frontal, parietal and occipital), distal humerus, radius, distal scapula, proximal femur and calcaneus. Since many of these bones consisted merely of shaft fragments, only a small proportion could be assigned to one species or the other. In addition, separation was hampered by the large proportion of bones of immature animals, in which the diagnostic features used for identification had not fully developed.

However, excluding articulated bones and material from the cess pits and F724, 1,032 ovicaprid bones were assigned specifically to sheep or goat. Only 40 of these belonged to goat (Table Section4.23). Most of these were recovered from 3rd-2nd Century B.C. deposits, in which 15% of the bones specifically identified belonged to goat. However, there was a marked contrast in their distribution. Only four bones identified as goat were recovered from the pits but 18 were found in various sections of the enclosure ditch, F55. In the same featues 60 and 46 bones respectively were identified as sheep. The enclosure ditch was of slightly earlier date than the pits and it is possible that more goats were kept in the very earliest phase of the settlement. However, as will be demonstrated in Section 5, the ageing evidence obtained from F55 suggested that much fewer lamb (and kid) carcases were deposited in that ditch in comparison with the pits. Several of the goat bones consisted of sets of radii, ulnae and humeri which bore evidence of butchery. Although not all of these necessarily belonged to adult animals, they belonged to goats of a size and age suitable for culling for their meat. F55 and other contemporary ditches appear to have been used more frequently for the disposal of bones derived from the processing of carcases of larger (i.e. cattle and horse) and older animals (of all species). The scarcity of goat bones in the pits may imply that much fewer very young goats than sheep were killed (or died through natural causes at the settlement).

It is also possible that in fact very few goats were kept by the inhabitants of Owslebury but were occasionally imported for slaughter for meat.

In the subsequent centuries it appears that goats were not kept at all at Owslebury. Only one bone was identified in a 1st Century A.D. deposit, whereas sheep bones were recognised in abundance. In the later Romano-British period, a few goat bones were identified but they still formed less than 5% of the ovicaprid sample (Table Section4.23).

It has generally been considered that goats were of little importance in the economy of Iron Age and Roman Britain, since their bones have been found only rarely in settlements of those dates. (Maltby 1981a: 159-160; Grant 1984b: 113). In general, the evidence from Owslebury supports this interpretation. However, the 3rd-2nd Century A.D. deposits produced more bones identified to goat than any of the contemporary Iron Age sites investigated to date in Wessex. It is an interesting point, however, that the majority of the bones retrieved from those sites came from pits. Had only the pits been excavated at Owslebury, a similar picture would have emerged. In this respect it should be noted that two of the three goat bones identified in Early Iron Age deposits at Winnall Down were found in the enclosure ditch at that settlement. If such a trend is typical, goats may well be under-represented from excavations that have not sampled features near the periphery of the settlement.

Sheep/Goat and Horse

It is not proposed to discuss the relative proportion of these species in detail since their assemblages are very difficult to compare. Horse bones were generally less fragmented and also survived better than those of sheep/goat and this makes accurate assessment of their relative abundance very difficult. As a general rule, contexts where cattle were poorly represented in relation to sheep, were also ones where horse bones were less common, particularly in Iron Age deposits (Table Section4.10). This again may be related to the fact that their carcases were often processed in different locations.

Pig and Horse

The smaller sample sizes of these species meant that their relative abundance could only be compared at a superficial level. Excluding articulated bones, pig fragments were found consistently in greater numbers than those of horse in all periods (Table Section4.10). In most periods their samples included similar proportions of loose teeth but the percentage of pig loose teeth in the 3rd-4th Century A.D. deposits increased to a greater extent than horse which may suggest that pig bones were more severely affected by the poorer preservation conditions (Table Section4.3). This could partially explain the relative decline in the ratio of pig to horse in that period. On the other hand, as it appears that pigs declined in importance in comparison to sheep and cattle at this period, it is conceivable that they declined in proportion to horse as well.

The ratio of pigs to horse is in fact higher at Owslebury than on many Iron Age and rural Romano-British settlements in Wessex. At Winnall Down, Balksbury, Old Down Farm, the Iron Age and Romano-British sites at Little Somborne, Chilbolton Down and Cowdery's Down, horse fragments were found more frequently than those of pig (see Table Section4.18 for references to these sites). Although such comparisons may be subject to bias by factors of differential preservation and disposal, there is a marked contrast between figures obtained from the sites above and those from Owslebury, the banjo enclosure in Micheldever Wood, Danebury, Groundwell Farm, Rope Lake Hole, Cleavel Point and all of the urban Romano-British samples, in which horse bones are much less well represented. In the majority of these cases it seems that the contrast is the result of a greater emphasis on pigs rather than unusually low levels of horse. On most of these sites (apart from those from towns) the relative proportion of horse to cattle was not correspondingly low. Once again it is possible that ecological factors may have played an important part in establishing the importance of pigs for the inhabitants of these settlements. Settlements located near suitable woodland may have relied more heavily on pigs for meat.

Dogs

Assessments of the relative importance of dogs in the various periods at Owslebury are complicated by the fact that, unlike the other major domestic species, most of their carcases do not appear to have been processed for meat. Consequently, a much larger proportion of their bones were found in articulated groups (Tables Section4.9-10). Consequently the low percentage of their unarticulated bones (Table Section4.10) may not be a true reflection of their importance. Conversely, since their carcases were usually less disturbed by butchery and seemingly more often buried immediately or soon after death, their bones survived better than many of those of the other domestic mammals. This is reflected in the relatively low percentage of shaft fragments even amongst their unarticulated major limb bones (Table Section4.4) and by the fact that a greater proportion of their bones were complete or substantially complete. These factors would have increased the chances of the survival and recovery of dog bones.

It is clear that dogs were kept by the inhabitants throughout the life of the settlement. The presence of bones of newborn puppies in all periods indicates that dogs were breeding there. The fact that large numbers of puppies were found in the cess pits (Table Section4.9) suggests that the population of dogs had to be controlled with some litters being put down at birth. Apart from the high frequency of dog skeletons in the 3rd-4th Century A.D. cess pits, the frequency of occurrence of articulated dog bones remained fairly stable throughout the different periods.

Conclusions

The previous analysis has taken into account some of the biases that affect species representation in archaeological samples. It is still possible, however, that the following conclusions may have to be amended when our knowledge of taphonomic processes and other causes of sample bias has improved. In particular, the Iron Age deposits produced such variable assemblages than conclusions about species representation must remain tentative. The following seven general conclusions about species representation can be made.

1) Cattle provided the most meat throughout the settlement's history.
2) Sheep were the most common species kept and eaten and were represented probably by three times as many animals as cattle in most periods.
3) There is, however, some evidence that sheep became gradually slightly less important in relation to cattle during the Romano-British period.
4) Pigs were comparatively well represented at Owslebury but declined in importance in relation to all the other major domestic species in the late Romano-British period.
5) Horses were represented in numbers typical of other Iron Age and rural Romano-British settlements but their carcases were not as heavily exploited as those of cattle.
6) Dogs were kept throughout the settlement's history but were rarely eaten.
7) Goat bones were recorded in some numbers in certain 3rd-2nd Century B.C. deposits but goats may then not have been kept at all during the late Iron Age and early Romano-British periods. Thereafter they were present only in small numbers.

The significance of these conclusions in relation to other Iron Age and Romano-British sites will be discussed in Section 10. However, a full understanding of the variations in species representation must also take into account ageing, metrical and butchery data. These will be the subjects of the next three sections.

TABLE SECTION4.1

Animal Bone Fragments Recorded in Owslebury Deposits by Period

Date	Pits	Ditches	Quarries	Tracks	Other	Total
3rd-2nd B.C.	5851	4851	1301	-	-	12003
1st B.C.	1527	1863	2932	-	71	6393
1st A.D.	1657	20339	1321	4939	-	28256
1st-2nd A.D.	-	11522	1061	-	1306	13889
3rd-4th A.D.	8759	23634	2886	3589	956	39824
Mixed		1850	1111		733	3694
TOTAL	17794	64059	10612	8528	3066	104059

Total includes articulated bones and unidentifiable fragments.

TABLE COWFRAG.1

Fragments of Cattle Represented at Owslebury

a) 3rd-2nd Century B.C. Deposits

Cattle	Pits	F55	Other Ditches	Quarries (F236)	Total
Skull frags.	57	74	41	18	190
Mandible	43	124	39	19	227
Hyoid	1	-	-	-	1
Loose teeth	96	158	49	40	343
Scapula	18	37	15	13	83
Humerus	4	35	8	9	56
Radius	5	20	6	8	39
Ulna	3	12	5	6	26
Os Coxae	7	18	9	3	37
Femur	7	26	12	8	53
Patella	-	1	-	1	2
Tibia	17	31	13	10	71
Carpals	1	-	3	1	5
Calcaneus	2	13	4	9	28
Astragalus	4	5	3	2	14
Centroquartal	1	4	1	-	6
Other tarsals	1	1	-	-	2
Metacarpal	12	20	11	8	51
Metatarsal	12	20	4	-	39
Metapodial	2	1	1	-	4
1st Phalanx	4	11	7	2	24
2nd Phalanx	1	1	4	2	8
3rd Phalanx	1	-	1	-	2
Sesamoids	-	1	-	-	1
Ribs	3	2	-	-	5
Sternebrae	-	1	-	-	1
Cervical verts.	6	10	4	8	28
Thoracic verts.	6	2	1	4	13
Lumbar verts.	5	15	1	4	25
Sacrum	2	2	1	-	5
Caudal verts.	-	1	-	-	1
TOTAL	323	646	243	178	1390

TABLE COWFRAG.1(CONT.)

Fragments of Cattle Represented at Owslebury

b) 1st Century B.C. Deposits

Cattle	Pits (F400)	Gullies	Quarries	Total
Skull frags.	50	65	93	208
Mandible	2	40	48	90
Hyoid	2	-	2	4
Loose teeth	16	89	63	168
Scapula	8	31	15	54
Humerus	2	18	15	35
Radius	4	19	18	41
Ulna	2	15	8	25
Os Coxae	6	22	19	47
Femur	4	11	8	23
Patella	-	-	1	1
Tibia	1	17	17	35
Carpals	-	2	3	5
Calcaneus	-	2	5	7
Astragalus	2	2	1	5
Centroquartal	-	2	1	3
Metacarpal	2	13	5	20
Metatarsal	5	12	10	27
Metapodial	2	3	5	10
1st Phalanx	1	7	2	10
2nd Phalanx	1	4	3	8
3rd Phalanx	1	-	1	2
Sesamoids	-	1	1	2
Ribs	1	1	1	3
Cervical verts.	-	13	14	27
Thoracic verts.	-	5	1	6
Lumbar verts.	1	2	4	7
Sacrum	1	2	3	6
Caudal verts.	-	1	-	1
TOTAL	114	399	367	880

TABLE COWFRAG.1(CONT.)

Fragments of Cattle Represented at Owslebury

c) 1st Century A.D. Ditches

Cattle	F75	F132	F133	F370	F642	Other Ditches
Skull frags.	33	129	129	201	192	98
Mandible	40	78	116	160	126	78
Hyoid	-	1	-	4	1	1
Loose teeth	54	116	159	239	181	128
Scapula	21	23	25	60	51	41
Humerus	11	22	21	31	40	21
Radius	13	11	19	16	37	19
Ulna	9	11	6	14	34	14
Os Coxae	13	17	19	25	24	17
Femur	11	10	17	27	35	23
Patella	1	-	1	-	4	2
Tibia	17	13	12	36	26	22
Carpals	1	7	3	8	22	2
Calcaneus	7	3	3	6	10	9
Astragalus	6	2	8	7	11	11
Centroquartal	2	4	7	3	3	3
Other tarsals	1	1	2	2	4	-
Metacarpal	11	12	22	17	27	23
Metatarsal	18	23	22	28	44	28
Metapodial	1	6	1	7	12	3
1st Phalanx	9	12	11	15	15	17
2nd Phalanx	-	1	4	16	12	6
3rd Phalanx	-	-	1	10	4	3
Sesamoids	-	2	1	4	2	1
Ribs	1	1	5	2	5	1
Cervical verts.	9	11	15	21	31	9
Thoracic verts.	3	11	4	6	11	12
Lumbar verts.	7	2	6	11	18	4
Sacrum	2	-	2	4	5	-
Caudal verts.	-	1	2	1	1	2
TOTAL	301	530	643	981	988	598

F75 = layers 1-4 only
F132 = layers 2-6 only
F133 = layers 1-2 only
F642 = layers 1-4 only

TABLE COWFRAG.1 (CONT.)

Fragments of Cattle Represented at Owslebury

d) Other 1st Century A.D. Deposits

Cattle	Pits	Quarries	Tracks	Total*
Skull frags.	15	29	114	940
Mandible	23	31	115	767
Hyoid	-	-	-	7
Loose teeth	42	52	182	1153
Scapula	4	9	73	307
Humerus	2	6	61	215
Radius	1	9	31	156
Ulna	5	6	23	122
Os Coxae	6	11	37	169
Femur	6	6	33	168
Patella	-	-	-	8
Tibia	5	8	40	179
Carpals	-	1	16	60
Calcaneus	3	2	13	56
Astragalus	-	1	11	57
Centroquartal	-	1	3	26
Other tarsals	1	1	2	14
Metacarpal	5	5	42	164
Metatarsal	7	5	34	209
Metapodial	1	2	4	37
1st Phalanx	5	2	21	107
2nd Phalanx	1	-	11	51
3rd Phalanx	1	-	5	24
Sesamoids	2	-	2	14
Ribs	1	3	-	19
Sternebrae	-	-	1	1
Cervical verts.	10	11	16	133
Thoracic verts.	-	3	8	58
Lumbar verts.	-	-	10	58
Sacrum	-	2	7	22
Caudal verts.	-	-	-	7
TOTAL	146	206	915	5308

* Total includes all 1st Century A.D. deposits, including ditches.

TABLE COWFRAG.1 (CONT.)

Fragments of Cattle Represented at Owslebury

e) 1st-2nd Century A.D. Deposits

Cattle	F133	F642	Other Ditches	Other 1st-2nd	2nd C. Quarries	Other 2nd C.	Total
Skull frags.	188	61	26	11	11	4	301
Mandible	182	103	40	7	23	11	366
Hyoid	1	-	1	2	-	-	4
Loose teeth	324	170	72	12	42	14	634
Scapula	55	32	22	4	17	4	134
Humerus	37	28	8	-	3	3	79
Radius	33	14	16	-	9	2	74
Ulna	15	16	6	2	10	5	54
Os Coxae	23	22	12	2	5	7	71
Femur	37	18	8	3	8	3	77
Patella	3	2	-	-	-	-	5
Tibia	32	22	8	-	5	3	70
Carpals	16	16	5	-	1	2	40
Calcaneus	9	4	5	-	7	2	27
Astragalus	9	7	2	-	2	2	22
Centroquartal	11	6	2	1	1	1	22
Other tarsals	4	6	-	-	-	1	11
Metacarpal	37	25	7	1	5	3	78
Metatarsal	59	22	11	2	6	3	103
Metapodial	14	4	3	-	1	1	23
1st Phalanx	37	21	9	-	2	-	69
2nd Phalanx	20	13	5	-	-	-	38
3rd Phalanx	13	5	1	-	-	-	19
Sesamoids	3	2	-	-	-	-	5
Ribs	5	1	2	-	3	-	11
Cervical verts.	6	11	7	1	7	-	32
Thoracic verts.	8	7	1	-	-	-	16
Lumbar verts.	9	6	4	1	5	-	25
Sacrum	4	3	-	-	-	-	7
TOTAL	1194	647	283	49	173	71	2417

F133 = layers 3-4 only
F642 = layers 5-6 only

TABLE COWFRAG.1 (CONT.)

Fragments of Cattle Represented at Owslebury

f) 3rd-4th Century A.D. Cess Pits

Cattle	F632	F646	F650	F664	F724	Total*
Skull frags.	6	15	3	27	17	68
Mandible	5	1	6	6	47	65
Hyoid	-	-	-	-	1	1
Loose teeth	22	11	14	24	38	109
Scapula	6	1	6	2	7	22
Humerus	2	-	3	6	4	15
Radius	1	3	2	2	7	15
Ulna	-	-	1	4	5	10
Os Coxae	4	-	4	10	4	22
Femur	3	1	10	6	11	31
Patella	-	-	1	-	1	2
Tibia	3	1	3	4	15	26
Carpals	-	-	2	-	3	5
Calcaneus	2	1	4	1	6	14
Astragalus	1	-	3	-	7	11
Centroquartal	1	-	3	-	5	9
Other tarsals	1	-	4	-	5	10
Metacarpal	1	3	1	2	3	10
Metatarsal	4	1	5	-	5	15
Metapodial	-	-	-	-	1	1
1st Phalanx	2	1	6	-	12	21
2nd Phalanx	1	1	4	-	10	16
3rd Phalanx	1	-	-	-	5	6
Ribs	-	1	1	6	30	38
Cervical verts.	1	3	6	8	19	37
Thoracic verts.	-	-	6	4	18	28
Lumbar verts.	1	-	4	5	10	20
Sacrum	-	-	2	2	4	8
Caudal verts.	-	-	-	-	2	2
TOTAL	68	44	104	119	302	637

* includes articulated bones

TABLE COWFRAG.1(CONT.)

Fragments of Cattle Represented at Owslebury

g) 3rd-4th Century A.D. Ditches

Cattle	F75	F133	F634	F642	Other Ditches
Skull frags.	13	92	47	98	48
Mandible	26	182	54	99	79
Hyoid	1	6	-	4	-
Loose teeth	98	494	129	228	138
Scapula	25	51	32	44	31
Humerus	17	39	25	39	21
Radius	8	44	22	36	22
Ulna	10	44	10	19	13
Os Coxae	5	39	14	22	15
Femur	11	34	26	26	11
Patella	1	4	2	1	3
Tibia	16	39	33	32	21
Carpals	1	24	1	8	8
Calcaneus	9	25	12	14	12
Astragalus	5	26	11	9	6
Centroquartal	5	12	7	5	3
Other tarsals	1	10	4	6	1
Metacarpal	5	45	16	19	13
Metatarsal	13	40	20	35	24
Metapodial	1	3	6	7	1
1st Phalanx	13	44	11	14	15
2nd Phalanx	2	11	-	8	4
3rd Phalanx	2	6	1	4	3
Sesamoids	-	4	1	2	2
Ribs	1	2	2	13	2
Cervical verts.	3	30	23	28	7
Thoracic verts.	3	20	7	18	3
Lumbar verts.	4	6	6	12	3
Sacrum	1	1	1	7	3
TOTAL	300	1377	523	857	512

F75 = layers 5-8 only
F133 = layers 5-8 only
F642 = layers 7-14 only

TABLE COWFRAG.1(CONT.)

Fragments of Cattle Represented at Owslebury

h) 3rd-4th Century A.D. Other Deposits

Cattle	Other Pits	F150	Quarries	Other	Total*
Skull frags.	5	39	26	3	371
Mandible	18	54	51	3	566
Hyoid	1	-	-	-	12
Loose teeth	27	162	98	41	1415
Scapula	15	29	15	7	249
Humerus	11	12	8	5	177
Radius	10	20	10	2	174
Ulna	11	12	5	3	127
Os Coxae	7	20	12	1	135
Femur	6	15	12	1	142
Patella	-	1	1	-	13
Tibia	17	19	11	2	190
Carpals	4	5	3	-	54
Calcaneus	6	4	3	-	85
Astragalus	8	10	4	1	80
Centroquartal	4	3	2	1	42
Other tarsals	4	1	2	-	29
Metacarpal	6	13	8	3	128
Metatarsal	3	29	9	9	182
Metapodial	-	5	1	2	26
1st Phalanx	6	16	2	1	122
2nd Phalanx	7	6	3	-	41
3rd Phalanx	1	-	1	-	18
Sesamoids	1	-	-	1	11
Ribs	-	3	1	1	25
Cervical verts.	14	9	3	-	117
Thoracic verts.	2	1	3	1	58
Lumbar verts.	6	3	1	1	42
Sacrum	2	-	-	-	15
TOTAL	202	491	295	89	4646

* Total includes ditches but excludes cess pits

TABLE S/GFRAG.1

Fragments of Sheep/Goat Represented at Owslebury

a) 3rd-2nd Century B.C. Deposits

Sheep/Goat	Pits	F55	Other Ditches	Quarries (F236)	Total
Skull frags.	74	49	24	14	161
Mandible	72	81	34	17	204
Hyoid	4	1	1	-	6
Loose teeth	323	244	73	97	737
Scapula	13	10	6	1	30
Humerus	41	22	11	2	76
Radius	55	52	23	12	142
Ulna	23	11	3	4	41
Os Coxae	17	8	10	3	38
Femur	38	26	17	7	88
Patella	1	-	-	2	3
Tibia	74	63	42	16	195
Carpals	2	3	-	1	6
Calcaneus	5	4	3	-	12
Astragalus	11	3	6	1	21
Centroquartal	-	-	-	1	1
Other tarsals	1	-	-	-	1
Metacarpal	25	14	9	7	55
Metatarsal	51	46	22	9	128
Metapodial	3	5	2	4	14
1st Phalanx	16	14	12	8	50
2nd Phalanx	8	5	-	3	16
3rd Phalanx	1	-	3	1	5
Ribs	16	3	1	-	20
Sternebrae	3	-	1	-	4
Cervical verts.	17	3	2	3	25
Thoracic verts.	5	4	1	3	13
Lumbar verts.	5	3	5	2	15
TOTAL	904	674	311	218	2107

TABLE S/GFRAG.1(CONT.)

Fragments of Sheep/Goat Represented at Owslebury

b) 1st Century B.C. Deposits

Sheep/Goat	Pits (F400)	Gullies	Quarries	Total
Skull frags.	11	30	93	134
Mandible	45	63	94	202
Hyoid	1	-	6	7
Loose teeth	98	150	209	457
Scapula	4	6	12	22
Humerus	11	12	23	46
Radius	35	15	48	98
Ulna	2	2	6	10
Os Coxae	3	5	18	26
Femur	9	9	33	51
Patella	-	1	4	5
Tibia	37	34	62	133
Carpals	-	2	6	8
Calcaneus	2	3	6	11
Astragalus	3	5	7	15
Centroquartal	-	1	2	3
Metacarpal	15	12	27	54
Metatarsal	22	17	33	62
Metapodial	1	1	5	7
1st Phalanx	1	7	12	20
2nd Phalanx	2	1	5	8
3rd Phalanx	-	-	2	2
Sesamoids	-	2	-	2
Ribs	1	1	8	10
Cervical verts.	1	6	6	13
Thoracic verts.	-	1	1	2
Lumbar verts.	-	3	6	9
Caudal verts.	-	-	2	2
TOTAL	304	389	737	1430

TABLE S/GFRAG.1(CONT.)

Fragments of Sheep/Goat Represented at Owslebury

c) 1st Century A.D. Ditches

Sheep/Goat	F75	F132	F133	F370	F642	Other Ditches
Skull frags.	30	35	97	116	94	50
Mandible	48	78	76	122	105	116
Hyoid	2	2	-	2	2	1
Loose teeth	138	151	169	382	246	327
Scapula	5	5	3	13	16	4
Humerus	17	12	18	27	27	23
Radius	16	22	27	39	37	26
Ulna	5	7	2	15	4	3
Os Coxae	8	4	9	20	18	12
Femur	13	16	16	33	27	17
Patella	-	2	2	-	2	-
Tibia	32	36	47	85	70	67
Carpals	-	2	3	-	5	-
Calcaneus	3	1	4	5	6	7
Astragalus	3	6	9	7	7	3
Centroquartal	-	2	3	4	5	-
Other tarsals	-	-	-	1	1	-
Metacarpal	11	14	16	35	35	25
Metatarsal	12	19	33	39	35	30
Metapodial	1	1	4	2	4	2
1st Phalanx	2	11	22	16	15	17
2nd Phalanx	3	5	9	8	15	3
3rd Phalanx	-	3	5	1	5	2
Sesamoids	1	-	-	-	1	-
Ribs	5	3	7	11	5	4
Sternebrae	-	-	-	1	-	-
Cervical verts.	12	5	2	20	11	10
Thoracic verts.	4	3	3	10	7	6
Lumbar verts.	2	3	7	9	7	3
Sacrum	-	1	1	2	2	-
Caudal verts.	-	-	1	-	1	1
TOTAL	373	449	595	1025	815	759

F75 = layers 1-4 only
F132 = layers 2-6 only
F133 = layers 1-2 only
F642 = layers 1-4 only

TABLE S/GFRAG.1(CONT.)

Fragments of Sheep/Goat Represented at Owslebury

d) Other 1st Century A.D. Deposits

Sheep/Goat	Pits	Quarries	Tracks	Total*
Skull frags.	29	22	85	558
Mandible	28	42	129	744
Hyoid	1	-	1	11
Loose teeth	160	129	381	2083
Scapula	4	5	21	86
Humerus	11	11	36	182
Radius	14	11	60	252
Ulna	3	1	7	47
Os Coxae	5	1	32	109
Femur	6	11	31	170
Patella	1	-	6	13
Tibia	24	25	100	486
Carpals	3	-	5	18
Calcaneus	3	3	7	39
Astragalus	3	1	5	44
Centroquartal	1	2	4	21
Other tarsals	-	-	-	2
Metacarpal	10	9	32	187
Metatarsal	21	11	65	255
Metapodial	1	-	5	20
1st Phalanx	5	7	18	113
2nd Phalanx	-	6	12	61
3rd Phalanx	1	2	2	21
Sesamoids	1	-	1	4
Ribs	3	1	10	49
Sternebrae	-	-	-	1
Cervical verts.	3	3	14	80
Thoracic verts.	1	3	6	43
Lumbar verts.	1	1	4	37
Sacrum	-	-	-	6
Caudal verts.	-	1	1	5
TOTAL	343	308	1080	5747

* Total includes all 1st Century A.D. deposits, including ditches.

TABLE S/GFRAG.1(CONT.)

Fragments of Sheep/Goat Represented at Owslebury

e) 1st-2nd Century A.D. Deposits

Sheep/Goat	F133	F642	Other Ditches	Other 1st-2nd	2nd C. Quarries	Other 2nd C.	Total
Skull frags.	90	24	36	7	6	2	165
Mandible	162	98	38	8	21	5	332
Hyoid	3	-	2	1	1	-	7
Loose teeth	432	272	146	22	85	47	1004
Scapula	10	2	4	2	3	1	22
Humerus	40	16	9	5	8	3	81
Radius	55	37	18	2	8	6	126
Ulna	6	10	2	2	2	-	22
Os Coxae	12	15	6	-	1	1	35
Femur	22	17	10	4	2	2	57
Patella	1	-	1	-	-	-	2
Tibia	92	44	30	12	31	11	220
Carpals	6	3	1	-	-	-	10
Calcaneus	11	5	2	1	2	1	22
Astragalus	14	4	1	-	2	-	21
Centroquartal	-	2	-	-	-	-	2
Other tarsals	1	-	-	-	1	-	2
Metacarpal	39	27	20	2	5	4	97
Metatarsal	39	28	12	5	10	8	102
Metapodial	5	1	-	-	-	1	7
1st Phalanx	28	11	8	1	2	3	53
2nd Phalanx	8	4	2	-	2	1	17
3rd Phalanx	2	4	2	-	2	-	10
Sesamoids	1	-	-	-	-	-	1
Ribs	4	2	-	1	1	-	8
Cervical verts.	7	5	4	-	-	-	16
Thoracic verts.	7	4	1	1	2	-	15
Lumbar verts.	9	4	1	-	1	-	15
Sacrum	1	-	-	-	1	-	2
Caudal verts.	2	-	-	-	-	-	2
TOTAL	1109	639	356	76	199	96	2475

F133 = layers 3-4 only
F642 = layers 5-6 only

TABLE S/GFRAG.1(CONT.)

Fragments of Sheep/Goat Represented at Owslebury

f) 3rd-4th Century A.D. Cess Pits

Sheep/Goat	F632	F646	F650	F664	F724	Total*
Skull frags.	-	16	50	4	13	83
Mandible	9	9	25	12	17	72
Hyoid	-	4	17	5	-	26
Loose teeth	38	18	57	27	30	170
Scapula	1	-	7	-	2	10
Humerus	4	1	11	-	3	19
Radius	3	7	19	1	4	34
Ulna	-	-	12	-	-	12
Os Coxae	1	-	13	-	2	16
Femur	3	-	21	1	2	27
Patella	-	2	6	-	-	8
Tibia	8	2	18	2	9	39
Carpals	1	31	28	5	2	67
Calcaneus	1	3	9	3	-	16
Astragalus	-	4	7	2	1	14
Centroquartal	-	5	10	5	3	23
Other tarsals	-	4	4	6	2	16
Metacarpal	6	11	18	11	6	52
Metatarsal	9	15	27	13	10	74
Metapodial	-	11	13	1	-	25
1st Phalanx	2	39	77	24	15	157
2nd Phalanx	4	31	57	20	11	123
3rd Phalanx	-	30	48	16	7	101
Ribs	3	2	130	-	-	135
Costal carts.	-	-	4	-	-	4
Sternebrae	1	-	9	-	-	10
Cervical verts.	-	-	43	1	-	44
Thoracic verts.	3	-	60	-	-	63
Lumbar verts.	-	-	38	-	1	39
Sacrum	-	-	6	-	-	6
Caudal verts.	-	-	13	-	-	13
TOTAL	97	266	881	185	150	1579

* includes articulated bones

TABLE S/GFRAG.1(CONT.)

Fragments of Sheep/Goat Represented at Owslebury

g) 3rd-4th Century A.D. Ditches

Sheep/Goat	F75	F133	F634	F642	Other Ditches
Skull frags.	6	34	30	62	22
Mandible	26	183	29	136	69
Hyoid	1	1	-	-	1
Loose teeth	175	954	170	433	399
Scapula	1	13	3	11	6
Humerus	9	43	6	31	25
Radius	19	80	7	38	34
Ulna	4	9	2	5	11
Os Coxae	7	27	5	22	11
Femur	3	21	3	27	14
Patella	1	4	1	1	-
Tibia	22	106	17	71	57
Carpals	2	3	-	1	1
Calcaneus	4	7	1	4	4
Astragalus	3	10	1	8	3
Centroquartal	1	1	-	-	-
Other tarsals	-	-	-	1	-
Metacarpal	8	37	13	25	25
Metatarsal	14	60	12	44	47
Metapodial	-	3	1	1	2
1st Phalanx	4	17	-	4	12
2nd Phalanx	1	12	-	4	2
3rd Phalanx	-	5	1	1	-
Ribs	6	3	-	19	5
Sternebrae	-	1	-	2	-
Cervical verts.	7	7	-	29	15
Thoracic verts.	2	5	-	12	8
Lumbar verts.	1	4	2	11	5
Sacrum	1	-	-	-	-
Caudal verts.	-	-	-	1	-
TOTAL	328	1650	304	1004	778

F75 = layers 5-8 only
F133 = layers 5-8 only
F642 = layers 7-14 only

TABLE S/GFRAG.1(CONT.)

Fragments of Sheep/Goat Represented at Owslebury

h) 3rd-4th Century A.D. Other Deposits

Sheep/Goat	Other Pits	F150	Quarries	Other	Total*
Skull frags.	13	13	19	8	207
Mandible	24	45	24	15	551
Hyoid	-	-	-	-	3
Loose teeth	163	444	106	160	3004
Scapula	4	5	2	4	49
Humerus	7	14	5	6	146
Radius	11	37	15	8	249
Ulna	1	3	-	2	37
Os Coxae	1	11	3	1	88
Femur	3	14	5	4	94
Patella	-	1	-	-	8
Tibia	18	56	17	16	380
Carpals	1	1	-	1	10
Calcaneus	2	1	1	-	24
Astragalus	1	2	1	2	31
Centroquartal	-	-	-	-	2
Other tarsals	-	-	-	-	1
Metacarpal	4	15	4	3	134
Metatarsal	6	26	11	7	227
Metapodial	-	1	-	1	9
1st Phalanx	1	4	1	2	45
2nd Phalanx	1	2	1	-	23
3rd Phalanx	1	-	-	1	9
Ribs	-	3	1	6	43
Sternebrae	-	-	-	-	3
Cervical verts.	4	3	2	2	69
Thoracic verts.	-	-	2	-	29
Lumbar verts.	-	2	-	2	27
Sacrum	-	-	-	-	1
Caudal verts.	-	-	-	-	1
TOTAL	266	703	220	251	5506

* Total includes ditches but excludes cess pits

TABLE PIGFRAG.1

Fragments of Pig Represented at Owslebury

a) 3rd-2nd Century B.C. Deposits

Pig	Pits	F55	Other Ditches	Quarries (F236)	Total
Skull frags.	11	41	28	11	91
Mandible	28	39	37	18	122
Hyoid	1	-	-	-	1
Loose teeth	44	32	30	31	137
Scapula	10	14	6	7	37
Humerus	11	12	14	6	43
Radius	7	4	1	2	14
Ulna	3	4	7	2	16
Os Coxae	5	5	4	2	16
Femur	8	11	5	4	28
Patella	1	-	1	-	2
Tibia	7	6	12	1	26
Fibula	5	2	-	2	9
Carpals	2	-	-	-	2
Calcaneus	1	1	4	-	6
Astragalus	3	4	3	-	10
Other tarsals	1	1	-	-	2
Metacarpal	-	1	3	-	4
Metatarsal	3	-	2	-	5
Lat.- Metapodial	4	1	1	2	8
Metapodial	3	-	1	1	5
1'st Phalanx	6	4	5	2	17
2nd Phalanx	4	-	3	1	8
3rd Phalanx	1	-	-	-	1
Ribs	6	1	8	-	15
Cervical verts.	1	1	3	-	5
Thoracic verts.	1	-	4	-	5
Lumbar verts.	1	2	2	-	5
Sacrum	1	-	1	-	2
Caudal verts.	1	-	-	-	1
TOTAL	180	186	185	92	643

TABLE PIGFRAG.1(CONT.)

Fragments of Pig Represented at Owslebury

b) 1st Century B.C. Deposits

Pig	Pits (F400)	Gullies	Quarries	Total
Skull frags.	13	11	33	57
Mandible	13	12	53	78
Loose teeth	38	43	61	142
Scapula	4	6	9	19
Humerus	3	12	13	28
Radius	4	1	4	9
Ulna	2	3	5	10
Os Coxae	4	3	11	18
Femur	8	9	9	26
Patella	-	1	1	2
Tibia	5	8	11	24
Fibula	4	1	1	6
Carpals	-	-	2	2
Calcaneus	1	1	2	4
Astragalus	-	2	-	2
Other tarsals	-	1	1	2
Metacarpal	2	-	-	2
Metatarsal	-	2	2	4
Metapodial	-	1	1	2
1st Phalanx	1	1	4	6
2nd Phalanx	-	3	3	6
3rd Phalanx	-	1	4	5
Ribs	1	-	4	5
Cervical verts.	3	2	6	11
Thoracic verts.	-	1	1	2
Lumbar verts.	1	2	1	4
Unid. verts.	-	1	-	1
TOTAL	107	128	242	477

TABLE PIGFRAG.1(CONT.)

Fragments of Pig Represented at Owslebury

c) 1st Century A.D. Ditches

Pig	F75	F132	F133	F370	F642	Other Ditches
Skull frags.	8	25	38	150	77	35
Mandible	15	45	62	140	61	37
Loose teeth	26	50	85	160	79	75
Scapula	3	10	7	25	19	27
Humerus	10	12	17	24	24	12
Radius	2	2	5	8	9	2
Ulna	4	13	8	7	10	2
Os Coxae	4	1	9	14	16	5
Femur	3	9	11	21	16	9
Patella	-	-	1	-	-	-
Tibia	6	11	18	28	12	15
Fibula	1	4	-	5	2	2
Carpals	1	-	5	-	-	1
Calcaneus	3	3	2	3	4	3
Astragalus	1	2	3	2	5	1
Other tarsals	-	-	1	-	2	3
Metacarpal	4	2	2	8	4	5
Metatarsal	4	3	1	4	5	-
Lat. Metapodial	4	2	2	8	5	1
Metapodial	-	3	1	1	2	-
1st Phalanx	2	8	10	8	6	2
2nd Phalanx	3	6	8	2	4	2
3rd Phalanx	1	1	3	3	1	1
Ribs	1	6	1	5	6	5
Sternebrae	-	-	-	-	1	-
Cervical verts.	-	2	4	4	10	3
Thoracic verts.	2	-	3	6	5	1
Lumbar verts.	2	3	1	8	11	2
Sacrum	-	-	-	-	1	-
TOTAL	110	223	308	644	397	251

F75 = layers 1-4 only
F132 = layers 2-6 only
F133 = layers 1-2 only
F642 = layers 1-4 only

TABLE PIGFRAG.1(CONT.)

Fragments of Pig Represented at Owslebury

d) Other 1st Century A.D. Deposits

Pig	Pits	Quarries	Tracks	Total*
Skull frags.	13	13	42	401
Mandible	18	34	73	485
Loose teeth	55	41	73	644
Scapula	1	8	11	111
Humerus	5	1	30	135
Radius	-	-	13	41
Ulna	2	2	19	67
Os Coxae	1	-	13	63
Femur	2	3	15	89
Patella	-	-	1	2
Tibia	7	8	19	124
Fibula	1	1	5	21
Carpals	-	-	4	11
Calcaneus	5	1	4	28
Astragalus	3	2	6	25
Other tarsals	1	-	-	7
Metacarpal	1	2	1	29
Metatarsal	1	1	6	25
Lat. Metapodial	5	2	4	33
Metapodial	-	-	2	9
1st Phalanx	9	1	10	56
2nd Phalanx	3	2	4	34
3rd Phalanx	2	1	4	17
Ribs	3	-	6	33
Sternebrae	-	-	-	1
Cervical verts.	2	2	3	30
Thoracic verts.	-	2	1	20
Lumbar verts.	1	1	5	34
Sacrum	-	-	-	1
TOTAL	141	128	374	2576

* Total includes all 1st Century A.D. deposits, including ditches.

TABLE PIGFRAG.1(CONT.)

Fragments of Pig Represented at Owslebury

e) 1st-2nd Century A.D. Deposits

Pig	F133	F642	Other Ditches	Other 1st-2nd	2nd C. Quarries	Other 2nd C.	Total
Skull frags.	79	15	10	4	8	3	119
Mandible	90	29	18	4	28	1	170
Loose teeth	137	64	28	5	34	3	271
Scapula	27	9	8	2	-	1	47
Humerus	30	10	3	2	5	5	55
Radius	11	5	3	-	-	1	20
Ulna	11	6	2	2	1	-	22
Os Coxae	12	5	3	2	2	-	24
Femur	21	7	5	2	3	1	39
Patella	1	-	-	-	-	-	1
Tibia	24	8	7	-	4	1	44
Fibula	4	3	3	-	1	-	11
Carpals	2	1	-	-	2	-	5
Calcaneus	5	1	-	-	-	-	6
Astragalus	3	-	-	-	1	-	4
Other tarsals	2	-	-	-	1	-	3
Metacarpal	5	2	-	-	-	-	7
Metatarsal	3	-	2	2	1	-	8
Metapodial	4	1	1	-	-	-	6
1st Phalanx	13	6	5	-	3	-	27
2nd Phalanx	10	5	3	-	2	-	20
3rd Phalanx	4	1	-	-	-	-	5
Ribs	3	3	-	1	-	1	8
Cervical verts.	8	4	1	-	2	-	15
Thoracic vert.	3	1	-	-	1	-	5
Lumbar verts.	1	1	2	-	1	-	5
TOTAL	516	191	105	27	101	17	957

F133 = layers 3-4 only
F642 = layers 5-6 only

TABLE PIGFRAG.1(CONT.)

Fragments of Pig Represented at Owslebury

f) 3rd-4th Century A.D. Cess Pits

Pig	F632	F646	F650	F664	F724	Total*
Skull frags.	2	-	1	-	1	4
Mandible	3	-	-	-	1	4
Hyoid	-	-	1	-	-	1
Loose teeth	9	-	5	1	2	17
Scapula	-	1	2	-	1	4
Humerus	-	-	2	3	1	6
Radius	-	-	2	2	-	4
Ulna	-	-	2	-	-	2
Os Coxae	1	-	1	-	1	3
Femur	-	-	3	-	1	4
Tibia	2	-	3	-	-	5
Fibula	-	-	2	-	-	2
Carpals	1	-	-	-	-	1
Calcaneus	-	-	2	-	-	2
Astragalus	-	-	1	-	-	1
Lat. Metapodial	1	-	-	-	-	1
Metapodial	-	-	3	-	-	3
1st Phalanx	1	-	4	-	-	5
Ribs	-	-	28	-	-	28
Sternebrae	-	-	1	-	-	1
Cervical verts.	-	-	4	-	-	4
Thoracic verts.	1	-	13	-	-	14
Lumbar verts.	-	-	6	-	-	6
TOTAL	21	1	86	6	8	122

* includes articulated bones

TABLE PIGFRAG.1(CONT.)

Fragments of Pig Represented at Owslebury

g) 3rd-4th Century A.D. Ditches

Pig	F75	F133	F634	F642	Other Ditches
Skull frags.	3	31	6	28	12
Mandible	10	38	7	33	21
Loose teeth	17	140	26	102	59
Scapula	-	14	-	9	4
Humerus	4	15	3	12	9
Radius	-	4	1	4	5
Ulna	3	5	1	5	6
Os Coxae	-	4	1	4	2
Femur	1	9	1	5	4
Patella	-	2	-	1	-
Tibia	2	16	3	11	8
Fibula	1	3	-	2	3
Carpals	-	1	-	1	-
Calcaneus	2	2	1	-	4
Astragalus	1	1	-	4	-
Other tarsals	-	3	-	-	1
Metacarpal	-	3	-	5	1
Metatarsal	-	1	-	-	-
Lat. Metapodial	1	2	-	1	7
Metapodial	-	4	1	1	1
1st Phalanx	5	12	-	3	5
2nd Phalanx	-	3	-	2	1
3rd Phalanx	-	5	-	1	1
Ribs	-	-	-	3	2
Cervical verts.	1	1	-	1	3
Thoracic verts.	-	-	-	1	-
Lumbar verts.	-	-	-	-	1
TOTAL	51	319	51	238	161

F75 = layers 5-8 only
F133 = layers 5-8 only
F642 = layers 7-14 only

TABLE PIGFRAG.1(CONT.)

Fragments of Pig Represented at Owslebury

h) 3rd-4th Century A.D. Other Deposits

Pig	Other Pits	F150	Quarries	Other	Total*
Skull frags.	5	9	11	3	108
Mandible	5	25	11	9	159
Loose teeth	15	32	24	15	430
Scapula	1	5	1	5	39
Humerus	3	6	4	1	57
Radius	-	1	-	1	16
Ulna	-	1	-	-	21
Os Coxae	-	2	2	-	15
Femur	1	2	4	-	27
Patella	-	-	-	-	3
Tibia	-	8	1	1	50
Fibula	-	3	2	3	17
Carpals	-	-	-	-	2
Calcaneus	-	-	-	1	10
Astragalus	-	1	2	-	9
Other tarsals	-	-	-	-	4
Metacarpal	1	-	1	-	11
Metatarsal	1	2	-	-	4
Lat. Metapodial	2	1	2	-	16
Metapodial	1	-	2	-	10
1st Phalanx	2	2	1	2	32
2nd Phalanx	3	1	1	-	11
3rd Phalanx	1	-	-	-	8
Ribs	-	-	-	1	6
Cervical verts.	-	1	-	-	7
Thoracic verts.	-	-	-	-	1
Lumbar verts.	1	-	-	-	2
Sacrum	-	-	1	-	1
TOTAL	42	102	70	42	1076

* Total includes ditches but excludes cess pits

TABLE HORFRAG.1

Fragments of Horse Represented at Owslebury

a) 3rd-2nd Century B.C. Deposits

Horse	Pits	F55	Other Ditches	Quarries (F236)	Total
Skull frags.	3	3	5	2	13
Mandible	1	5	15	-	21
Loose teeth	8	19	11	1	39
Scapula	1	4	2	1	8
Humerus	-	3	-	-	3
Radius	1	5	3	-	9
Ulna	1	2	2	-	5
Os Coxae	1	7	3	1	12
Femur	1	2	1	-	4
Patella	-	1	-	-	1
Tibia	1	7	1	1	10
Carpals	-	3	-	-	3
Calcaneus	-	1	1	-	2
Astragalus	-	1	-	1	2
Other tarsals	-	2	1	-	3
Metacarpal	2	5	-	1	8
Metatarsal	3	3	1	-	7
Lat. Metapodial	1	2	2	1	6
Metapodial	-	-	1	-	1
1st Phalanx	1	2	-	-	3
2nd Phalanx	-	1	-	1	2
Ribs	1	3	2	-	6
Cervical verts.	3	2	-	1	6
Thoracic verts.	-	2	-	1	3
Lumbar verts.	-	-	1	-	1
Sacrum	-	-	1	-	1
TOTAL	29	85	53	12	179

TABLE HORFRAG.1(CONT.)

Fragments of Horse Represented at Owslebury

b) 1st Century B.C. Deposits

Horse	Pits (F400)	Gullies	Quarries	Total
Skull frags.	11	6	5	22
Mandible	1	12	2	15
Loose teeth	5	24	10	39
Scapula	1	3	1	5
Humerus	-	1	1	2
Radius	-	2	5	7
Ulna	1	-	2	3
Os Coxae	1	1	1	3
Femur	1	2	2	5
Tibia	-	4	1	5
Calcaneus	-	3	1	4
Astragalus	-	1	2	3
Other tarsals	-	2	3	5
Metacarpal	2	3	1	6
Metatarsal	1	5	1	7
Lat. Metapodial	2	4	2	8
Metapodial	-	2	-	2
1st Phalanx	-	1	-	1
Cervical verts.	-	3	2	5
Thoracic verts.	1	3	-	4
Lumbar verts.	-	1	-	1
TOTAL	27	83	42	152

TABLE HORFRAG.1(CONT.)

Fragments of Horse Represented at Owslebury

c) 1st Century A.D. Ditches

Horse	F75	F132	F133	F370	F642	Other Ditches
Skull frags.	6	2	2	4	2	12
Mandible	2	2	5	6	3	5
Loose teeth	13	5	16	19	25	39
Scapula	2	-	3	3	2	5
Humerus	3	1	2	1	3	4
Radius	4	-	1	2	4	7
Ulna	1	-	-	4	4	2
Os Coxae	5	1	1	5	4	5
Femur	-	-	2	1	5	5
Patella	-	2	-	-	1	-
Tibia	3	4	4	3	2	3
Carpals	-	4	1	-	6	-
Calcaneus	-	4	2	-	2	4
Astragalus	2	3	1	2	1	-
Other tarsals	-	5	-	2	3	1
Metacarpal	-	1	7	-	2	2
Metatarsal	8	2	1	7	2	3
Lat. Metapodial	1	3	5	1	5	4
Metapodial	-	1	1	-	-	1
1st Phalanx	3	2	3	-	6	7
2nd Phalanx	-	2	3	-	1	-
3rd Phalanx	-	-	1	-	1	1
Sesamoids	-	-	1	-	-	-
Ribs	-	2	3	2	1	2
Cervical verts.	-	3	6	3	8	4
Thoracic verts.	-	-	-	1	6	6
Lumbar verts.	-	-	-	2	-	3
Sacrum	1	-	-	-	-	-
TOTAL	54	49	71	68	99	125

F75 = layers 1-4 only
F132 = layers 2-6 only
F133 = layers 1-2 only
F642 = layers 1-4 only

TABLE HORFRAG.1(CONT.)

Fragments of Horse Represented at Owslebury

d) Other 1st Century A.D. Deposits

Horse	Pits	Quarries	Tracks	Total*
Skull frags.	2	2	12	44
Mandible	-	4	8	35
Hyoid	2	-	-	2
Loose teeth	5	3	41	166
Scapula	-	2	5	22
Humerus	-	2	7	23
Radius	1	2	15	36
Ulna	-	-	10	21
Os Coxae	1	2	1	25
Femur	-	-	6	19
Patella	-	2	-	5
Tibia	-	-	3	22
Carpals	-	-	1	12
Calcaneus	-	-	2	14
Astragalus	-	2	5	16
Other tarsals	1	-	1	13
Metacarpal	2	1	4	19
Metatarsal	-	1	3	27
Lat. Metapodial	-	-	1	20
Metapodial	-	-	1	4
1st Phalanx	2	1	4	28
2nd Phalanx	1	-	1	8
3rd Phalanx	-	-	-	3
Sesamoids	1	-	1	3
Ribs	1	-	1	12
Cervical verts.	1	-	5	30
Thoracic verts.	-	-	1	30
Lumbar verts.	-	-	1	6
Sacrum	-	-	-	1
TOTAL	20	24	140	650

* Total includes all 1st Century A.D. deposits, including ditches.

TABLE HORFRAG.1(CONT.)

Fragments of Horse Represented at Owslebury

e) 1st-2nd Century A.D. Deposits

Horse	F133	F642	Other Ditches	Other 1st-2nd	2nd C. Quarries	Other 2nd C.	Total
Skull frags.	5	3	3	2	1	1	15
Mandible	12	18	6	-	1	-	37
Loose teeth	37	31	12	3	6	11	100
Scapula	5	3	1	1	1	1	12
Humerus	2	6	-	-	1	3	12
Radius	5	4	3	-	2	2	16
Ulna	2	2	2	-	1	1	8
Os Coxae	2	4	4	-	2	1	13
Femur	6	3	1	-	3	-	13
Patella	1	1	-	-	1	-	3
Tibia	4	3	3	1	-	-	11
Carpals	7	1	1	-	1	-	10
Calcaneus	1	1	3	-	-	-	5
Astragalus	5	2	1	-	1	-	9
Other tarsals	2	1	2	-	-	-	5
Metacarpal	4	1	1	-	2	2	10
Metatarsal	2	4	2	-	-	2	10
Lat. Metapodial	2	4	1	-	-	2	9
Metapodial	-	1	-	-	-	-	1
1st Phalanx	8	3	2	-	1	-	14
2nd Phalanx	2	-	2	-	1	-	5
Ribs	8	-	-	-	1	-	9
Cervical verts.	5	1	-	-	-	1	7
Thoracic verts.	8	1	1	1	4	-	15
Lumbar verts.	3	1	-	-	-	-	4
TOTAL	138	99	51	8	30	27	353

F133 = layers 3-4 only
F642 = layers 5-6 only

TABLE HORFRAG.1(CONT.)

Fragments of Horse Represented at Owslebury

f) 3rd-4th Century A.D. Cess Pits

Horse	F632	F646	F650	F664	F724	Total*
Skull frags.	2	2	-	1	-	5
Mandible	1	-	-	1	-	2
Loose teeth	2	2	-	4	2	10
Scapula	2	-	1	-	-	3
Humerus	2	1	-	1	2	6
Radius	2	1	-	2	-	5
Ulna	1	-	-	1	-	2
Os Coxae	2	-	-	5	-	7
Femur	3	1	1	2	-	7
Tibia	1	-	-	-	1	2
Carpals	1	-	-	-	1	2
Calcaneus	-	-	-	2	-	2
Astragalus	1	-	-	1	1	3
Metacarpal	-	-	1	1	-	2
Metatarsal	2	-	-	-	-	2
Lat. Metapodial	1	-	-	-	2	3
1st Phalanx	1	-	1	1	-	3
3rd Phalanx	-	-	1	-	-	1
Ribs	1	-	-	-	1	2
Cervical verts.	1	-	-	3	-	4
Thoracic verts.	-	-	-	-	9	9
Lumbar verts.	-	-	-	-	2	2
TOTAL	26	8	5	25	21	85

* includes articulated bones

TABLE HORFRAG.1(CONT.)

Fragments of Horse Represented at Owslebury

g) 3rd-4th Century A.D. Ditches

Horse	F75	F133	F634	F642	Other Ditches
Skull frags.	2	5	4	3	5
Mandible	2	22	10	4	3
Loose teeth	10	67	44	18	41
Scapula	-	7	2	5	2
Humerus	6	10	4	6	6
Radius	5	8	6	2	6
Ulna	2	7	3	1	-
Os Coxae	2	14	7	3	2
Femur	3	6	10	9	2
Patella	-	3	1	-	1
Tibia	5	8	9	7	-
Carpals	-	7	-	1	1
Calcaneus	3	1	1	2	1
Astragalus	1	8	3	2	2
Other tarsals	5	5	-	-	2
Metacarpal	5	5	5	7	2
Metatarsal	3	2	2	7	3
Lat. Metapodial	4	12	3	4	2
Metapodial	1	3	1	2	1
1st Phalanx	4	11	4	2	4
2nd Phalanx	2	9	1	1	4
3rd Phalanx	-	1	-	-	1
Sesamoids	-	-	-	2	-
Ribs	-	3	4	-	-
Cervical verts.	3	4	5	4	3
Thoracic verts.	2	11	-	2	1
Lumbar verts.	-	1	-	-	-
Sacrum	-	1	-	1	-
TOTAL	70	241	129	95	95

F75 = layers 5-8 only
F133 = layers 5-8 only
F642 = layers 7-14 only

TABLE HORFRAG.1(CONT.)

Fragments of Horse Represented at Owslebury

h) 3rd-4th Century A.D. Other Deposits

Horse	Other Pits	F150	Quarries	Other	Total*
Skull frags.	-	8	1	1	29
Mandible	-	-	3	1	45
Loose teeth	5	41	17	11	254
Scapula	1	1	3	-	21
Humerus	-	4	3	-	39
Radius	2	1	3	-	33
Ulna	-	1	2	-	16
Os Coxae	-	1	1	-	30
Femur	1	-	3	-	34
Patella	-	1	-	-	6
Tibia	-	4	-	-	33
Carpals	1	2	-	-	12
Calcaneus	1	-	-	1	10
Astragalus	4	-	2	1	23
Other tarsals	-	-	-	-	12
Metacarpal	-	-	1	1	26
Metatarsal	1	2	-	-	20
Lat. Metapodial	1	-	1	-	27
Metapodial	-	4	1	-	13
1st Phalanx	1	2	4	2	34
2nd Phalanx	-	-	-	-	17
3rd Phalanx	1	2	-	-	5
Sesamoids	-	-	-	1	3
Ribs	-	-	-	-	7
Cervical verts.	-	1	1	-	21
Thoracic verts.	-	-	-	-	16
Lumbar verts.	-	-	-	-	1
Sacrum	-	-	-	-	2
TOTAL	19	75	46	19	789

* Total includes ditches but excludes cess pits

TABLE DOGFRAG.1

Fragments of Dog Represented at Owslebury

a) 3rd-2nd Century B.C. Deposits

Dog	Pits	F55	Other Ditches	Quarries (F236)	Total
Skull frags.	2	6	3	2	13
Mandible	3	6	1	-	10
Loose teeth	4	9	1	1	15
Scapula	1	2	-	-	3
Humerus	-	2	5	1	8
Radius	-	1	1	-	2
Ulna	-	1	-	-	1
Os Coxae	-	2	-	-	2
Femur	2	-	-	2	4
Tibia	1	-	1	-	2
Carpals	1	-	-	-	1
Calcaneus	1	-	-	-	1
Metacarpals	2	1	1	-	4
Metatarsals	2	-	2	-	4
Metapodial	3	-	-	-	3
1st Phalanx	1	2	-	-	3
Ribs	4	3	3	1	11
Cervical verts.	1	1	-	-	2
Lumbar verts.	-	1	-	-	1
Caudal verts.	3	1	-	-	4
TOTAL	31	38	18	7	94

TABLE DOGFRAG.1 (CONT.)

Fragments of Dog Represented at Owslebury

b) 1st Century B.C. Deposits

Dog	Pits (F100)	Gullies	Quarries	Total
Skull frags.	3	3	3	9
Mandible	-	3	2	5
Loose teeth	1	6	7	14
Scapula	1	1	1	3
Humerus	1	-	1	2
Radius	-	-	2	2
Os Coxae	-	1	1	2
Femur	-	2	-	2
Tibia	1	1	-	2
Metacarpals	-	1	-	1
Metatarsals	1	1	2	4
Metapodial	-	1	1	2
1st Phalanx	-	-	3	3
2nd Phalanx	-	-	1	1
3rd Phalanx	-	-	1	1
Ribs	-	-	6	6
Cervical verts.	-	1	-	1
Thoracic verts.	1	-	1	2
Lumbar verts.	-	-	2	2
TOTAL	9	21	34	64

TABLE DOGFRAG.1(CONT.)

Fragments of Dog Represented at Owslebury

c) 1st Century A.D. Ditches

Dog	F75	F132	F133	F370	F642	Other Ditches
Skull frags.	1	4	4	12	11	8
Mandible	2	3	4	2	14	7
Loose teeth	4	3	18	5	7	14
Scapula	-	-	-	3	6	3
Humerus	-	1	-	1	13	4
Radius	1	-	3	1	7	7
Ulna	-	-	2	2	4	5
Os Coxae	-	-	2	3	3	1
Femur	1	-	3	-	6	2
Patella	-	-	1	-	-	-
Tibia	1	1	5	4	7	3
Fibula	-	-	-	-	-	1
Carpals	-	1	-	-	1	-
Calcaneus	1	-	-	-	2	1
Astragalus	1	-	-	-	-	-
Other tarsals	-	1	-	-	-	1
Metacarpals	1	1	-	-	6	4
Metatarsals	4	-	7	-	6	3
Metapodial	1	-	1	-	4	9
1st Phalanx	1	2	3	-	8	5
2nd Phalanx	-	-	-	-	-	1
3rd Phalanx	-	-	-	-	-	1
Ribs	-	2	1	4	14	3
Cervical verts.	-	-	1	2	7	2
Thoracic verts.	-	-	1	-	3	2
Lumbar verts.	-	1	1	1	7	1
Sacrum	-	-	-	-	3	-
Caudal verts.	-	-	-	-	1	-
Unid. verts.	-	-	-	-	-	1
Baculum	-	-	-	-	-	1
TOTAL	19	20	57	40	140	89

F75 = layers 1-4 only
F132 = layers 2-6 only
F133 = layers 1-2 only
F642 = layers 1-4 only

TABLE DOGFRAG.1(CONT.)

Fragments of Dog Represented at Owslebury

d) Other 1st Century A.D. Deposits

Dog	Pits	Quarries	Tracks	Total*
Skull frags.	-	2	10	52
Mandible	1	-	5	38
Hyoid	-	-	2	2
Loose teeth	2	2	8	63
Scapula	1	1	4	18
Humerus	-	-	7	26
Radius	1	1	4	25
Ulna	-	-	1	14
Os Coxae	-	1	5	15
Femur	-	-	6	18
Patella	-	-	-	1
Tibia	-	2	1	24
Fibula	1	-	-	2
Carpals	-	-	-	2
Calcaneus	-	-	-	4
Astragalus	-	-	-	1
Other tarsals	-	-	-	2
Metacarpals	-	-	5	17
Metatarsals	-	1	-	21
Metapodial	-	-	2	17
1st Phalanx	-	1	2	22
2nd Phalanx	-	1	-	2
3rd Phalanx	-	-	-	1
Ribs	-	-	22	46
Cervical verts.	-	-	11	23
Thoracic verts.	-	1	2	9
Lumbar verts.	-	-	-	11
Sacrum	-	-	-	3
Caudal verts.	-	-	4	5
Unid. verts.	-	-	-	1
Baculum	-	-	1	1
TOTAL	6	13	102	486

* Total includes all 1st Century A.D. deposits, including ditches.

TABLE DOGFRAG.1(CONT.)

Fragments of Dog Represented at Owslebury

e) 1st-2nd Century A.D. Deposits

Dog	F133	F642	Other Ditches	Other 1st-2nd	2nd C. Quarries	Other 2nd C.	Total
Skull frags.	3	5	-	-	1	1	10
Mandible	4	5	-	-	1	-	10
Loose teeth	23	23	5	2	8	2	63
Scapula	1	1	-	-	-	-	2
Humerus	2	2	1	-	-	-	5
Radius	5	4	1	-	-	1	11
Ulna	4	4	-	-	-	-	8
Os Coxae	2	5	-	1	1	-	9
Femur	2	5	-	1	-	-	8
Tibia	6	5	2	-	1	-	14
Fibula	-	-	1	-	-	-	1
Calcaneus	-	1	-	-	-	-	1
Metacarpals	7	1	1	-	-	-	9
Metatarsals	3	2	-	1	-	1	7
Metapodial	-	4	-	1	-	-	5
1st Phalanx	1	-	2	-	1	-	4
2nd Phalanx	-	1	-	-	-	-	1
Sesamoids	1	-	-	-	-	-	1
Ribs	8	5	1	-	6	2	22
Cervical verts.	4	5	1	-	2	-	12
Thoracic verts.	2	2	1	-	-	-	5
Lumbar verts.	1	3	-	-	1	1	6
Caudal verts.	2	-	-	-	-	-	2
TOTAL	82	83	16	6	22	8	217

F133 = layers 3-4 only
F642 = layers 5-6 only

TABLE DOGFRAG.1(CONT.)

Fragments of Dog Represented at Owslebury

f) 3rd-4th Century A.D. Cess Pits

Dog	F632	F646	F650	F664	F724	Total*
Skull frags.	6	7	10	262	4	289
Mandible	4	2	10	87	3	106
Hyoid	1	-	1	5	1	8
Loose teeth	5	2	-	8	6	21
Scapula	2	6	7	77	1	93
Humerus	2	5	14	89	4	114
Radius	3	6	8	71	6	94
Ulna	4	6	10	75	2	97
Os Coxae	2	10	8	97	2	119
Femur	2	6	11	88	3	110
Patella	-	-	-	6	2	8
Tibia	5	5	12	81	7	110
Fibula	4	-	-	23	3	30
Carpals	4	-	-	65	10	79
Calcaneus	1	-	-	12	2	15
Astragalus	-	-	-	12	1	13
Other tarsals	2	-	-	32	5	39
Metacarpals	15	-	-	49	11	75
Metatarsals	10	-	-	53	5	68
Metapodial	5	-	17	31	1	54
1st Phalanx	13	-	1	91	15	120
2nd Phalanx	5	-	-	71	11	87
3rd Phalanx	-	-	-	59	14	73
Sesamoids	-	-	-	1	9	70
Ribs	39	5	75	616	25	760
Costal carts.	-	-	-	42	15	57
Sternebrae	4	-	-	14	1	19
Cervical verts.	10	-	-	44	7	61
Thoracic verts.	18	-	-	86	13	117
Lumbar verts.	14	-	-	45	6	65
Sacrum	2	-	-	7	1	10
Caudal verts.	17	4	-	71	7	99
Baculum	2	-	-	2	-	4
TOTAL	201	66	240	2670	203	3380

* includes articulated bones

TABLE DOGFRAG.1(CONT.)

Fragments of Dog Represented at Owslebury

g) 3rd-4th Century A.D. Ditches

Dog	F75	F133	F634	F642	Other Ditches
Skull frags.	1	12	4	18	2
Mandible	5	18	5	7	3
Hyoid	-	-	-	1	-
Loose teeth	2	41	15	19	13
Scapula	-	2	-	4	-
Humerus	-	6	1	5	2
Radius	2	7	1	10	1
Ulna	-	2	-	8	2
Os Coxae	1	5	-	4	1
Femur	-	1	2	8	1
Tibia	1	4	2	4	2
Fibula	-	1	-	1	-
Carpals	-	2	-	1	-
Calcaneus	-	2	2	1	2
Astragalus	-	1	-	2	-
Other tarsals	-	1	-	-	-
Metacarpals	-	7	-	9	2
Metatarsals	-	2	-	4	-
Metapodial	1	12	2	1	1
1st Phalanx	-	6	-	2	1
2nd Phalanx	-	1	1	-	-
3rd Phalanx	-	1	-	-	-
Sesamoids	-	-	-	2	-
Ribs	2	21	-	8	6
Cervical verts.	-	9	1	5	2
Thoracic verts.	-	1	-	3	-
Lumbar verts.	-	1	-	4	-
Caudal verts.	-	1	-	3	1
Unid. verts.	-	-	-	1	-
TOTAL	15	167	36	135	42

F75 = layers 5-8 only
F133 = layers 5-8 only
F642 = layers 7-14 only

TABLE DOGFRAG.1(CONT.)

Fragments of Dog Represented at Owslebury

h) 3rd-4th Century A.D. Other Deposits

Dog	Other Pits	F150	Quarries	Other	Total*
Skull frags.	-	2	7	-	46
Mandible	1	-	3	-	42
Hyoid	-	-	-	-	1
Loose teeth	2	5	10	1	108
Scapula	1	-	1	-	8
Humerus	-	-	1	-	15
Radius	-	2	-	-	23
Ulna	-	-	1	-	13
Os Coxae	-	-	1	-	12
Femur	1	-	1	-	14
Tibia	-	2	1	1	17
Fibula	-	2	-	-	4
Carpals	-	-	-	-	3
Calcaneus	1	1	1	-	10
Astragalus	-	-	-	-	3
Other tarsals	-	-	-	-	1
Metacarpals	-	-	-	-	18
Metatarsals	-	1	1	-	8
Metapodial	1	-	-	1	19
1st Phalanx	-	1	-	-	10
2nd Phalanx	-	-	-	-	2
3rd Phalanx	-	-	-	-	1
Sesamoids	-	-	-	-	2
Ribs	-	1	2	-	40
Cervical verts.	-	-	1	-	18
Thoracic verts.	-	1	1	-	6
Lumbar verts.	-	1	2	-	8
Caudal verts.	-	-	-	-	5
Unid. verts.	-	-	-	-	1
TOTAL	7	19	34	3	458

* Total includes ditches but excludes cess pits

TABLE SECTION4.2

Mean Ranking of Selected Elements of Cattle and Sheep/Goat

	Cattle	Sheep/G
Skull frags.	3.1 (3)	4.6 (4)
Mandible	2.6 (2)	2.3 (2)
Loose teeth	1.1 (1)	1.0 (1)
Scapula	4.6 (4)	13.2 (11)
Humerus	8.4 (7)	7.7 (7)
Radius	9.0 (9)	5.2 (5)
Ulna	11.4 (12)	14.8 (14)
Os Coxae	8.7 (8)	14.5 (13)
Femur	9.4 (10)	8.8 (9)
Tibia	7.9 (5)	3.1 (3)
Carpals	18.2 (20)	19.5 (21)
Calcaneus	15.9 (15)	16.0 (16)
Astragalus	16.5 (16)	15.5 (15)
Centroquartal	19.5 (21)	21.0 (22)
Other tarsals	21.3 (23)	22.0 (23)
Metacarpal	9.8 (11)	7.8 (8)
Metatarsal	8.3 (6)	5.7 (6)
1st Phalanx	12.9 (14)	11.8 (10)
2nd Phalanx	17.8 (18)	16.3 (17)
3rd Phalanx	21.1 (22)	19.4 (20)
Cervical verts.	12.5 (13)	13.9 (12)
Thoracic verts.	18.0 (19)	17.2 (18=)
Lumbar verts.	17.6 (17)	17.2 (18=)

Mean rankings based on number of fragments listed in Tables CowFrag.1 and S/GFrag.1 excluding the ones from the cess pits and F724. Totals from the three smallest 1st-2nd Century A.D. samples were amalgamated as were the samples from the 3rd-4th Century A.D. quarries and "other" features. The mean rankings were thus calculated from 28 samples.

TABLE SECTION4.3

Percentages of Losse Teeth in Assemblages of Major Species

3rd-2nd B.C.	Cattle	Sheep/G	Pig	Horse
Pits	30	36	24	
F55	24	36	17	22
Other Ditches	20	23	16	21
Quarries	22	44	34	
TOTAL	25	35	21	22

1st B.C.	Cattle	Sheep/G	Pig	Horse
Pits	14	32	36	
Gullies	22	39	34	29
Quarries	17	28	25	
TOTAL	19	32	30	26

1st A.D.	Cattle	Sheep/G	Pig	Horse
F75 1/4	18	37	24	24
F132 2/6	22	34	22	
F133 1/2	25	28	28	23
F370	24	37	25	28
F642 1/4	18	30	20	25
Other Ditches	21	43	30	31
Pits	29	47	39	
Quarries	25	42	32	
Track Gullies	20	35	20	29
TOTAL	22	36	25	26

1st-2nd A.D.	Cattle	Sheep/G	Pig	Horse
F133 3/4	27	39	27	27
F642 5/6	26	43	34	31
Other Ditches	25	41	27	24
Other Features	23	42	29	31
TOTAL	26	41	28	28

Context	Cattle	Sheep/G	Pig	Horse
F75 4/8	33	53	33	14
F133 5/8	36	58	44	28
F634	25	56	51	34
F642 7/14	27	43	43	19
Other Ditches	27	51	37	43
Pits	13	61	36	
F150	33	63	31	55
Quarries	33	48	34	
Other Features	46	64	36	
TOTAL	30	55	40	32

TABLE SECTION4.4

Percentage of Shaft Fragments in Samples of Major Limb Bones of Major Species (excluding articulated bones)

Humerus	3-1 B.C.	1 B.C.	1 A.D.	1-2 A.D.	3-4 A.D.*	Total
Cattle	45	(63)	64	53	60	60
Sheep/Goat	62	(59)	60	60	71	63
Pig	(67)	(71)	73	67	84	73
Horse					(36)	39
Dog			(38)			34

Radius	3-1 B.C.	1 B.C.	1 A.D.	1-2 A.D.	3-4 A.D.*	Total
Cattle	(36)	(37)	21	23	25	25
Sheep/Goat	76	84	75	76	87	80
Pig			(20)	(35)		32
Horse			(17)		(21)	22
Dog			(58)		(39)	46

Femur	3-1 B.C.	1 B.C.	1 A.D.	1-2 A.D.	3-4 A.D.*	Total
Cattle	62	(78)	58	68	57	63
Sheep/Goat	65	76	64	81	66	68
Pig	(61)	(73)	67	(64)	81	68
Horse					(24)	43
Dog						(46)

Tibia	3-1 B.C.	1 B.C.	1 A.D.	1-2 A.D.	3-4 A.D.*	Total
Cattle	55	(60)	50	57	49	50
Sheep/Goat	85	89	83	85	87	85
Pig	(77)	(71)	69	(68)	80	72
Horse					(24)	32
Dog			(54)			61

Metacarpus	3-1 B.C.	1 B.C.	1 A.D.	1-2 A.D.	3-4 A.D.*	Total
Cattle	35	35	26	31	27	29
Sheep/Goat	62	70	70	73	83	73
Horse						12

Metatarsus	3-1 B.C.	1 B.C.	1 A.D.	1-2 A.D.	3-4 A.D.*	Total
Cattle	44	41	43	46	37	42
Sheep/Goat	77	79	80	88	91	84
Horse						18

* = excludes bones from cess pits and F724

( ) = figures derived from a small sample.

TABLE SECTION4.5

Comparative Representation of Proximal and Distal Ends of Cattle Limb Bones

		Iron Age	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Humerus	P	14	18	10	13	55
	D	28	64	27	53	172
	%P	50	28	37	25	32
Radius	P	44	102	44	105	295
	D	8	34	18	32	92
	%D	18	33	41	21	31
Femur	P	9	38	13	21	81
	D	14	30	14	25	83
Tibia	P	8	31	7	20	66
	D	37	66	26	68	197
	%P	22	47	27	29	34
Metacarpus	P	31	87	32	73	223
	D	21	54	24	35	134
	%D	68	62	75	48	60
Metatarsus	P	29	90	39	94	252
	D	10	39	20	37	106
	%D	34	43	29	39	42

P = proximal; D = distal.

TABLE SECTION4.6

Comparative Representation of Proximal and Distal Ends of Sheep/Goat Limb Bones

		Iron Age	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Humerus	P	7	9	4	8	28
	D	45	69	27	36	177
	%P	16	13	15	22	16
Radius	P	36	45	24	25	130
	D	23	18	8	8	57
	%D	64	40	33	32	30
Femur	P	18	36	9	21	84
	D	24	16	2	13	55
Tibia	P	10	15	3	8	36
	D	35	63	31	41	170
	%P	29	24	10	20	21
Metacarpus	P	33	49	25	25	132
	D	8	20	9	7	44
	%D	24	41	36	28	33
Metatarsus	P	30	62	12	28	132
	D	19	19	4	4	46
	%D	63	31	33	14	35

P = proximal; D = distal.

TABLE SECTION4.7

Relative Abundance of Skull to Mandible Fragments of Major Species

3rd-2nd B.C.	Cattle	Sheep/G	Pig	Horse
Pits	57	51	28	
F55	37	38	51	
Other Ditches	51	41	43	
Quarries	49	45	38	
TOTAL	46	44	41	38

1st B.C.	Cattle	Sheep/G	Pig	Horse
Pits	96	20	50	
Gullies	62	32	48	
Quarries	66	50	38	
TOTAL	70	40	42	59

1st A.D.	Cattle	Sheep/G	Pig	Horse
F75 1/4	45	38	35	
F132 2/6	62	31	36	
F133 1/2	53	56	38	
F370	56	49	52	
F642 1/4	60	47	51	
Other Ditches	56	30	49	
Pits	39	51	42	
Quarries	48	34	28	
Track Gullies	50	40	37	
TOTAL	55	43	45	56

1st-2nd A.D.	Cattle	Sheep/G	Pig	Horse
F133 3/4	51	36	47	
F642 5/6	37	20	34	
Other Ditches	39	49	36	
Other Features	37	31	31	
TOTAL	45	33	41	29

Context	Cattle	Sheep/G	Pig	Horse
F75 4/8	33	19	23	
F133 5/8	34	16	46	
F634	47	51	46	
F642 7/14	50	31	46	
Other Ditches	38	24	36	
Pits	22	35	50	
F150	42	22	26	
Other Features	35	41	41	
TOTAL	40	27	40	39

Figures are % of skull frags. of total mandible + skull frags.

TABLE SECTION4.8

Minimum Number of Domestic Mammals Represented in Articulated Groups in 3rd-4th Century Cess Pits and F724

Species	F632	F646	F650	F664	F724	Total
Cattle	-	-	2	1	3	6
Sheep	-	6	11	4	3	24
Pig	-	-	1	-	-	1
Dog	2	4	9	50	1	66
(Puppies)	(-)	(4)	(9)	(42)	(-)	(55)
TOTAL	2	10	23	55	8	98

TABLE SECTION4.9

Major Groups of Articulated Bones of Domestic Mammals

in Other Features

Cattle	3-2 B.C.	1st B.C.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Art. Bones	-	-	79	52	138	269
Groups	-	-	6	3	8	17
Bones/Group	-	-	13	17	17	16
% of Unart.	-	-	1	2	3	2

Sheep/Goat	3-2 B.C.	1st B.C.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Art. Bones	193	-	95	51	48	387
Groups	6	-	4	2	3	15
Bones/Group	32	-	24	26	16	26
% of Unart.	9	-	2	2	1	2

Pig	3-2 B.C.	1st B.C.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Art. Bones	608	28	427	8	-	1071
Groups	5	1	6	1	-	13
Bones/Group	122	28	71	8	-	82
% of Unart.	95	6	17	1	-	19

Horse	3-2 B.C.	1st B.C.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Art. Bones	-	7	85	36	79	207
Groups	-	1	5	2	4	12
Bones/Group	-	7	17	18	20	17
% of Unart.	-	5	13	10	10	10

Dog	3-2 B.C.	1st B.C.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Art. Bones	322	13	858	170	422	1785
Groups	3	1	14	7	8	33
Bones/Group	107	13	61	24	53	54
% of Unart.	343	20	177	78	92	135

Art. Bones = number of articulated bones.
Groups = number of groups of articulated bones.
Arts/Group = average number of articulated bones/group.
% of Unart. = number of articulated bones expressed as a percentage of the number of articulated fragments as given in Tables CowFrag.1, S/Frag.1, PigFrag.1, HorFrag.1, DogFrag.1.

TABLE SECTION4.10

Percentages of Fragments of Major Species Recorded at Owslebury

a) 3rd-2nd Century B.C.

Context	Cattle	Sheep/G	Pig	Horse	Dog	Others	N
Pits	22	61	12	2	2	1	1472
F55	39	41	11	5	2	.5	1637
Other Ditches	30	38	23	7	2	.6	815
Quarries	35	42	18	2	1	1	513
TOTAL %	31	47	14	4	2	.8	4437

b) 1st Century B.C.

Context	Cattle	Sheep/G	Pig	Horse	Dog	Others	N
Pits	20	54	19	5	2	.4	563
Gullies	39	38	13	8	2	.2	1022
Quarries	26	52	17	3	2	.1	1424
TOTAL %	29	48	16	5	2	2	3009

c) 1st Century A.D.

Context	Cattle	Sheep/G	Pig	Horse	Dog	Others	N
Pits	22	52	21	3	1	.3	658
F75 1/4	35	43	13	6	2	.3	860
F132 2/6	42	35	18	4	2	-	1271
F133 1/2	38	35	18	4	3	-	1678
F370	36	37	23	2	1	.1	2760
F642 1/4	41	33	16	4	6	.2	2456
Other Ditches	33	41	14	7	5	.4	1837
Quarries	30	45	19	4	2	.1	680
Track Gullies	35	41	15	5	4	.2	2593
TOTAL %	36	39	17	4	3	.2	14793

d) 1st-2nd Century A.D.

Context	Cattle	Sheep/G	Pig	Horse	Dog	Others	N
F133 3/4	39	36	17	5	3	.1	3043
F642 5/6	39	38	11	6	5	.1	1666
Other Ditches	35	44	13	6	2	.1	812
Quarries	33	38	19	6	4	.6	528
Other Features	34	46	9	7	3	.8	487
TOTAL %	38	39	15	5	3	.2	6536

e) 3rd-4th Century A.D.

Context	Cattle	Sheep/G	Pig	Horse	Dog	Others	N
Pits	36	48	8	6	2	-	756
F133 5/8	37	44	8	6	4	.3	3766
F634	50	29	5	12	4	.7	1056
F642 7/14	36	43	10	4	6	.5	2358
Other Ditches	34	47	9	7	2	.5	2364
Quarries	44	33	10	7	5	.4	668
Track Gullies	35	50	7	5	1	.4	1396
Other Features	22	62	10	5	.7	-	404
TOTAL %	37	44	9	6	4	.4	12768

N = number of fragments of the major identified species (excluding articulated bones).

TABLE SECTION4.11

Percentage of Sheep/Goat Fragments in Samples of Selected Cattle and Sheep/Goat Bones

3rd-2nd B.C.	Mandible	Radius	Tibia	Metatarsus
Pits	63	92	81	81
F55	40	72	67	70
Other Ditches	47	(79)	76	70
Quarries	(47)	(60)	(62)	(100)
TOTAL %	47	78	73	77

1st B.C.	Mandible	Radius	Tibia	Metatarsus
Pits	(96)	(90)	(97)	(81)
Gullies	61	(44)	67	59
Quarries	66	73	78	(77)
TOTAL %	69	71	79	73

1st A.D.	Mandible	Radius	Tibia	Metatarsus
F75 1/4	55	(55)	(65)	(40)
F132 2/6	50	(67)	(73)	(45)
F133 1/2	40	(59)	80	60
F370	43	71	70	58
F642 1/4	45	50	73	44
Other Ditches	60	(58)	75	52
Pits	55	(93)	(83)	(75)
Quarries	58	(55)	(76)	(69)
Track Gullies	53	66	71	66
TOTAL %	49	62	73	55

1st-2nd A.D.	Mandible	Radius	Tibia	Metatarsus
F133 3/4	47	63	74	40
F642 5/6	49	73	67	56
Other Ditches	49	(53)	(79)	(52)
Other Features	45	(59)	87	(68)
TOTAL %	48	63	76	50

Context	Mandible	Radius	Tibia	Metatarsus
F75 4/8	50	(70)	(58)	(52)
F133 5/8	50	66	73	60
F634	35	(24)	34	(38)
F642 7/14	58	51	69	56
Other Ditches	47	51	73	66
Pits	(57)	52	51	(67)
F150	45	65	75	47
Other Features	45	(66)	72	(50)
TOTAL %	49	59	67	56

( ) = derived from small sample.

TABLE SECTION4.12

Cattle and Sheep/Goat Mandibles: Whole Bone Equivalent Calculations and Number of Specimens with Surviving Cheek Teeth

3rd-2nd B.C.	Cow WBE	S/G WBE	%S/G	Cow CT	S/G CT	%S/G
Pits	10.75	21.95	67	14	31	69
F55	23.80	23.95	50	21	32	60
Other Ditches	11.90	13.25	53	18	19	51
Quarries	3.05	5.70		1	10	
TOTAL	49.50	64.85	57	54	92	63

1st B.C.	Cow WBE	S/G WBE	%S/G	Cow CT	S/G CT	%S/G
Pits	0.35	13.30		1	25	96
Gullies	11.00	24.20	69	8	36	82
Quarries	14.20	27.90	66	12	37	76
TOTAL	25.55	65.40	72	21	98	82

1st A.D.	Cow WBE	S/G WBE	%S/G	Cow CT	S/G CT	%S/G
F75 1/4	12.70	16.70	57	12	21	64
F132 2/6	14.90	26.20	64	10	36	78
F133 1/2	24.90	26.15	51	27	37	58
F370	33.55	26.55	44	22	36	62
F642 1/4	22.10	34.20	61	15	52	78
Other Ditches	20.30	31.30	61	16	38	70
Pits	7.50	6.75		5	10	
Quarries	10.20	10.05		10	16	62
Track Gullies	29.65	41.85	59	26	61	70
TOTAL	175.80	219.75	56	143	307	68

1st-2nd A.D.	Cow WBE	S/G WBE	%S/G	Cow CT	S/G CT	%S/G
F133 3/4	32.05	38.10	54	22	46	82
F642 5/6	16.30	28.80	64	6	25	81
Other Ditches	10.35	9.70		8	12	
Other Features	7.10	11.10		3	11	
TOTAL	65.80	87.70	57	39	94	71

Context	Cow WBE	S/G WBE	%S/G	Cow CT	S/G CT	%S/G
F75 4/8	5.05	6.80		7	11	
F133 5/8	27.75	32.25	54	17	29	63
F634	15.75	6.75		17	12	41
F642 7/14	20.45	34.75	63	15	42	74
Other Ditches	13.70	13.45	50	11	16	59
Pits	3.70	4.55		1	5	
F150	9.40	9.05		4	9	
Other Features	10.55	9.40		8	14	
TOTAL	106.35	117.00	52	80	117	63

WBE = Whole Bone Equivalent; CT = number of specimens with cheek teeth; %S/G = percentage of sheep/goat.

TABLE SECTION4.13

Number of Cattle and Sheep/Goat Tibiae Fragments on Iron Age and Romano-British Sites in Wessex

Site	Date	Cattle	Sheep/G	%S/G	Source
Old Down Farm Ph.3	EIA	16	29	64	Maltby 1981b
Ph.5	MIA	20	69	78	
Balksbury 1973	MIA	105	279	73	Maltby AML
	RB	17	69	80	Report
Winnall Down Ph.3 Pts	EIA	9	31	78	Maltby 1985b
Ph.3 Other	EIA	26	35	57	
Ph.4	MIA	58	112	66	
Ph.6	ERB	38	80	68	
Chilbolton Down	MIA	3	17	85	Maltby 1984a
Groundwell Farm	IA	22	179	89	Coy 1982
Rope Lake Hole	MIA	7	54	89	Coy AML
	LIA	10	81	89	Report 4070
	RB	8	124	95	
Cowdery's Down Ph.3B	ERB	5	22	81	Maltby 1983a
Little Somborne	ERB	4	28	88	Maltby 1984b
	LRB	15	14	48	
Staple Gardens, Ph.12	LRB	24	7	31	Maltby n.d.
Winchester Ph.13-18	LRB	29	34	54	

IA = Iron Age; RB = Romano-British; E = Early; M = Middle; L = Late. %S/G = sheep/goat tibiae expressed as a percentage of total of cattle and sheep/goat tibiae fragments.

TABLE SECTION4.14

Horse Expressed as a Percentage of Cattle and Horse Fragments

3rd-2nd B.C.	Total Frags.	Excluding Teeth
Pits	8	8
F55	12	12
Other Ditches	18	18
Quarries	6	7
TOTAL	11	12

1st B.C.	Total Frags.	Excluding Teeth
Pits	19	18
Gullies	17	16
Quarries	10	9
TOTAL	15	14

1st A.D.	Total Frags.	Excluding Teeth
F75 1/4	15	14
F132 2/6	8	10
F133 1/2	10	10
F370	6	6
F642 1/4	9	8
Other Ditches	17	15
Pits	12	13
Quarries	10	12
Track Gullies	13	12
TOTAL	11	10

1st-2nd A.D.	Total Frags.	Excluding Teeth
F133 3/4	10	10
F642 5/6	13	12
Other Ditches	15	16
Other Features	18	17
TOTAL	13	12

Context	Total Frags.	Excluding Teeth
F75 4/8	19	23
F133 5/8	15	16
F634	20	18
F642 7/14	10	11
Other Ditches	16	13
Pits	9	7
F150	13	9
Other Features	14	13
TOTAL	15	14

TABLE SECTION4.15

Pig Expressed as a Percentage of Cattle and Pig Fragments

3rd-2nd B.C.	Total Frags.	Excluding Teeth
Pits	36	37
F55	22	23
Other Ditches	43	44
Quarries	34	31
TOTAL	32	33

1st B.C.	Total Frags.	Excluding Teeth
Pits	48	41
Gullies	24	22
Quarries	40	37
TOTAL	35	32

1st A.D.	Total Frags.	Excluding Teeth
F75 1/4	27	25
F132 2/6	30	29
F133 1/2	32	32
F370	40	39
F642 1/4	29	28
Other Ditches	30	27
Pits	49	45
Quarries	38	36
Track Gullies	29	29
TOTAL	33	32

1st-2nd A.D.	Total Frags.	Excluding Teeth
F133 3/4	30	30
F642 5/6	23	21
Other Ditches	27	27
Other Features	33	31
TOTAL	28	28

Context	Total Frags.	Excluding Teeth
F75 4/8	15	14
F133 5/8	19	17
F634	9	6
F642 7/14	22	18
Other Ditches	24	21
Pits	17	13
F150	17	18
Other Features	23	23
TOTAL	19	17

TABLE SECTION4.16

Percentage of Pig Fragments in Samples of Cattle and Pig

Mandibles and Humeri

3rd-2nd B.C.	Mandible	Humerus
Pits	39	(73)
F55	24	(26)
Other Ditches	49	(64)
Quarries	(49)	(40)
TOTAL %	35	43

1st B.C.	Mandible	Humerus
Pits	(87)	
Gullies	23	(40)
Quarries	52	(46)
TOTAL %	46	44

1st A.D.	Mandible	Humerus
F75 1/4	27	(48)
F132 2/6	37	(35)
F133 1/2	35	(45)
F370	47	44
F642 1/4	33	38
Other Ditches	32	(36)
Pits	(44)	
Quarries	52	
Track Gullies	39	33
TOTAL %	39	39

1st-2nd A.D.	Mandible	Humerus
F133 3/4	33	45
F642 5/6	22	(26)
Other Ditches	31	
Other Features	45	(67)
TOTAL %	32	41

Context	Mandible	Humerus
F75 4/8	(28)	(19)
F133 5/8	17	28
F634	11	(11)
F642 7/14	25	24
Other Ditches	21	(30)
Pits	(22)	
F150	32	(33)
Other Features	27	(28)
TOTAL %	22	24

( ) = derived from small sample.

TABLE SECTION4.17

Cattle and Pig Mandibles: Whole Bone Equivalent Calculations
and Number of Specimens with Surviving Cheek Teeth

3rd-2nd B.C.	Cow WBE	Pig WBE	%Pig	Cow CT	Pig CT	%Pig
Pits	10.75	7.75	42	14	14	50
F55	23.80	12.95	35	21	19	48
Other Ditches	11.90	6.35	35	18	9	33
Quarries	3.05	2.05		1	7	
TOTAL	49.50	29.10	37	54	49	48

1st B.C.	Cow WBE	Pig WBE	%Pig	Cow CT	Pig CT	%Pig
Pits	0.35	2.80		1	2	
Gullies	11.00	6.55	37	8	11	58
Quarries	14.20	14.75	51	12	28	70
TOTAL	25.55	24.10	49	21	41	66

1st A.D.	Cow WBE	Pig WBE	%Pig	Cow CT	Pig CT	%Pig
F75 1/4	12.70	2.65		12	5	29
F132 2/6	14.90	9.55	39	10	13	57
F133 1/2	24.90	15.15	38	27	30	53
F370	33.55	26.80	44	22	50	69
F642 1/4	22.10	17.20	44	15	28	65
Other Ditches	20.30	5.05	20	16	8	33
Pits	7.50	4.20		5	5	
Quarries	10.20	7.30	42	10	12	55
Track Gullies	29.65	19.00	39	26	32	55
TOTAL	175.80	106.90	38	143	183	56

1st-2nd A.D.	Cow WBE	Pig WBE	%Pig	Cow CT	Pig CT	%Pig
F133 3/4	32.05	20.40	39	22	37	63
F642 5/6	16.30	6.05	27	6	12	67
Other Ditches	10.35	4.50		8	8	50
Other Features	7.10	4.85		3	7	
TOTAL	65.80	35.80	35	39	64	62

Context	Cow WBE	Pig WBE	%Pig	Cow CT	Pig CT	%Pig
F75 4/8	5.05	2.10		7	8	
F133 5/8	27.75	6.95	20	17	15	47
F634	15.75	2.85	15	17	5	23
F642 7/14	20.45	7.20	26	15	15	50
Other Ditches	13.70	4.90	26	11	8	42
Pits	3.70	0.80		1	3	
F150	9.40	3.85		4	7	
Other Features	10.55	4.20	28	8	8	50
TOTAL	106.35	32.85	24	80	69	46

WBE = Whole Bone Equivalent; CT = number of specimens with cheek teeth; %Pig = percentage of pig.

TABLE SECTION4.18

Pig expressed as a Percentage of Cattle and Pig Fragments in Iron Age and Romano-British Samples from Wessex

Site	Date	Cattle	Pig	%Pig	Source
Old Down Farm Ph.3	EIA	302	92	23	Maltby 1981b
Ph.5	MIA	401	86	18	
Balksbury 1973	EIA	272	72	21	Maltby AML
	MIA	1542	282	15	Report
	RB	438	60	12	
Winnall Down Ph.3 Pts	EIA	142	61	30	Maltby 1985b
Ph.3 Ditch	EIA	297	31	9	
Ph.3 Other	EIA	260	31	11	
Ph.4	MIA	838	259	24	
Ph.6	ERB	831	129	13	
Chilbolton Down	MIA	113	15	12	Maltby 1984a
Groundwell Farm	IA	556	1288	70	Coy 1982
Winklebury	E-MIA	757	263	26	Jones 1977
Danebury Early Phase	EIA	2724	1796	40	Grant 1984a
Middle Phase	EIA	1130	1244	52	
Late Phase a	EIA	1287	1108	46	
Late phase b	MIA	5536	2074	27	
Micheldever Wood Ph.2	M-LIA	836	326	28	Coy AML
Ph.3-4	LIA-ERB	320	154	32	Report 3288
Rope Lake Hole	MIA	271	52	16	Coy AML
	LIA	402	74	16	Report 4070
	RB	330	84	20	
Cowdery's Down Ph.3B	ERB	246	35	13	Maltby 1983a
Little Somborne	IA	268	45	14	Locker 1981
Little Somborne	ERB	116	20	15	Maltby 1984b
	LRB	145	16	10	
Staple Gardens,	ERB	92	60	39	Maltby n.d.
Winchester Ph.12	LRB	136	36	21	
Ph.13-18	LRB	186	387	32	
Portchester Castle	LRB	10774	2654	20	Grant 1975
South Gate,	ERB	201	70	26	Maltby 1984c
Silchester	LRB	164	91	36	
Forum + Basilica, Ph.1	LIA	82	72	47	Grant 1985
Silchester Ph.2	ERB	789	975	55	
Ph.3	ERB	606	534	57	
Ph.4	LRB	467	276	37	
Fishbourne Ph.1	ERB	316	486	61	Grant 1971
Ph.2-3	RB	295	344	54	
Destruct.	LRB	145	110	43	
Cleavel Point, Ph.1-2	ERB	101	238	70	Coy AML
Ower Ph.7	LRB	181	79	30	Report 3592

IA = Iron Age; RB = Romano-British; E = Early; M = Middle; L = Late. %Pig = pig expressed as a percentage of total of cattle and pig fragments. Ph. = phase or period.

TABLE SECTION 4.19

Pig Expressed as a Percentage of Sheep/Goat and Pig Fragments

3rd-2nd B.C.	Total Frags.	Excluding Teeth
Pits	17	19
F55	22	26
Other Ditches	37	39
Quarries	30	34
TOTAL	23	27

1st B.C.	Total Frags.	Excluding Teeth
Pits	26	25
Gullies	25	26
Quarries	25	26
TOTAL	25	26

1st A.D.	Total Frags.	Excluding Teeth
F75 1/4	23	26
F132 2/6	33	37
F133 1/2	34	34
F370	39	43
F642 1/4	33	36
Other Ditches	25	29
Pits	29	32
Quarries	29	33
Track Gullies	26	30
TOTAL	31	35

1st-2nd A.D.	Total Frags.	Excluding Teeth
F133 3/4	32	36
F642 5/6	23	26
Other Ditches	23	27
Other Features	28	32
TOTAL	28	32

Context	Total Frags.	Excluding Teeth
F75 4/8	13	18
F133 5/8	16	20
F634	14	16
F642 7/14	19	19
Other Ditches	17	21
Pits	14	21
F150	13	21
Other Features	19	26
TOTAL	16	21

TABLE SECTION4.20

Percentage of Pig Fragments in Samples of Sheep/Goat and Pig

Mandibles, Humeri and Tibiae

3rd-2nd B.C.	Mandible	Humerus	Tibia
Pits	28	21	9
F55	33	33	9
Other Ditches	52	(56)	22
Quarries	(51)		
TOTAL %	37	36	12

1st B.C.	Mandible	Humerus	Tibia
Pits	22		(12)
Gullies	16	(50)	(19)
Quarries	36	(36)	15
TOTAL %	28	38	15

1st A.D.	Mandible	Humerus	Tibia
F75 1/4	24	(37)	(16)
F132 2/6	37	(50)	(23)
F133 1/2	45	(49)	28
F370	53	47	25
F642 1/4	37	47	15
Other Ditches	24	(34)	18
Pits	(39)	(31)	(23)
Quarries	45		(24)
Track Gullies	36	45	16
TOTAL %	39	43	20

1st-2nd A.D.	Mandible	Humerus	Tibia
F133 3/4	36	43	21
F642 5/6	23	(38)	15
Other Ditches	32		(19)
Other Features	46	(43)	8
TOTAL %	34	40	17

Context	Mandible	Humerus	Tibia
F75 4/8	(28)		(8)
F133 5/8	17	26	13
F634	(19)		(15)
F642 7/14	20	(28)	13
Other Ditches	23	26	12
Pits	(17)		(-)
F150	36	(30)	13
Other Features	34	(31)	(6)
TOTAL %	22	28	12

( ) = derived from small sample.

TABLE SECTION4.21

Sheep/Goat and Pig Mandibles: Whole Bone Equivalent Calculations

and Number of Specimens with Surviving Cheek Teeth

3rd-2nd B.C.	S/G WBE	Pig WBE	%Pig	S/G CT	Pig CT	%Pig
Pits	21.95	7.75	26	31	14	31
F55	23.95	12.95	35	32	19	37
Other Ditches	13.25	6.35	32	19	9	32
Quarries	5.70	2.05		10	7	41
TOTAL	64.85	29.10	31	92	49	35

1st B.C.	S/G WBE	Pig WBE	%Pig	S/G CT	Pig CT	%Pig
Pits	13.30	2.80	17	25	2	7
Gullies	24.20	6.55	21	36	11	23
Quarries	27.90	14.75	35	37	28	43
TOTAL	65.40	24.10	27	98	41	29

1st A.D.	S/G WBE	Pig WBE	%Pig	S/G CT	Pig CT	%Pig
F75 1/4	16.70	2.65	14	21	5	19
F132 2/6	26.20	9.55	27	36	13	27
F133 1/2	26.15	15.15	37	37	30	45
F370	26.55	26.80	50	36	50	58
F642 1/4	34.20	17.20	33	52	28	35
Other Ditches	31.30	5.05	14	38	8	17
Pits	6.75	4.20		10	5	33
Quarries	10.05	7.30	42	16	12	43
Track Gullies	41.85	19.00	31	61	32	34
TOTAL	219.75	106.90	33	307	183	37

1st-2nd A.D.	S/G WBE	Pig WBE	%Pig	S/G CT	Pig CT	%Pig
F133 3/4	38.10	20.40	35	46	37	45
F642 5/6	28.80	6.05	17	25	12	32
Other Ditches	9.70	4.50		12	8	40
Other Features	11.10	4.85	30	11	7	39
TOTAL	87.70	35.80	29	94	64	41

Context	S/G WBE	Pig WBE	%Pig	S/G CT	Pig CT	%Pig
F75 4/8	6.80	2.10		11	8	42
F133 5/8	32.25	6.95	18	29	15	34
F634	6.75	2.85		12	5	29
F642 7/14	34.75	7.20	17	42	15	26
Other Ditches	13.45	4.90	27	16	8	33
Pits	4.55	0.80		5	3	
F150	9.05	3.85		9	7	44
Other Features	9.40	4.20	28	14	8	36
TOTAL	117.00	32.85	22	138	69	33

WBE = Whole Bone Equivalent; CT = number of specimens with cheek teeth; %Pig = percentage of pig.

TABLE SECTION 4.22

Pig expressed as a Percentage of Sheep/Goat and Pig Fragments

in Iron Age and Romano-British Samples from Wessex

Site	Date	Sheep/G	Pig	%Pig	Source
Old Down Farm Ph.3	EIA	340	92	21	Maltby 1981b
Balksbury 1973	EIA	420	72	15	Maltby AML
	MIA	2308	282	11	Report
	RB	607	60	9	
Winnall Down Ph.3 Pts	EIA	314	61	16	Maltby 1985b
Ph.3 Ditch	EIA	105	31	23	
Ph.3 Other	EIA	170	31	15	
Ph.4	MIA	1307	259	17	
Ph.6	ERB	831	129	13	
Chilbolton Down	MIA	229	15	6	Maltby 1984a
Groundwell Farm	IA	1882	1288	41	Coy 1982
Winklebury	E-MIA	1797	263	13	Jones 1977
Danebury Early Phase	EIA	6633	1796	21	Grant 1984a
Middle Phase	EIA	3955	1244	24	
Late Phase a	EIA	4609	1108	19	
Late phase b	MIA	17574	2074	11	
Micheldever Wood Ph.2	M-LIA	1147	326	22	Coy AML
Ph.3-4	LIA-ERB	356	154	30	Report 3288
Rope Lake Hole	MIA	374	52	12	Coy AML
	LIA	616	74	11	Report 4070
	RB	993	84	8	
Cowdery's Down Ph.3B	ERB	159	35	18	Maltby 1983a
Little Somborne	IA	256	45	15	Locker 1981
Little Somborne	ERB	193	20	9	Maltby 1984b
	LRB	102	16	14	
Staple Gardens,	ERB	84	60	42	Maltby n.d.
Winchester Ph.12-18	LRB	374	222	37	
Portchester Castle	LRB	3212	2654	45	Grant 1975
South Gate,	ERB	91	70	43	Maltby 1984c
Silchester	LRB	73	91	55	
Forum + Basilica, Ph.1	LIA	56	72	56	Grant 1985
Silchester Ph.2	ERB	924	975	51	
Ph.3	ERB	558	534	49	
Ph.4	LRB	1042	276	21	
Fishbourne Ph.1	ERB	334	486	59	Grant 1971
Ph.2-3	RB	198	344	63	
Destruct.	LRB	89	110	55	
Cleavel Point, Ph.1-2	ERB	132	238	64	Coy AML
Ower Ph.7	LRB	175	79	31	Report 3592

IA = Iron Age; RB = Romano-British; E = Early; M = Middle; L = Late. %Pig = pig expressed as a percentage of total of sheep/goat and pig fragments. Ph. = phase or period.

TABLE SECTION4.23

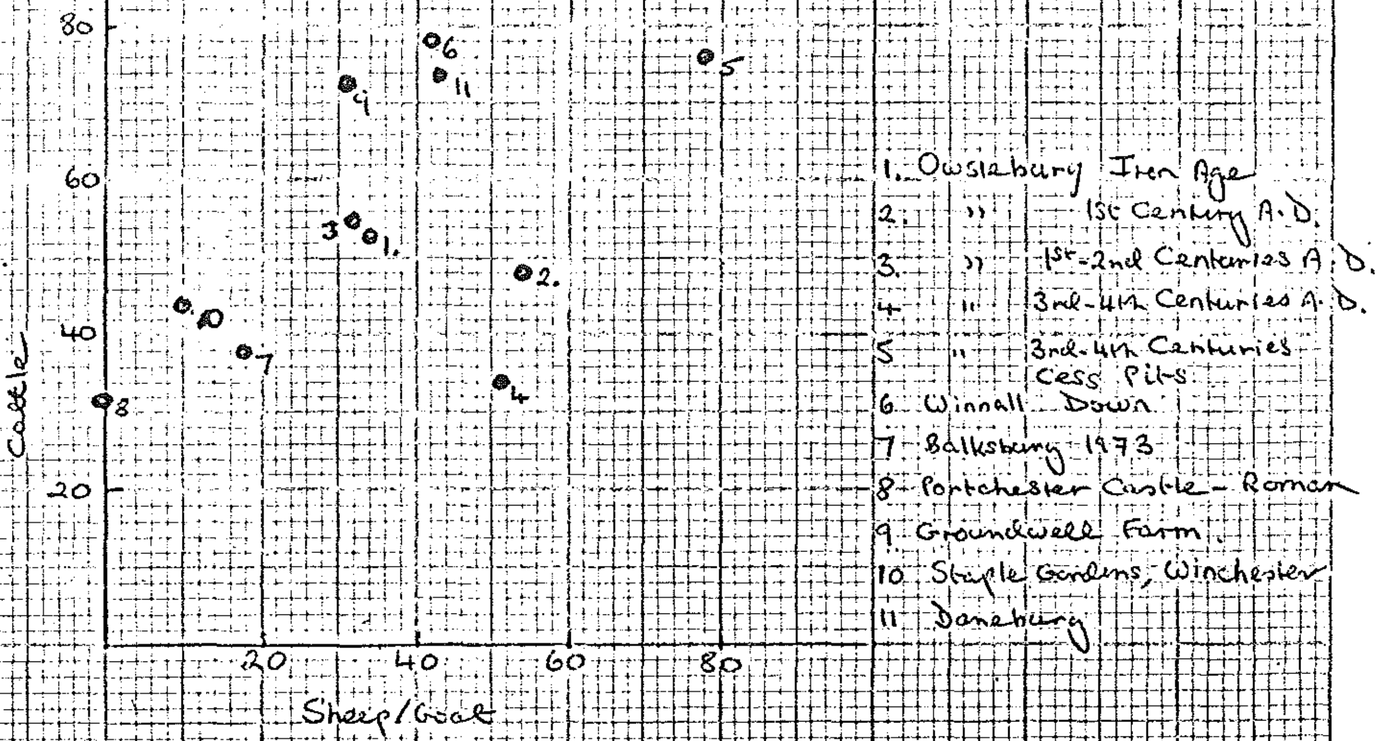
Ovicaprid Fragments identified specifically to Sheep or Goat

(excluding articulated bones)

Period	Sheep	Goat	%Goat
3rd-2nd B.C.	141	25	15
1st B.C.	81	-	-
1st A.D.	441	1	.2
1st-2nd A.D.	154	8	5
3rd-4th A.D.*	175	6	3
TOTAL	992	40	4

* excluding bones from cess pits and F724.

FIGURE SECTION 4.1



Percentage of Second Phalanges compared to First Phalanges in Samples from Owslebury and other Contemporary Assemblages

FIGURE SECTION4.2

Comparison of Erosion and Loose Teeth Indices

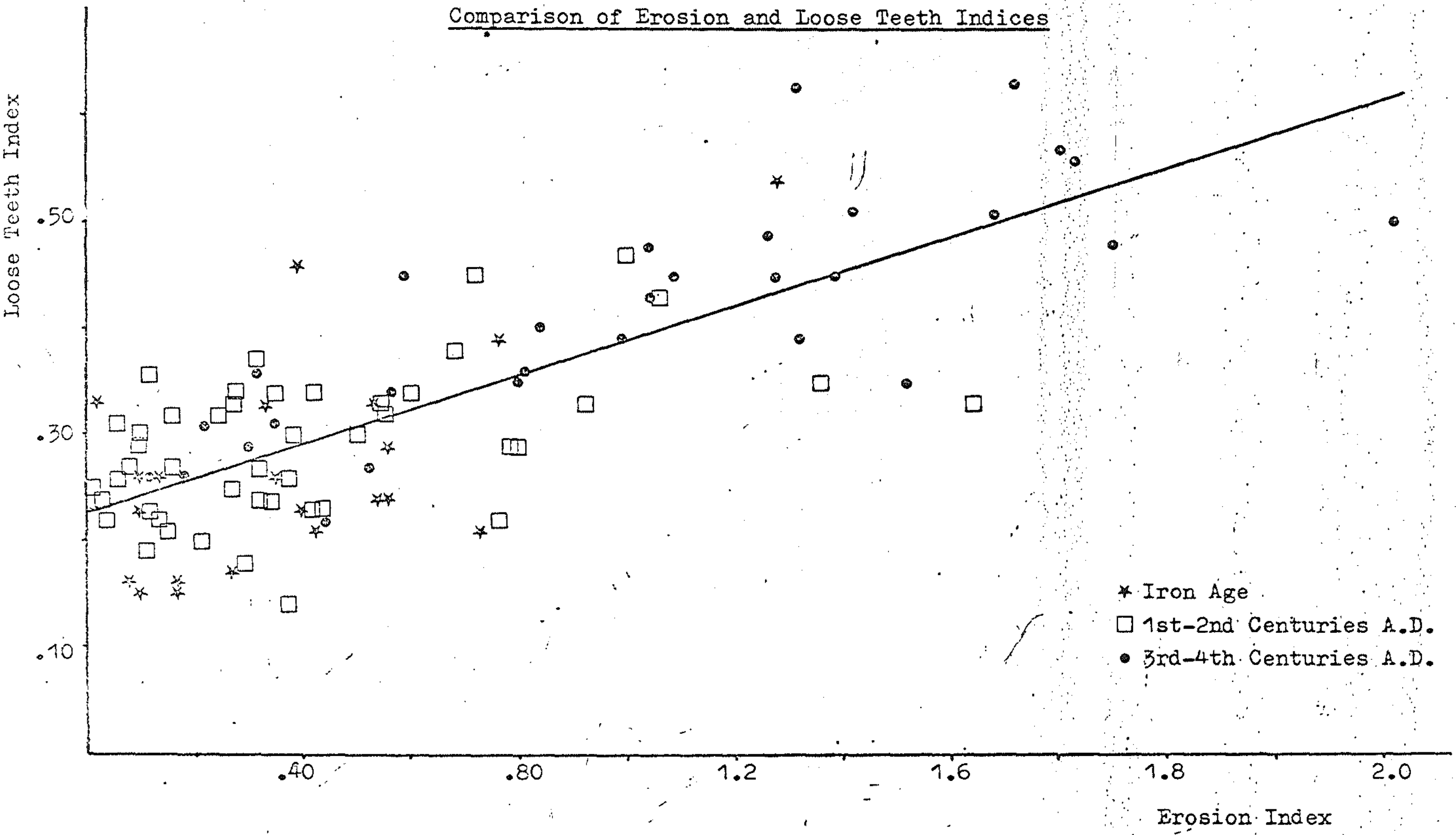


FIGURE SECTION 4.3

Proportion of Loose Teeth in Cattle and Sheep/Goat Samples

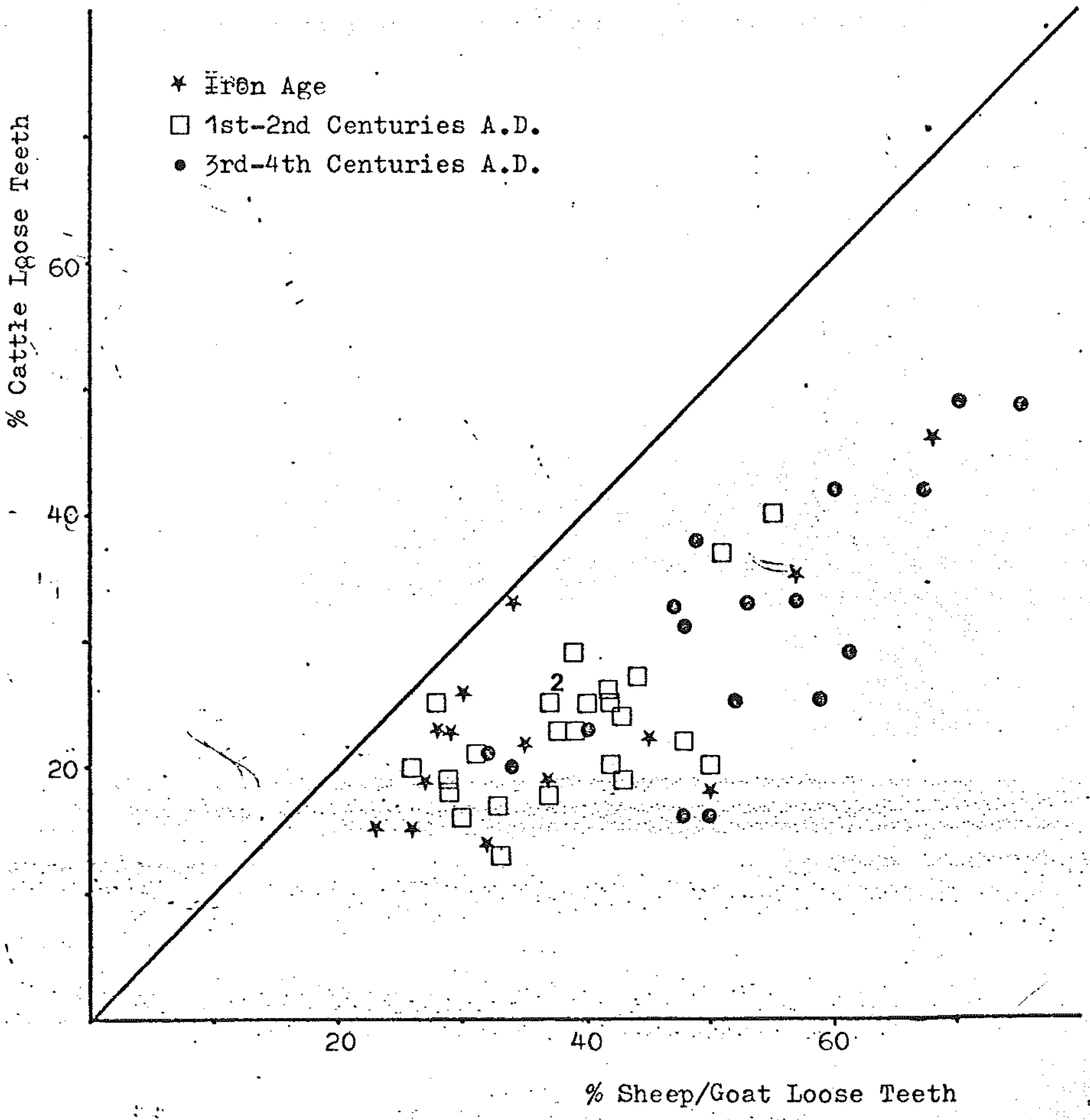


FIGURE SECTION4.4

Comparison of Gnawing and Erosion Indices

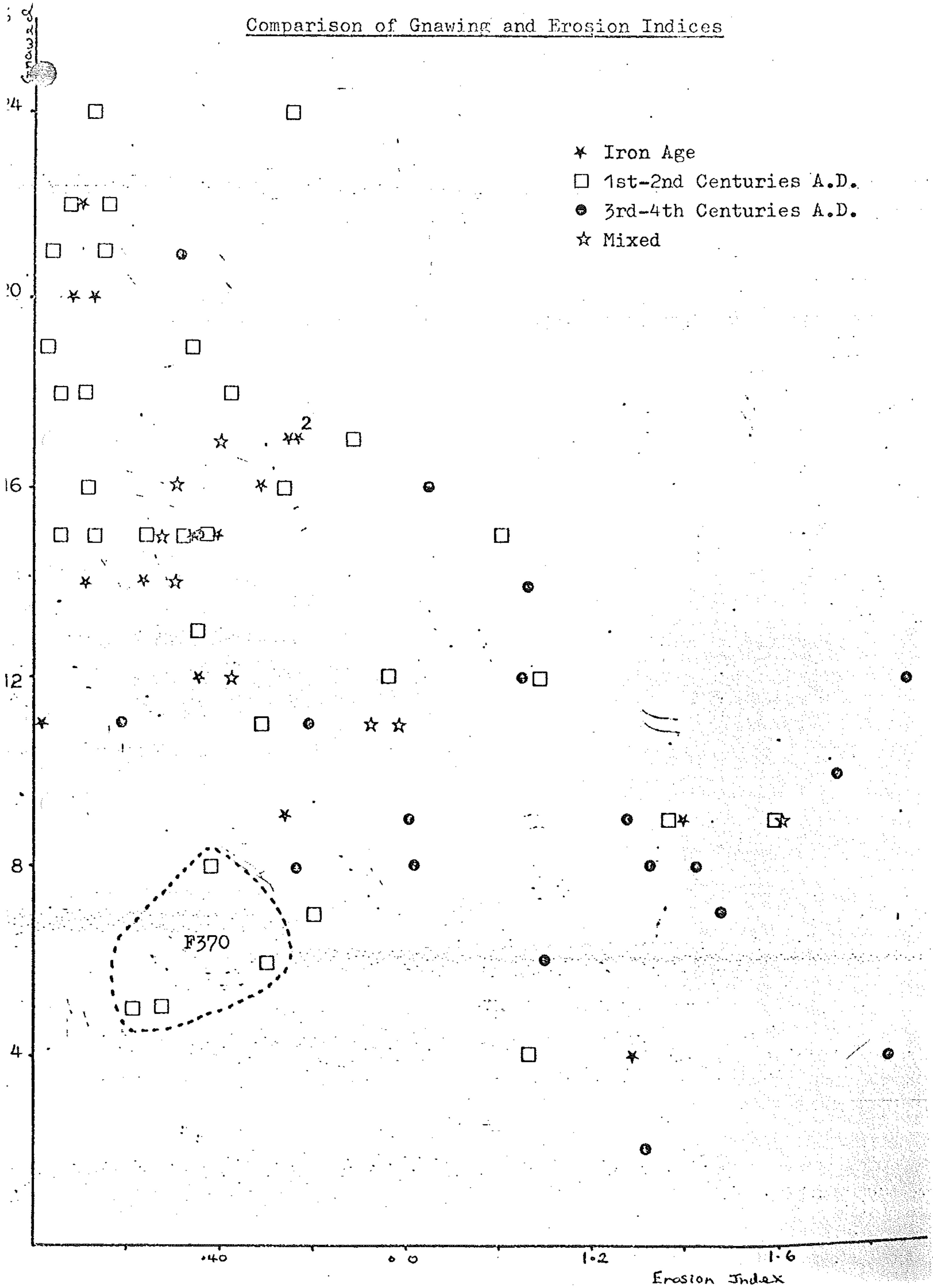


FIGURE SECTION4.5

Comparison of the Relative Abundance of Sheep/Goat Skull and Mandible Fragments

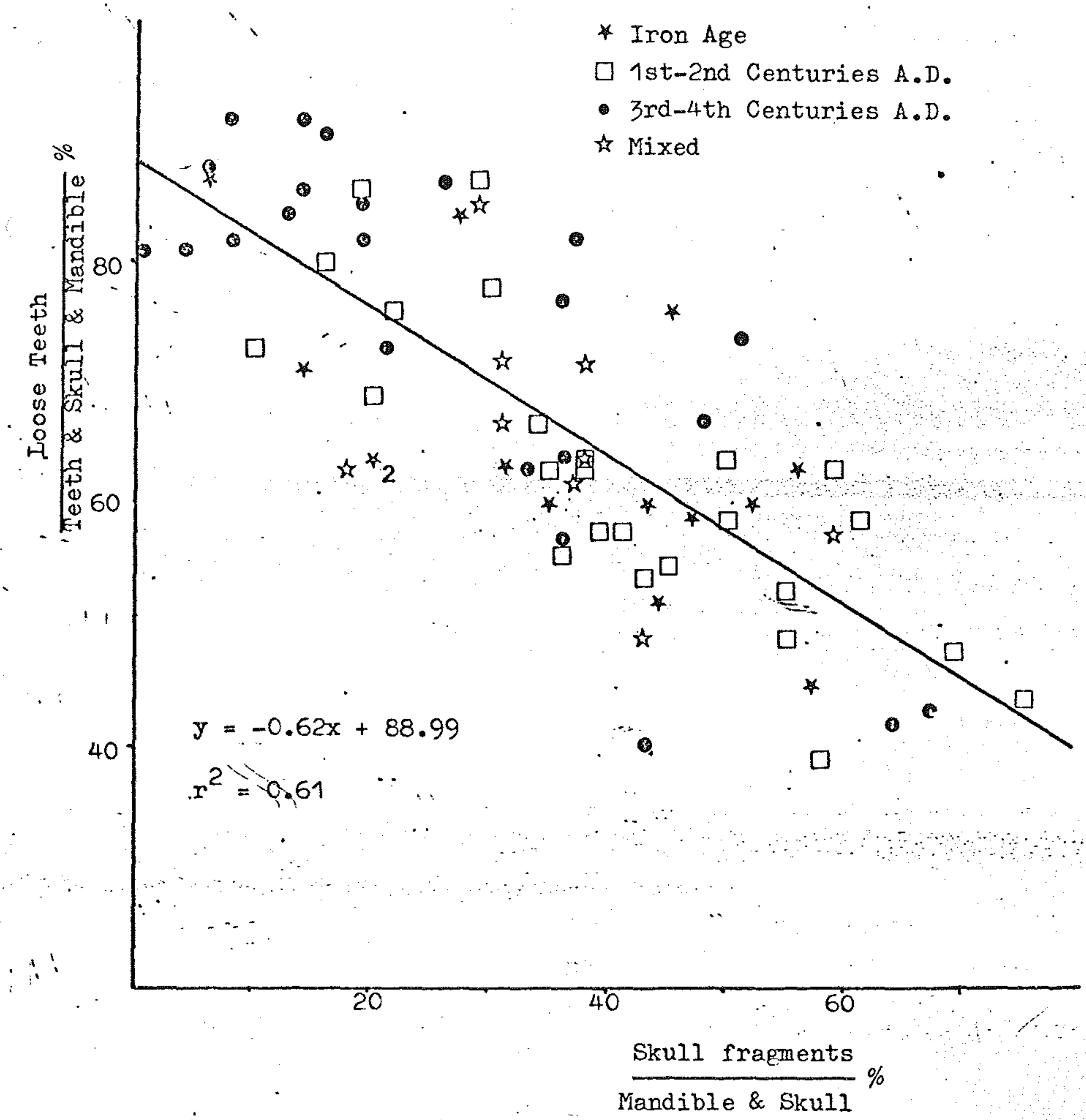


FIGURE SECTION 4.5

PERCENTAGES OF SHEEP/GOAT AND CATTLE FRAGMENTS

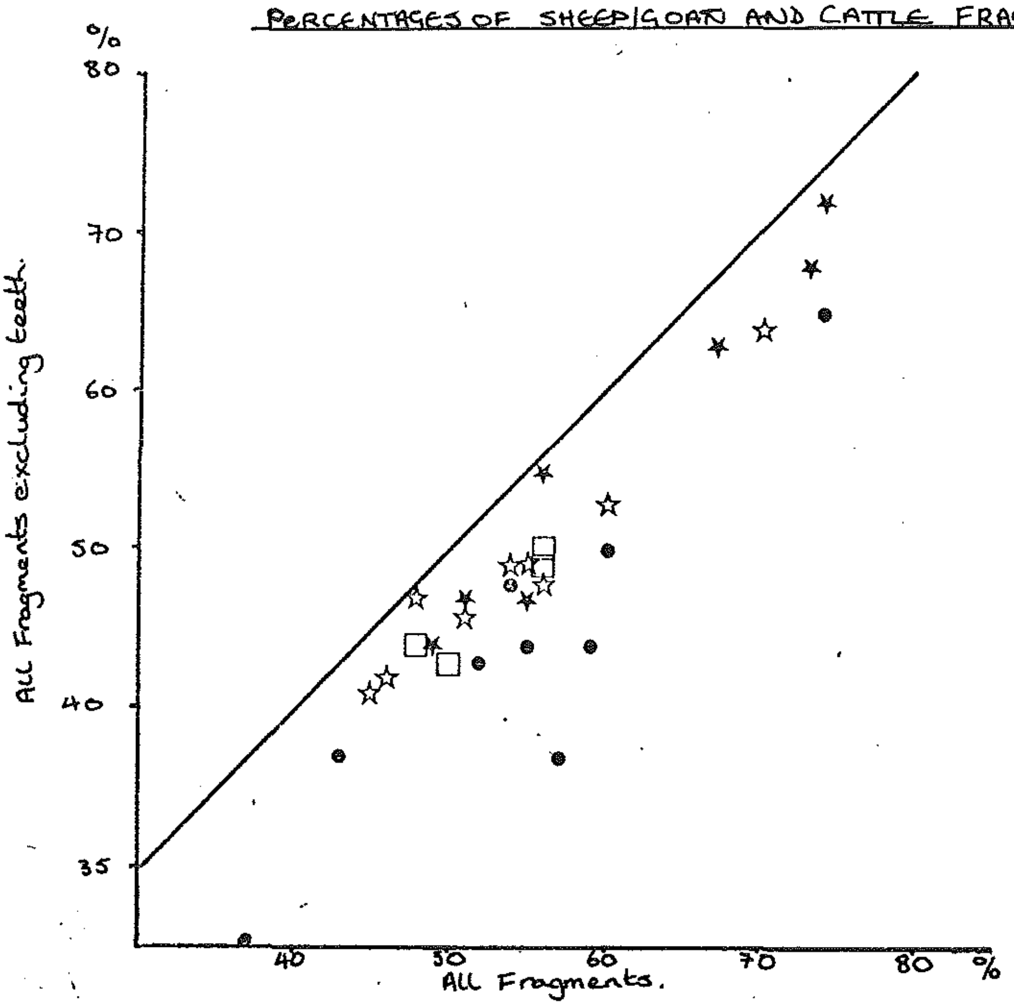
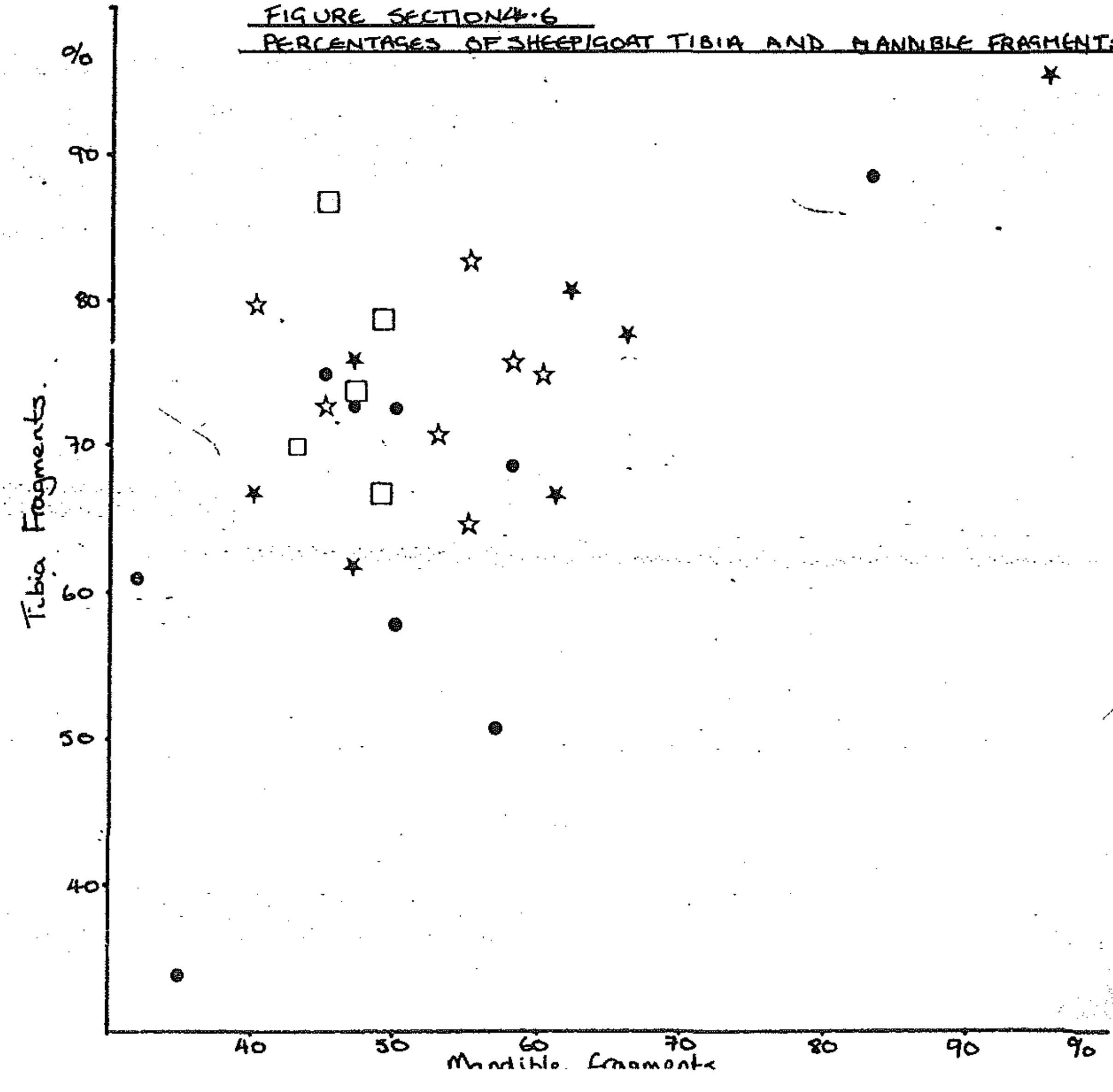
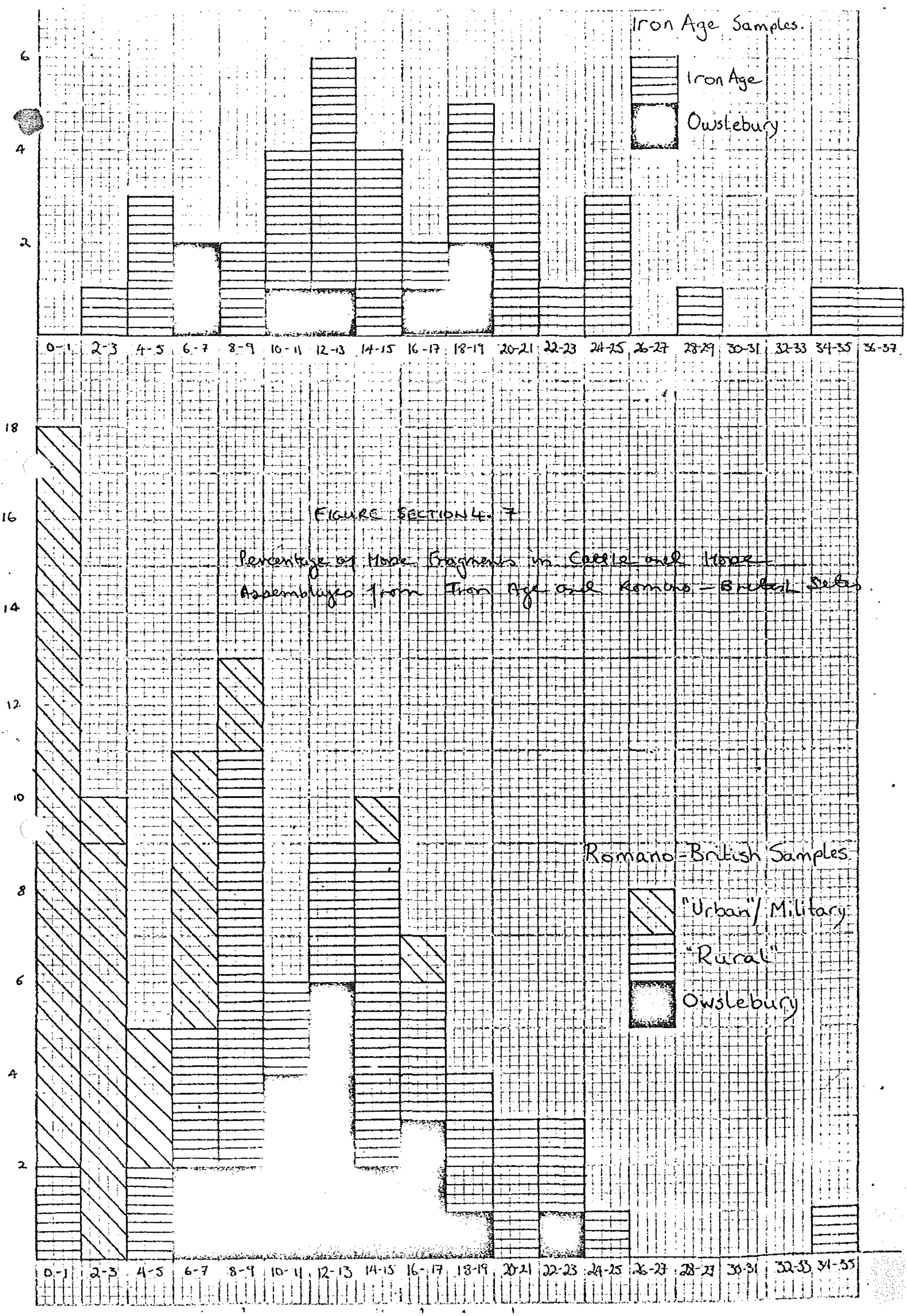


FIGURE SECTION 4.6

PERCENTAGES OF SHEEP/GOAT TIBIA AND MANDIBLE FRAGMENTS




Iron Age Samples.
Iron Age
Owslebury
6
4
2
0-1
2-3
4-5
6-7
8-9
10-11
12-13
14-15
16-17
18-19
20-21
22-23
24-25
26-27
28-29
30-31
32-33
34-35
36-37
FIGURE SECTION 4. 7
Percentage of Horse Fragments in Cattle and Horse
Assemblages from Iron Age and Romano-British Sites.
18
16
14
12
10
8
6
4
2
Romano-British Samples.
"Urban"/ Military
"Rural"
Owslebury
0-1
2-3
4-5
6-7
8-9
10-11
12-13
14-15
16-17
18-19
20-21
22-23
24-25
26-27
28-29
30-31
32-33
34-35

SECTION 5

AGEING ANALYSIS OF THE MAJOR DOMESTIC SPECIES

INTRODUCTION

One of the most important aspects of animal bone studies is the examination of ageing data. By studying the mortality rates of the various species, it is possible to provide information about the exploitation of the animals represented at the settlement. For example, the presence of a high number of neonatal mortalities may suggest that the animals were bred by the inhabitants of the settlement. A concentration of immature animals may indicate the preferred age and season for the culling of young animals for their meat. A high representation of mature animals may suggest that meat was of secondary importance to other considerations, such as the need to maintain adequate supplies of milk, wool, traction power, transport animals and breeding stock.

Of course there are problems of interpretation of such data. Ageing analysis of archaeological faunal material usually involves the study of data on tooth eruption and wear and epiphyseal fusion, or a combination of the two (Wilson, Grigson and Payne 1982). The reliability of epiphyseal fusion data is questionable in samples severely affected by scavenging and erosion. The fusion points of young animals survive less well than the denser bones of older specimens, since unfused articulations are less likely to survive than fused ones. Articulations in general are especially at the mercy of canid scavengers (Binford 1981: 51-77). The problems are increased by the fact that there is a large amount of variability in the ages that fusion occurs because of factors such as domestication, castration, breed and planes of nuitrition (Noddle 1974; Bull and Payne 1982; Bullock and Rackham 1982). Consequently, although fusion data were recorded at Owslebury, the analysis of ageing will be restricted principally to the study of mandibular toothwear and eruption.

There have, however, also been marked variations in the rate of development of teeth in domestic species during the last 2,000 years. Although advances have been made in the study of eruption and wear of teeth from archaeological samples in recent years, many doubts remain about the absolute ages of the various stages of dental development observed in the assemblages. Estimates of the approximate age of the various stages of development will be given for each species but it is generally recognised that comparisons with modern breeds may sometimes be misleading because of the improvements in the rates of dental development in some breeds over the last few centuries. The study of the Owslebury mandibles should be regarded principally as a comparison of the relative, as opposed to the absolute, ages of the animals represented. Until further detailed work is done to investigate the dental development of primitive breeds (e.g. Deniz and Payne 1982), or on the analysis of incremental growth on teeth from archaeological specimens (e.g. Coy et al. 1982), estimates of absolute age should be treated with great caution.

It has already been shown (Sections 2-4) how greatly different contexts, preservation conditions and disposal practices can affect faunal assemblages. Ageing data are not immune from this. Analysis of the mandibles from the Iron Age levels at Winnall Down suggested, for example, that there were significant differences in the ages of sheep/goat recovered from pits and the enclosure ditch (Maltby 1982: 88-89). The analysis of the mandibles from Owslebury attempts to take such factors as preservation and context into account. It should also be remembered that the animals represented at Owslebury do not necessarily reflect the overall exploitation pattern of these species in the region in any given period. Redistribution and marketing of animals especially to Winchester may have had a profound effect on the ages of animals represented at different settlements in the redistribution network.

All mandibles of cattle, sheep/goat and pig were recorded using the toothwear recording system of Grant (1975; 1982). Using this method, wear stages are calculated according to the stage of eruption and degree of wear on the three molars. At Owslebury, where many of the mandibles were fragmentary, heavy reliance had to be made on estimated wear stages. The analysis of the mandibles was divided into two halves. The specimens were divided where possible into several stages of development and the results from different periods and context types compared. This method also allowed data concerning the deciduous and permanent premolars to be taken into condsideration. Secondly, the results from the analyses of the Grant wear stages were considered. Analysis of the horse and dog mandibles was restricted to the first stage of the analysis.

THE CATTLE MANDIBLES

348 fragments of cattle mandible had sufficient evidence of dental development to be included in this analysis. In cases where pairs of articulated mandibles were recovered, data from only one of them was used. The specimens were divided into four main chronological groups (Iron Age, 1st Century A.D., 1st-2nd Century A.D., 3rd-4th Century A.D.). Within each group the results are presented by context type, or by individual feature in the case of a few large assemblages (Tables CowJaw.1-4).

Initially the mandibles were divided where possible into six stages of development:-

Stage 1 - deciduous 4th premolar (d4) not in wear.
Stage 2 - d4 in wear; 1st molar (M1) not in wear.
Stage 3 - M1 in wear; 2nd molar (M2) not in wear.
Stage 4 - M2 in wear; 3rd molar (M3) not in wear.
Stage 5 - M3 in wear; 4th permanent premolar (P4) not in wear.
Stage 6 - P4 in wear.

In a few cases fragmentary specimens could not be assigned to a particular stage but could have belonged to one of two stages. These are shown in the relevant tables.

Adapting Higham's (1967) scheme for the estimated ages of these stages, Stage 1 = < 3 weeks; Stage 2 = 1-9 months; Stage 3 = 8-18 months; Stage 4 = 18-30 months; Stage 5 = 30-40 months;

Stage 6 = > 40 months. However, such figures should be treated merely as a guide. Andrews (1982: 142) has demonstrated that potential errors of age estimates increase in older mandibles due to differential rates of dental development. Consequently absolute age estimates of the later Stages are very approximate.

Iron Age

72 mandibles are considered (Table CowJaw.1). Almost half of them were recovered from enclosure ditches dated to the 3rd Century B.C. Most of the specimens from the pits were also of that date. The quarries and smaller gullies were dated mainly to the 1st Century B.C. In all context types apart from the 3rd Century B.C. ditches, over half of the mandibles had reached Stage 6 and belonged to cattle over 40 months old. The 3rd Century B.C. ditches contained a rather greater proportion of animals killed between Stages 4-5 (18-40 months). These would have belonged to immature animals culled for their meat. Some of the pits and enclosure ditches also contained a few mandibles at Stage 2. These belonged to calves probably under a year old.

Erosion scores were noted on these mandibles and an overall index of .33 was calculated - a relatively low figure. However, the pits and 3rd Century B.C. ditches generally contained better preserved faunal assemblages and it is possible that the higher proportion of immature animals in these contexts was partially due to this rather than a change in culling practices in the 1st Century B.C. Overall, 46% of the mandibles did not reach full dental maturity and 23% of the specimens were at Stage 4 (18-30 months). Such figures suggest a deliberate policy of culling some of the immature stock for meat at that age.

1st Century A.D.

148 mandibles of this date bore evidence of tooth eruption and wear. 102 of these were found in various ditches and gullies. Those from layers 1-2 of F133, F370 and layers 1-4 of F642 are listed separately. Of the mandibles recovered from the ditches and gullies, 65% had reached Stage 6. However, the largest ditch assemblages, particularly F133 and F370 contained even higher percentages of mature specimens (Table CowJaw.2). In this instance differential preservation does not appear to have been the major cause of variability since F133 and F370 contained few eroded bones and the latter had relatively few gnawed bones as well (see Section 2). It is possible that the variations are due to some extent to different disposal practices in the lower layers of these large ditches. Primary dumps may be more likely to include bones of large adult animals. Nine of the specimens in the other gullies of this date were at Stage 4. Mandibles from the quarries and track gullies also contained a fair proportion of mandibles at the same stage. Five examples were recovered from F633. A total of nine mandibles belonged to very young calves (Stage 1).

Overall, 64% of the mandibles in these deposits belonged to adult animals, 6% were at Stage 1 and 15% at Stage 4. These results show that although the majority of cattle reached dental maturity, there was a significant kill-off of immature animals aged between 18-30 months. The observed variations of immature animals in the deposits could be partially due to variable disposal strategies. In addition, there may have been significant changes in cattle exploitation within this period, but it was impossible to separate out sufficently large samples of Pre-Conquest and late 1st Century A.D. material for comparison. The presence of neonatal cattle mandibles merely indicates that cattle husbandry was practised by the inhabitants. Large numbers of bones of young calves have been found on a few prehistoric sites in Britain and it has been suggested that their presence indicates dairy production was an important aspect of cattle husbandry (Legge 1981). However, the numbers of such animals represented at Owslebury are lower than would be expected in such exploitation systems.

The overall erosion index for ageable cattle mandibles in the 1st Century A.D. deposits was .29, comparable to the Iron Age samples.

1st-2nd Century A.D.

Only 40 mandibles with sufficient tooth eruption evidence were assigned to this period. Most of them were from layers 3-4 of F133 and layers 5-6 of F642. The sample from F133 contained a greater proportion of immature animals than in its lowest layers. Although the samples are relatively small, this lends support to the theory that the lowest layers, which included more primary disposal of bones, were biased more towards adult animals. Overall, 53% of the mandibles had reached dental maturity (Stage 6) but 20% were only at Stage 4, showing that there was still a significant cull of animals of that age (Table CowJaw.3). The preservation of mandibles in these deposits was poorer than the earlier deposits. The ageable mandibles had a higher erosion index of .60.

3rd-4th Century A.D.

88 mandibles of this date were recorded. Again, most of them (65) were recovered from various ditches and gullies. The samples from F133 (layers 5-8), F634 and F642 (layers 7-14) are considered separately (Table CowJaw.4).

A much higher proportion (68%) of mandibles at Stage 6 of the tooth eruption sequence was recovered from the various ditches and gullies than from the earlier deposits, although the sample still contained a significant number of mandibles at Stage 4 (14%). Whether this reflects a further shift towards the culling of adult cattle is clouded by the fact that the preservation of bones in the 3rd-4th Century A.D. ditches and gullies was comparatively poor. The mandibles from F634, in particular, were heavily eroded and this may have biased the sample towards sturdier mandibles of older animals. Nearly all the mandibles found in the top two layers of F133, which also had high erosion indices (Table F133.3), were at Stage 6. The better preserved samples from layers 5-6 contained a slightly higher proportion of immature specimens. Most of the specimens from F642 were from layer 7 (3rd Century A.D.). The erosion index for that layer (.35) was quite low and a larger number of immature cattle mandibles were recovered. Most of the bones from the other gullies of 3rd-4th Century A.D. date were eroded and only three immature specimens were recovered from them.

Most of the other mandibles of this date were found in cess pits and some of these belonged to articulated groups. Only seven of the 12 specimens could be assigned to Stage 6. Overall from the 3rd-4th Century A.D. deposits, 65% of the mandibles had completed the tooth eruption sequence (Stage 6) with 11% each at Stages 4 and 5. The overall erosion index was .98. Therefore, although a change in the kill-off pattern of cattle favouring older animals cannot be entirely ruled out, the increase in the proportion of mandibles at Stage 6 does appear to correlate positively with a decrease in the standards of preservation in these deposits. It has been shown in Section 4 how cattle loose teeth indices in these more poorly preserved deposits. By implication this indicates that a greater proportion of the mandibles and maxillae had been destroyed (or at least had lost their teeth). It is more likely that immature mandibles were affected by such processes than adult ones.

Grant Wear Analysis

309 mandibles were complete enough to be included in this study. Although exact wear stages were calculated whenever possible, the fragmentary nature of most of the cattle mandibles meant that many results had to be estimated and the mandibles therefore could not be assigned to a single wear stage. Most, however could be assigned with confidence to within a few stages. In this analysis the mandibles are divided into groups covering 5 Grant wear stages (1-5, 6-10 etc.). Such groupings to some extent counteract the problem that analyses using exact wear stages only tend to be biased against the generally more fragmented older specimens (Grant 1984a: 511-512). The results are given in Table CowJaw.5, in which the mandibles from the four main chronological divisions are compared. The wear stage groups do not necessarily last for equal lengths of time. As a guide, the following Grant wear stages roughly correlate to the 6-Stage scheme used above:-

Stage 3 (M1 in wear) - from Grant wear stage 8.
Stage 4 (M2 in wear) - from Grant wear stage 17.
Stage 5 (M3 in wear) - from Grant wear stage 30.
Stage 6 (P4 in wear) - from Grant wear stage 38.

As it happens, the Grant wear stage groups do correspond roughly with the age in months for the inception of Stages 3-6 using Higham's (1967) estimates. However, such figures should be again be regarded as a minimum age.

Most of the cattle from all periods, as we saw above, had fully developed toothrows. Consequently most of the mandibles obtained Grant wear stages of over 40. The percentage of mandibles reaching these stages ranged from 48% in the Iron Age deposits to 63% in the 3rd-4th Century deposits. The increase may again merely reflect the poorer preservation of immature specimens in the later deposits. However, there is an interesting increase in the number of mandibles of very old cattle. These possessed Grant wear stages of over 45. Only 7%

of the Iron Age specimens reached this stage compared to over 20% in all the Romano-British samples. It is unlikely that this merely reflects differential preservation of the samples. In particular, there was not a lot of difference in the overall erosion indices of the Iron Age and 1st century A.D. samples. Nor is it likely that mandibles with Grant wear stages of 41-45 would be more susceptible to destruction than specimens with values of over 45. Yet the ratio of these dropped from 6:1 in the Iron Age deposits to 1.6:1 in the 1st Century A.D. features and further to 1.2:1 in the 3rd-4th Century A.D. sample. The results thus indicate that a significantly larger proportion of old cattle were consumed at the settlement in the Romano-British period.

Although the emphasis was on adult animals, there was also a significant kill-off of immature animals between Grant wear stages 16-25 in all periods. These were animals presumably culled for meat as they were probably too young to have bred or to have been used as working animals.

Discussion

Complete interpretation of these kill-off patterns must take into account the evidence for the proportion of cows, castrates and bulls in the adult population (see Section 6) and the very real possibility that they are not representative of cattle exploitation in the area during any of the periods, because of trade and redistribution of livestock and carcases between settlements. This means that the results have to be compared with those obtained from other sites. A full discussion of the possible interpretations of cattle husbandry at Owslebury is given in Section 10. However, it seems appropriate here to view the mortality data in the light of other studies from contemporary settlements in southern England.

Iron Age

The largest comparable sample has been excavated at Danebury (Grant 1984a: 511-512). To adapt the results from the pits of the Late (b) phase (300-100/50 B.C.) at Danebury, 29% of the cattle mandibles belonged to young calves without the M1 in wear (Stages 1-2). This was a significantly higher percentage than at Owslebury and was higher than those obtained from the Middle Iron Age deposits at Balksbury (Maltby 1981a: 180) and Winnall Down (Maltby 1985b: 106). These latter samples both contained a larger proportion of young cattle than at Owslebury but it should be remembered that the samples from Danebury, Balksbury and Winnall Down were all recovered mostly from pits, whereas Owslebury's Iron Age sample was obtained mainly from ditches and gullies. The variations between the sites therefore may be the result of differential preservation or different disposal practices.

Only 9% of the mandibles from Danebury were at Stage 4 (M2 in wear; M3 not in wear). Mandibles of this age were also rare in the Middle Iron Age deposits at Winnall Down and Old Down Farm (Maltby 1981b) and formed only about 10% of the sample at Balksbury. The small Iron Age sample from the banjo enclosure at Micheldever Wood, Hampshire contained no specimens at that stage of development (Griffiths AML Report 2647). The percentage of animals at that stage at Owslebury is therefore comfortably the highest of the Hampshire Iron Age sites from where suitable comparative data are available. Further North, two samples have been examined that contained very high percentages of immature cattle of that age group. These are from Barton Court Farm, Oxfordshire (Hamilton 1978) and Odell, Bedfordshire (Grant 1984b: 108). However those samples differ from the one from Owslebury in that they contained very few adult specimens.

On all the comparable Iron Age sites in Hampshire, however, the greatest percentage of animals had attained full dental maturity. The figures range from 43% at Danebury, to 54% at Owslebury, 56% at Winnall Down and 63% at Balksbury. Apart perhaps from the Balksbury sample, the distributions of the specimens reach a peak between Grant wear stages 41-45 with relatively few cattle seemingly kept to a very old age.. The emphasis on the killing mainly of adult stock would imply that many of the cattle were kept for breeding purposes or as working animals. Ownership of large numbers of cattle may also have been indicative of status and wealth in the communities involved and there may accordingly have been a reluctance to dispose of such a valuable commodity (either in exchange or consumption) unless it was absolutely necessary. Such an attitude would result in an emphasis in killing mainly adult animals.

Romano-British Period

Comparisons with Romano-British settlements in Hampshire are more limited. The largest sample to date has been examined from Portchester Castle (Grant 1975). The 3rd-4th Century A.D. material from there contained a larger proportion of adult cattle that at Owslebury. Only about 10% of the mandibles from Portchester Castle were at Stages 1-4 compared to 22% in the generally poorly preserved late Roman deposits at Owslebury. In contrast, smaller samples from rural settlements have tended to contain a higher proportion of immature animals, for example at Balksbury (Maltby 1981a: 180), Winnall Down (Maltby 1985b: 110) and the Romano-British settlement at Little Somborne (Maltby 1984b: 136). Large samples from several urban excavations in southern England have, however, produced very few immature cattle (Maltby 1981a: 179-182). It will be extremely interesting to compare how the Owslebury data compares with the Roman assemblages from nearby Winchester, from where market forces may have produced an imbalance between the ages of animals represented on rural and urban sites in the area.

THE SHEEP/GOAT MANDIBLES

The very large sample of ageable mandibles was divided into six main chronological groups (3rd-2nd Century B.C.; 1st Century B.C.; 1st Century A.D.; 1st-2nd Century A.D.; 2nd Century A.D.; 3rd-4th Century A.D.). Initially the mandibles were divided into the following stages of tooth eruption and wear:-

Stage 1 - deciduous 4th premolar (d4) not in wear.
Stage 2 - d4 in wear; 1st molar (M1) not in wear.

Stage 3 - M1 in wear; 2nd molar (M2) not in wear.
Stage 4 - M2 in wear; 3rd molar (M3) and 4th permanent premolar (P4) not in wear.
Stage 5 - M3 and P4 in wear; M1 not in heavy wear.
Stage 6 - M1 in heavy wear.
Stage 7 - M1 and M2 in heavy wear.

Heavy wear on the M1 and M2 is wear beyond the mature stage as defined by Payne (1973: 285; Deniz and Payne 1982: 163). It is equivalent to stage h and beyond in Grant's (1975; 1982:93) recording system. In practice many mandibles were too fragmentary to be assigned to a single stage but could be placed in broader categories (Stages 2/3; 5/6 etc.). These were also included in the analysis.

As in the case of cattle, the absolute ages of these eruption stages are open to question. The following alternative estimates are adapted from Payne's (1973) analysis of the ovicaprine mandibles from Asvan Kale, Turkey and Grant's (1984a: 504-506) estimates for the sheep/goat mandibles from Danebury:-

	Payne (1973)	Grant (1984a)
Stage 1	0-2 months	
Stage 2	2-6 months	
Stage 3	6-12 months	12-24 months
Stage 4	12-24 months	24-42 months
Stage 5	24-48 months	42-60 months
Stage 6	48-72 months	60-72 months
Stage 7	>72 months	>72 months

The degree of difference in these estimates are similar to those cited by Silver (1969) for modern improved breeds of sheep and late 18th Century records of unimproved hill sheep. The former had much faster rates of eruption and Payne's (1973) estimates were based on this data. Deniz and Payne (1979: 158) have cast doubt upon the reliability of Silver's historical sources and have claimed that the use of estimates derived from modern flocks of sheep and goats may not be as unreliable as sometimes thought. If this is the case, the estimates for the Danebury tooth eruption sequence could be substantially too slow. However, until further research is carried out either on the eruption rates of unimproved breeds of sheep or on incremental growth analysis of archaeological data, absolute ages of the sheep represented in Iron Age and Romano-British contexts cannot be accurately determined.

3rd-2nd Century B.C.

87 mandibles of this date were complete enough for analysis. 49 came from F55 and other 3rd Century B.C. ditches. Most of these belonged either to Stage 4 or Stage 5 of the tooth eruption sequence, although 27% of the specimens were assigned to Stages 1-3. In contrast, 21 (72%) of the mandibles recovered from the pits belonged to animals that died or were killed between Stages 1-3. The pits therefore contained a significantly greater proortion of sheep under one year old. Several possible causes of such a contrast between the contents of the pits and the ditches need to be considered.

The first is one of differential preservation. The mandibles of Stage 3 and less are fragile bones and are more prone to destruction than older mandibles. There is some evidence that the sheep/goat samples from the ditches were less well preserved than in the pits. The loose teeth indices were higher, although the degree of difference was not particularly great (the loose teeth index for F55 = .36; those from the pits = .29). The epiphyseal fusion data revealed that sheep of under a year old were somewhat better represented in the ditches than the evidence from the mandibles would indicate. However, the percentage of shaft fragments of the sheep/goat limb bones was greater in the ditches than the pits and a relatively greater proportion of the late-fusing articulations were recovered from the pits (see Section 4). These indications suggest that the sheep/goat assemblage was less well preserved in the ditches and this may have destroyed more of the young fragile mandibles than in the pits.

Although differential preservation may to some extent explain the discrepancy in the relative number of mandibles at Stages 1-3 in the tooth eruption sequence, it cannot explain all the observed variability. In particular, few mandibles at Stage 4 (M2 in wear; M3 not in wear) were recovered in the pits, yet they survived in significant numbers in the ditches. This cannot be explained by differential preservation. One possibility is that the deposits are not exactly contemporary, although this is not supported by the pottery evidence. Another possibility is that more goats were represented in the ditch deposits. Although it is difficult to distinguish sheep from goat apart perhaps from the deciduous premolars (Payne 1985), goats were unusually well represented in the 3rd Century B.C. ditches, particularly in F55 (see Section 2). At least one of the immature mandibles in F55 belonged to goat (Stage 2) and some of the mandibles with permanent teeth may also have belonged to the same species. However, it is unlikely that this was the major cause of the variation in the ages of sheep/goat mandibles, since sheep were the dominant species even in the ditches and none of the mandibles at Stage 4 could be assigned to goat.

It seems more likely that the principal reason for the discrepancy must be differential disposal strategies between the pits and the ditches. More neonatal mortalities and lambs that died or were culled under a year old tended to be deposited in the pits. The ditches were depositories for a greater proportion of adult animals and sheep killed at Stage 4 (at an age when the animals not required for breeding or wool production had reached a good size for culling for their meat). It is possible that the carcases of sheep of different ages tended to be butchered in different ways and in different parts of the settlement. The youngest carcases may not have been butchered at all and the small animals at Stage 3 may often have been cooked whole, for example. If the pits tended to be situated nearer to the cooking areas or near where neonatal sheep died, subsequent disposal of the bones would result in a higher proportion of young mandibles in the pits. More of the carcases of older sheep may have been butchered in parts of the settlement nearer to the enclosure ditch, resulting in a higher proportion of the mandibles of such animals in the ditch fills.

Overall, from the 3rd-2nd Century B.C. deposits, 43% of the mandibles were at Stages 1-3, 14% at Stage 4 and 16% at Stage 5 (Table SheJaw.1).

1st Century B.C.

This sample consisted of 99 mandibles. Most of the 27 specimens from pits were found in F400. Analysis of these showed similarities with the samples from the earlier pits with 37% of the mandibles belonging to Stages 1-3 and few specimens definitely at Stage 4. In contrast, 10 (26%) of the mandibles from the gullies and 33% of those recovered from the quarries were at Stage 4 (Table SheJaw.1). Overall, 23% of the mandibles of this date were at Stage 4 and 16% at Stage 5 of the tooth eruption sequence.

The preservation of the mandibles was not as good generally as in the earlier deposits but the sheep/goat loose teeth indices in most Iron Age deposits were low (see Section 4). Variations in the ages of the animals represented in the pits and in the other features may again be the result of differential preservation and disposal strategies.

1st Century A.D.

298 mandibles were analysed, of which 204 were found in ditches and gullies. Those from F75 (layers 1-4), F132, F133 (layers 1-2), F370 and F642 (layers 1-4) are considered separately. The samples from all these ditches were dominated by mandibles at Stages 4-5 (32% and 25% respectively). The samples from F133 anf F642 had particular concentrations of mandibles at Stage 4. Mandibles of animals of under a year old (mostly at Stage 3) formed 17% of the assemblage (Table SheJaw.3).

From the other deposits, the track gully, F147, contributed 37 mandibles with those at Stages 4-5 again in the majority. Unfortunately few specimens from pits were available for comparison with the Iron Age deposits. The quarries produced 28 specimens mostly at Stages 4-5. From all the 1st Century A.D. deposits, 15% were at Stages 1-3, 30% at Stage 4 and 24% at Stage 5. These sheep/goat samples were generally less well preserved than the Iron Age samples and this may account for the low representation of neonatal animals. All the context types, however, showed that there was a considerable kill-off of animals at Stages 4-5.

1st-2nd Century A.D.

This sample consisted almost entirely of mandibles from F133 (layers 3-4). There was an even more marked peak of mortalities at Stage 4 (38%) than in its lower layers (Table SheJaw.3)

2nd Century A.D.

22 of the 53 ageable mandibles of this date were found in F642 (layers 5-6). Again, most of these were at Stages 4-5 of

the tooth eruption sequence, as were most of the mandibles from the other gullies of this date. The sample from the quarries, however, contained a higher proportion of mandibles of adult animals (Table SheJaw.3).

3rd-4th Century A.D.

173 mandibles were analysed. 107 were recovered from ditches and gullies. Those from F133 (layers 7-8), F634 and F642 (layers 7-14) are listed separately (Table SheJaw.4). The samples contained a higher proportion of adult animals than in the previous phases (44% at Stages 6-7). This, however, may again partially be the consequence of poorer preservation of the sheep/goat samples. High erosion and loose teeth indices were characteristic of most of the samples from the ditches and gullies of this date. Stages 4 and 5 each accounted for 19% of the specimens but only 11% were assigned to Stages 1-3.

The cess pits contained a much greater proportion of immature animals including some neonatal mortalities and a peak of specimens at Stage 4. Only 37% of the mandibles from cess pits were at Stages 5-7. Most of these pits contained articulated bones of the heads and feet of sheep dumped after primary butchery of the carcases. It is an open question whether such dumps represent a more accurate cross-section of sheep mortalities or whether they were biased towards particular ages or types of sheep.

Overall, Stages 4 and 6 each contained 24% of the ageable mandibles from the 3rd-4th Century A.D. deposits. 23% were at Stage 5 (Table SheJaw.4).

Grant Wear Analysis

658 mandibles were complete enough to be assigned to Grant wear stages. These were divided into blocks of five stages (1-5, 6-10....>40). These correspond approximately to the following Stages discussed above.

Stage 3 (M1 in wear) - from Grant stage 8.
Stage 4 (M2 in wear) - from Grant stage 18.
Stage 5 (M3 in wear) - from Grant stage 29.
Stage 6 (M1 in heavy wear) - from Grant stage 36.
Stage 7 (M2 in heavy wear) - from Grant stage 40.

The results are shown in Table SheJaw.5 by chronological period. These results are again influenced by context variability. Of the 84 mandibles from the 3rd-2nd Century B.C. deposits, 17% possessed Grant wear stages of 5 or less. These included neonatal animals (Stages 1-2). These were found mainly in the pits, which preserved such fragile elements the best. In the other periods the mandibles of young lambs provided only 3-6% of the samples. The Iron Age pits also contained most of the mandibles of wear stages 6-15. The ditches provided most of the mandibles at wear stages 21-25. However, relatively few mandibles were found at this stage compared to samples of later date. Wear stages 31-35 accounted for 17% of the 3rd-2nd Century B.C. mandibles. These would have belonged to animals aged between 2-4 years using Payne's (1973) estimates or 3.5-5 years on Grant's (1984a) scale.

The 1st Century B.C. sample of 60 mandibles contained much fewer specimens with Grant wear stages of less than 20. This may partially be a reflection of the relatively small number of specimens recovered from pits. However, there was also a marked concentration of mandibles between wear stages 21-30, suggesting that more animals were culled for meat at that stage of development.

The large sample of 265 mandibles from the 1st Century A.D. deposits contained marked concentrations of specimens at wear stages 21-25 (27%) and 31-35 (22%). Once again, these figures may be biased by the poor survival of the mandibles of young lambs. However, it does appear that there was a significant kill-off of animals in either their second or third years (depending on which estimates of tooth eruption rates one employs). This peak was at an age when the 2nd molar was in early wear (mainly Grant stages d-e) and before the 3rd molar had erupted (wear stages 22-25). This must have been the result of the deliberate culling of immature animals for their meat. The 89 mandibles from deposits dated from the late 1st and 2nd Century A.D. gave very similar results to those obtained from the 1st Century A.D. sample (Table SheJaw.5).

The 3rd-4th Century A.D. sample contained slightly fewer mandibles at wear stages 21-25 (18%) and higher percentages of mandibles at wear stages 31-40. 33% of the sample possessed wear stages of 36 and above. These belonged to mature sheep (it is assumed that goat mandibles are scarcely represented in the Romano-British samples), of over four years of age and probably substantially older than that in most cases. The percentage of mature sheep therefore rose to this level from 18% in the 3rd-2nd Century B.C. sample and 22-23% in the various samples dated between the 1st Century B.C. and the 2nd Century A.D. Such figures to some degree must reflect the poorer preservation of bones in many of the 3rd-4th Century A.D. deposits, in which more mandibles of immature animals are likely to have been destroyed. However, the number of mandibles of wear stages 36 and above also comfortably outnumbered those at wear stages 31-35 in the 3rd-4th Century A.D. sample. Such an increase is more difficult to explain on the grounds of differential preservation, since the mandibles at wear stages 31-35 are also fairly sturdy bones. It is possible, therefore, that the late Roman deposits witnessed an increase in the number of sheep allowed to reach old age.

Discussion

The interpretation of the ageing analysis of the sheep/goat mandibles is faced with several problems. It has been shown that some of the observed variations in the mortality profiles can be more easily explained by differential preservation and variations in disposal strategies in different contexts, than by changes in the kill-off patterns of sheep. As a result, it is unclear whether the samples from any of the periods necessarily represent an accurate cross-section of the ages at which sheep died, or were killed. Added to this problem is the fact that there is still much debate about the absolute ages of the rates of dental development of sheep in these periods. These problems should be borne in mind during the following discussion, which incorporates comparisons with samples from contemporary sitesin Hampshire.

Iron Age

Figures SheJaw.1-2 show the percentages of mandibles represented at the various eruption Stages 1-7 (Table SheJaw.1). Figure SheJaw.1 demonstrates the apparent higher rate of kill-off of young animals in the 3rd-2nd Centuries B.C. deposits. However, Figure SheJaw.2 shows the marked divergence in these percentages between cattle types. The pits (from both periods), contained a much greater proportion of of specimen at Stage 3 of the tooth eruption sequence. If one uses the results from the ditches and gullies alone, the variations between the two samples are much smaller. The proportion of the mandibles at Stage 4 did, however, increase from 18% in the 3rd-2nd Centuries B.C. enclosure ditches to 25% in the 1st Century B.C. gullies, and so there may have been an increase in the relative number of sheep culled for meat at that age in the latter period.

Several sites in Hampshire have produced sizeable samples of sheep/goat mandibles of Middle Iron Age date. The results of Grant wear stage analysis from four sites are compared with the 3rd-2nd Century B.C. sample from Owslebury in Table SheJaw.6. The samples from Danebury, Winnall Down, Balksbury and Old Down Farm all contained substantially higher percentages of mandibles at wear stages 1-15 than at Owslebury. Most of the samples have relatively few mandibles of animals killed between wear stages 21-30, whereas 30-34% of the mandibles had reached wear stage 31 and above.

It has been suggested that the kill-off patterns witnessed at most of the Iron Age sites, with their high rates of first year mortalities, represents a system of exploitation which saw a high proportion of the newborn lambs dying through natural causes and a kill-off of lambs during their first winter (Maltby 1981a: 172). Such a strategy may indicate a shortage of winter fodder or pasture for sheep, or at least no incentive nor necessity to overwinter a significant proportion of the stock. It also assumes that the rate of tooth eruption adheres more closely to the estimates of Payne (1973) than Grant (1984a).

The low numbers of mandibles between wear stages 21-30 on these chalkland settlements, would suggest that relatively few animals were killed at an age and size most suitable for culling of meat (Payne 1973). The numbers of animals killed at this Stage age was greater at Owslebury than any of the other contemporary sites. However, a very high proportion of of the samples from all the other sites came from pits, whereas the Owslebury data were derived mainly from enclosure ditches. Comparison of the small sample from the Owslebury pits alone would show a much closer correlation with the other Middle Iron Age samples.

We are then faced with the following alternatives to explain the variations in mortality profiles between Owslebury and the other settlements:

a) The samples from all the sites represent an approximate cross-section of the mortality profiles of sheep (or at least have all been biased to a similar extent), and therefore the inhabitants of Owslebury consumed more sheep raised specifically for meat.

b) The samples from the pits alone best represent an approximate cross-section of the mortality profiles of sheep on all the sites. On all sites, therefore there were high levels of neonatal mortality and a substantial kill-off of first year animals. Relatively few animals were killed at the optimum age and size for kill-off of meat.

c) The sample from Owslebury represents a better reflection of kill-off patterns, and samples derived from pits alone may be biased towards neonatal deaths and other young sheep because of variations in disposal strategies for the carcases of different ages of sheep.

It is possible that the explanation may lie in a combination of all three alternatives. Clearly the matter cannot be fully resolved without further studies of intra-site variability.

The increase in the percentage of mandibles at Stage 4 of the tooth eruption sequence in the Late Iron Age deposits at Owslebury has similarities with some other Late Iron Age samples. 22% of the sample of 67 mandibles from the banjo enclosure at Micheldever Wood were at the equivalent of Stage 4, compared to 24% at Stage 3 (Griffith, AML Report 2647), and samples from Barley, Hertfordshire (Ewbank et al. 1964), Odell, Bedfordshire (Grant 1984b: 106), Skeleton Green, Hertfordshire (Ashdown and Evans 1981: 210) and Gussage All Saints, Dorset (Harcourt 1979: 152) also possessed about 20% of the mandibles at that Stage of the tooth eruption sequence. Tentatively, one may suggest that a picture is emerging of an increased emphasis on culling some sheep for meat at that age in the Late Iron Age. However, a much wider range of samples is required to investigate this further.

Wool production is often cited as a principle product of sheep during the Iron Age. Older animals would have produced an annual fleece. However, although the evidence of loom weights and other tools testifies to the processing of wool on many sites, the high rates of immature mortalities evidenced in most of these Iron Age samples, would suggest that wool was only a by-product of sheep farming.

1st Century A.D.

The large sample of this date from Owslebury shows further emphasis towards the killing of immature sheep for meat at Stage 4 of the tooth eruption sequence (Table SheJaw.3). This again is typical of the results obtained from several other Romano-British samples, for example, Portchester Castle (Grant 1975 and 1982:104), and various other Romano-British settlements in England (Maltby 1981a: 175). The peak of specimens at Stages 4 and 5 of the tooth eruption sequence at Owslebury is, however, more marked than in the contemporary deposits at Winnall Down (Maltby 1985b: 111), which was more typical of some Iron Age samples. The decrease in the number of first year mandibles may partly be a factor of differential preservation but, if the sample in any way reflects the kill-off pattern, it would suggest that meat-production had become a more important aspect of sheep farming. Once again, however, it will be interesting to compare the kill-off patterns of sheep eaten in Winchester, to establish whether the urban market attracted particular ages of animals. Figure SheJaw.3 shows that the smaller 1st-2nd Century A.D. sample was very similar to the one of 1st Century A.D. date.

3rd-4th Century A.D.

The increase in the proportion of of adult sheep represented in the sample of mandibles from deposits of this date is shown in Figure SheJaw.3. Comparisons with the samples from the gullies and ditches alone, shows an even greater emphasis on mandibles at Stages 5-7. The samples were, however, badly preserved and this must account for some of the observed variations. However, samples with relatively high levels of adult mandibles have been found on several later Romano-British sites (Maltby 1981a: 175), and it is possible that the same phenomenon is reflected at Owslebury. An increase in the numbers of animals allowed to reach maturity could reflect the growing importance of wool production in sheep management. Wild (1982) has discussed the possible importance of British wool in the later Romano-British period, and there may be some evidence from archaeological sites that flocks were providing more wool in the later Romano-British period. However, The degree of emphasis on wool production does not seem to have been as great as in the Anglo-Saxon or Medieval periods in the area.

THE PIG MANDIBLES

389 pig mandibles had sufficient evidence of tooth eruption for analysis. The dental development sequence was divided into the following seven stages:-

Stage 1 - deciduous 4th premolar (d4) not on wear.
Stage 2 - d4 in wear; 1st molar (M1) not in wear.
Stage 3 - M1 in wear; 2nd molar (M2) not in wear.
Stage 4 - M2 in wear; 4th permanent premolar (P4) not in wear.
Stage 5 - P4 in wear; 3rd molar (M3) not in wear.
Stage 6 - M3 in early wear.
Stage 7 - M1 heavily worn; M3 in moderate wear.

Early wear on the M3 is equivalent to stages a-b in Grant's (1982: 94) recording system. Moderate wear on the M3 is defined as stage c and greater. Heavy wear on the M1 is defined as stages j-n. Once again some fragmentary specimens could not be assigned to a single Stage but could be assigned to within two Stages.

Bull and Payne (1982) have suggested that the tooth eruption rates of slower-erupting modern breeds of pigs or of wild boar are probably the most suitable for estimating the ages of mandibles from archaeological sites. Adapting such figures, animals at Stage 1 would probably be only a few weeks old at most. Stage 2 would last until about 8 months. Stage 3 would last between 9-14 months, Stage 4 between 15-18 months, Stage 5 from 19-26 months and Stage 6 possibly between 27-36 months. These figures are only approximate since relatively little work has been done to determine the time between eruption and wear of any of these teeth, and published estimates usually refer to eruption ages only. Recording of the Grant wear stages also revealed a much greater degree of diversity in the amounts of wear on the teeth at any given Stage. At the Stage when the M3 was in early wear (Stage 6), the M1 was found to be anywhere between Grant stages f-m (Grant 1982: 94). The rate of wear on pig teeth is largely determined by type of food it procures.

The Iron Age

The 3rd-2nd Century B.C. deposits produced a pattern of variability in the ages of pig mandibles that bore similarities with the sheep/goat assemblage from the same contexts. only 11 ageable mandibles were found in the pits. They included two specimens belonging to neonatal mortalities, and four at Stage 3 of the tooth eruption sequence. Only one specimen had the M3 in early wear (Stage 6). In complete contrast, the enclosure ditches produced 29 mandibles, of which seven were at Stage 6 and seven at Stage 7 (over 36 months). Five of the six specimens from the quarries belonged to Stages 6-7 (Table PigJaw.1). Such a high proportion of adult pigs is unusual, since in most exploitation systems, the majority of the pigs are killed as immature animals for meat and lard. Due to their high reproduction rates, pigs can tolerate substantial levels of immature mortalities.

Although the pits probably preserved pig bones better than the other context types, the preservation of bones in F55 and other 3rd Century B.C. ditches was generally quite good. Differential preservation alone cannot account for the variations in the mandible ages. As in the case of sheep, there may have been different butchery and disposal practices for pig carcases of different ages.

26 of the 36 ageable mandibles from the 1st Century B.C. deposits were found in various quarries. 21 of these came from F377 and F378. 15 of those belonged to Stage 5 of the tooth eruption sequence. If these assemblages are representative of killing practices of pigs at that time, it would appear that much of the stock was culled between 18-24 months of age, using the estimates of tooth eruption rates discussed above. Stage 5 mandibles accounted for 50% of the ageable pig mandibles in all 1st Century B.C. deposits (Table PigJaw.1). However, F377, in particular, contained a very high proportion of mandibles in its pig assemblage and it may have been located near an area where the butchery of pigs culled at a specific age took place.

1st Century A.D.

177 ageable mandibles of this date were analysed. 131 came from various ditches and gullies. Those from F133 (layers 1-2), F370 and F642 (layers 1-4) are considered separately (Table PigJaw.2). In the ditches, in general, 34% of the mandibles were at Stage 5, and 18% at Stage 6, reflecting that most of the pigs were culled between 18-36 months old. 14% were at Stage 3 (9-14

months). Only 6% of the mandibles were at Stages 1-2 and 5% only at Stage 7. The low numbers of neonatal mortalities may be partly the consequence of their poor survival. However, the low proportion of adult pigs is to be expected. The three largest ditch assemblages all had more mandibles at Stage 5 than at any other Stage. However, F133 produced a very high proportion of mandibles at that Stage (16 out of 28). As in the case of the samples of cattle and sheep/goat in this feature (Tables CowJaw.2; SheJaw.2), the pig assemblage appears to contain a marked concentration of mandibles belonging to animals killed at the peak culling age. It seems that this ditch was used more commonly as a depository of butchery waste from animals culled at the prime age for meat production. It is possible that butchery areas for the victims of annual culls may have been located nearby. The other major ditches contained a wider range of animals at all ages.

The track gully, F147, produced 20 ageable pig mandibles, with peaks again at Stages 5-6. The mandibles from the small samples from other features of 1st Century A.D. date were also mainly at Stage 5. Overall, 37% of the mandibles of this date were at Stage 5 and 17% were at Stage 6 (Table PigJaw.2). Unfortunately, few bones from pits were recovered from this phase for comparison with the Iron Age samples.

1st-2nd Century A.D.

35 of the 37 mandibles of late 1st-2nd Century A.D. date were found in F133 (layers 3-4). Specimens at Stages 5 and 6 were found in equal numbers and dominated the assemblage. The marked concentration of mandibles at Stage 5 encountered in the lower layers of the ditch, was, therefore not evidenced in these layers (Table PigJaw.3).

2nd Century A.D.

27 mandibles could be aged. 11 of these were from F642 (layers 5-6). Specimens at Stages 5-6 were again the most common. No neonatal mortalities were recovered from these deposits (Table PigJaw.3).

3rd-4th Century A.D.

Poorer prservation conditions in these features again limited the usefulness of the sample. Only a total of 64 mandibles could be aged. 43 of these were recovered from ditches. Those from F133 (layers 7-8) and F642 (layers 7-14) are again listed separately (Table PigJaw.4). No specimens of less than Stage 5 were recovered from F133. Most were again at Stages 5-6. However, both F642 and the samples from the other ditches and gullies and the track gully, F150, all contained a relatively larger number of mandibles at Stages 3-4 than at Stage 5. Unfortunately, only two mandibles came from cess pits. Significantly, perhaps, one of these belonged to a piglet killed at Stage 2 of the tooth eruption sequence.

Overall, from 3rd-4th Century A.D. deposits, 23% of the pig mandibles were at Stage 5, lower than in the previous Romano-British deposits. More mandibles at Stage 7 (13%) were represented than in earlier deposits.

Grant Wear Stages

Although Grant wear stages were recorded whenever possible, relatively few mandibles were complete enough for wear stages to be calculated. In addition, wear stages on fragmentary mandibles proved difficult to estimate accurately because of the wide diversity on tooth wear rates on pig mandibles. The results have been stored in the archive.

Discussion

The Iron Age samples of pig mandibles produced interesting variations in mortality profiles. The 3rd-2nd Century B.C. samples again demonstrated how much ageing data can vary between features. The overall mortality profile appears mainly to be the product of the relative amounts of ditch sections and pits sampled.

Comparisons with other Iron Age samples are also interesting. Grant (1984a: 515-517) observed a significant change in the samples between the Early and Late (b) phases at Danebury. The former contained a significantly higher number of mandibles with the M3 in wear. The latter was dominated by mandibles of immature animals, including neonatal mortalities. At Danebury, the variation may have chronological significance. However, the much smaller samples from the 3rd-2nd Century B.C. deposits at Owslebury appear to show the same variations in deposits that were essentially contemporary.

In the pits from the Middle Iron Age sample from another hillfort at Balksbury, nine mandibles that formed parts of articulated groups were all at Stages 1-3 and six of these belonged to neonatal mortalities. Of the other 23 mandibles from the pits, another six belonged to neonatal mortalities, three were at Stage 3, eight at Stages 4-5 and six at Stages 6-7 (Maltby AML Report). Such a mortality profile has similarities with the Danebury Late (b) phase. Neonatal mortalities in these pits signifies the breeding of pigs at these settlements.

At Winnall Down, most of the pig mandibles were at Stages 5-6 in the Middle Iron Age deposits (Maltby 1985b: 107), and the same was true at Old Down Farm in the Iron Age deposits (Maltby 1981b: 149). Few mandibles at Stage 7 were recovered at either of these sites.

Turning to Iron Age samples outside Hampshire, at Groundwell Farm, Wiltshire, most mandibles were at Stages 5-6 with only a few at Stage 7 (Coy 1982). In contrast, at Ower in Dorset, 71% of the pigs represented had the M3 in wear. The peak culling age of pigs represented in the late Iron Age deposits at Skeleton Green, Hertfordshire (Ashdown and Evans 1982: 208-209), appears to correspond with the peak witnessed in the 1st Century B.C. deposits at Owslebury.

Mortality rates of pigs represented on Iron Age settlements therefore appear to vary both chronologically and within deposits of the same date. Reasons for this may lie partly in different carcase processing, cooking and disposal practices for pigs of different ages. Another possibility is that processing areas for carcases destined for preservation by salting may have been located in different areas of the settlement from those in which pigs were processed for immediate consumption. Tentatively, it can be suggested that in the late Iron Age at Owslebury, pigs of 18-30 months old were considered to be at the most suitable age for slaughter and this became the peak culling age.

Mandibles of pigs can be sexed if the alveolus of the permanent canine (or the tooth itself), is present. Table PigJaw.5 shows that in the Iron Age deposits, 24 ageable mandibles could also be sexed. These derived mainly from F55, F377 and F378. 11 of these mandibles belonged to males of which five were at Stage 6 and two at Stage 7 of the tooth eruption sequence. Seven of the 13 females were at Stage 5 and two at Stage 7. Whether this was a typical pattern remains to be tested against other samples.

1st-2nd Century A.D.

At Owslebury the peak culling age appears to have been between 18-36 months, continuing the practice that seems to have been established by the 1st Century B.C. This is not a very intensive rate of culling by modern standards, but would ensure that pigs fattened to a reasonable size were slaughtered. The peaks appear fairly typical of other Romano-British samples, both urban and rural (Maltby 1981a: 183-184), although some Romano-British samples have higher proportions of first year mortalities, for example, Exeter (Maltby 1979: 57) and Fishbourne (Grant 1971: 383). It is possible that suckling pigs, a reputedly popular dish in the Roman diet, may have been favoured more in some settlements than others. However, such preferences are more likely to appear on settlements where Roman influence was greater than on rural native settlements such as Owslebury. Of the sexed mandibles, 23 belonged to females and 19 to males. Both sexes appear to have been culled at Stages 5-6 in relatively equal numbers (Table PigJaw.5).

3rd-4th Century A.D.

The poorer preservation of the samples makes comparisons with the previous deposits more hazardous since, judging by the much higher numbers of loose teeth in the pig assemblages, a much higher proportion of the pig mandibles have been destroyed. The limited evidence suggests that the concentration of pigs culled at 18-36 months old was not as marked, although it remained a common age for slaughter. More of the pigs appear to have been killed at a slightly younger age. Whether this represents increased intensity of pig exploitation or a change in dietary preferences is, however, unclear from such flimsy evidence.

Burials

Eight pig mandibles were found in fills associated with human burials. One specimen was at Stage 3, two at Stage 4, three at Stage 5 and one at Stage 7.

THE HORSE JAWS

Detailed analysis of horse tooth ageing data was more restricted because the wear patterns on the cheek teeth are less diagnostic of relative age. However, the wear on the surface of the teeth gradually decreases the heights of these teeth and in some instances it was possible to take measurements of these following the methods of Levine (1982). It was also fortunate that more mandibles and incisives had incisors still present and these could be approximately aged by study of their shape and wear patterns. The following stages of tooth eruption were devised for analysis:-

Stage 1 - first molar (M1) not in wear - estimated age = under 9-18 months.
Stage 2 - M1 in wear; second molar (M2) not in wear - under 18-24 months.
Stage 3 - M2 in wear; permanent premolars (P2-4) and third molar (M3) not in wear - less than 36-48 months.
Stage 4 - All cheek teeth in wear but probably less than 10 years of age.
Stage 5 - All cheek teeth in wear; heavy wear on incisors - aged probably over 10 years.

In practice many of the adult jaws could not be closely aged and were assigned to Stages 4/5. This was because the height of the cheek teeth could not be determined in many cases without damaging the mandible or by the use of X-rays. In addition to ageing information, horse jaws can provide sexing data because those of males possess canines whereas those of mares generally do not.

The results of the ageing and sexing analysis are given in Tables HorJaw.1-2. The results show that there was a dominance of adult animals in all periods. This is typical of other Iron Age and Romano-British settlements investigated in southern England. At Gussage All Saints, Dorset, the lack of neonatal horse mortalities represented in the assemblage led Harcourt (1979: 158) to conclude that horses were not bred but captured from the wild at an age suitable for training and then employed as working animals. This is a plausible theory and it has been supported by the evidence from other sites in Wessex. Grant (1984a: 521) noted that only 25% of the adult jaws at Danebury belonged to females. She argued that the bias towards male animals coupled with the lack of neonatal mortalities meant that a typical breeding population was not represented. It is of course possible that such an age and sex distribution could also be obtained in cases where horses were imported by traders, who may have specialised in the breeding of horses.

The ageing evidence from Owslebury was too flimsy to add much to this debate. Only 11 jaws of Iron Age date provided any data. All but two of these belonged to mature animals but one specimen from F380 belonged to a foal that was probably under nine months of age. This isolated example of a juvenile animal, however, does not necessarily prove that horses were bred at Owslebury at the time. Only five jaws could be sexed in these Iron Age deposits (three male, two female).

In the early Romano-British period the proportion of immature animals increased. Of the 25 mandibles belonging to contexts of 1st Century A.D. and 1st-2nd Century A.D. date, eight (32%) had tooth rows that had not fully erupted. This is an unusually high figure for samples of that date. It could imply that not only were horses now almost certainly bred at the settlement (although no neonatal mortalities were recovered), but also that they had become rather more intensively exploited for their meat, particularly in the 1st Century A.D. However, most horses were still not killed until they had reached skeletal maturity. Increasingly the emphasis on adult horses became more marked until in the 3rd-4th Century A.D. deposits only three (12%) of the jaws recovered belonged to immature animals including one neonatal mortality. These figures may be affected by the poorer preservation conditions in this period that has biased the sample towards older jaws, but it does seem that horses were often kept until old age. Several of the jaws belonged to animals probably substantially older than 10 years of age. This pattern would fit in with the horse's increasingly important role as a transport and pack animal,wheras its meat became less important in its exploitation.

DOG AGEING DATA

Tooth eruption and wear and epiphyseal fusion data were reocorded on dog jaws and bones. Details of these along with the ageing data from all the other domestic species are kept in the archival record. However, detailed analysis of the ages of the dogs represented was handicapped by the fact that the permanent teeth of dog erupt and come into wear at an early age (Silver 1969). Since they do not display any clear wear patterns on their teeth, it is difficult to establish their exact ages. The evidence of the epihyseal fusion data is of some assistance but the unreliability of such data makes if difficult to assess the information.

The ageing evidence did, however, produce abundant evidence for the breeding of dogs at Owslebury. The spectacular concentrations of neonatal puppies dumped in the 3rd-4th Century cess pits (Table Section4.8) demostrates that litters may have been deliberately put down at birth to control the dog population. Neonatal mortalities were present, albeit in smaller numbers in all periods. In addition, the epiphyseal fusion evidence indicated that immature dogs were also represented in some numbers. Since their meat does not appear to have been consumed except in rare instances, the presence of these immature dogs may imply either that they were natural mortalities or that these also were put down to keep the dog numbers under control.

TABLE COWJAW.1

Wear Stages of Cattle Mandibles in Iron Age Deposits

Stage	Pits	3rd C. Ditches	1st C. Gullies	Quarries	Total	Stage %	Cum. %
1	-	-	-	-	-	-	-
2	2	4	-	-	6	8	8
3	-	1	1	1	3	4	13
3/4	-	-	1	-	1	1	14
4	4	8	2	2	16	23	36
4/5	-	1	-	-	1	1	38
5	-	4	-	1	5	7	44
5/6	-	1	-	-	1	1	46
6	8	16	7	8	39	54	100
TOTAL	14	35	11	12	72		

Cum. % = cumulative percentage.

TABLE COWJAW.2

Wear Stages of Cattle Mandibles in 1st Century A.D. Deposits

Stage	Ditches/Gullies F133	F370	F642	Others	Total	Stage %	Cum. %
1	-	3	2	3	8	8	8
2	-	1	-	1	2	2	10
3	1	1	-	2	4	4	14
3/4	-	-	-	-	-	-	14
4	1	-	2	9	12	12	25
4/5	-	-	-	1	1	1	26
5	1	1	1	3	6	6	32
5/6	1	-	1	1	3	3	35
6	21	17	9	19	66	65	100
TOTAL	25	23	15	39	102		

Stage	Pits	Quarries	Tracks	Overall Total	Stage %	Cum. %
1	-	-	1	9	6	6
2	-	-	-	2	1	7
3	-	-	-	4	3	10
3/4	-	1	-	1	.7	11
4	-	6	4	22	15	26
4/5	-	-	1	2	1	27
5	-	1	3	10	7	34
5/6	-	-	1	4	3	36
6	5	8	15	94	64	100
TOTAL	5	16	25	148		

Cum. % = cumulative percentage.

TABLE COWJAW.3

Wear Stages of Cattle Mandibles in 1st-2nd Century A.D. Deposits

	1st-2nd C.		2nd Century					
Stage	F133	Others	F642	Gullies	Quarries	Total	Stage %	Cum. %
1	-	-	-	-	-	-	-	-
2	-	1	-	-	-	1	3	3
3	2	-	1	1	-	4	10	13
3/4	-	-	-	-	-	-	-	13
4	3	-	3	-	2	8	20	33
4/5	-	-	-	-	-	-	-	33
5	2	1	1	-	-	4	10	43
5/6	1	-	-	-	1	2	5	48
6	12	4	1	1	3	21	53	100
TOTAL	20	6	6	4	4	40		

Cum. % = cumulative percentage.

TABLE COWJAW.4

Wear Stages of Cattle Mandibles in 4th Century A.D. Deposits

Stage	F133	F634	F642	Other Gullies	Total	Stage %	Cum. %
1	-	-	-	1	1	2	2
2	1	-	-	-	1	2	3
3	-	1	-	-	1	2	5
3/4	-	-	-	-	-	-	5
4	1	1	5	2	9	14	18
4/5	-	-	-	-	-	-	18
5	5	-	2	-	7	11	29
5/6	-	1	1	-	2	3	32
6	10	12	7	15	44	68	100
TOTAL	17	15	15	18	65		

Stage	Cess Pits	Oth. Pits	Quarries	Track Gullies	Overall Total	Stage %	Cum. %
1	-	-	-	-	1	1	1
2	1	-	-	1	3	3	5
3	3	-	1	-	5	6	10
3/4	-	-	-	-	-	-	10
4	-	-	1	-	10	11	22
4/5	-	-	-	-	-	-	22
5	1	1	1	-	10	11	33
5/6	-	-	-	-	2	2	35
6	7	-	3	3	57	65	100
TOTAL	12	1	6	18	88		

Cum. % = cumulative percentage.

TABLE COWJAW.5

Grant Wear Stages of Cattle Mandibles from Owslebury

W.S.	Iron Age N	Iron Age %	1st A.D. N	1st A.D. %	1st-2nd A.D. N	1st-2nd A.D. %	3rd-4th A.D. N	3rd-4th A.D. %
1-5	6	10	11	8	1	3	4	5
6-10	1	2	1	.7	-	-	2	3
11-15	1	2	1	.7	1	3	1	1
16-20	5	8	6	4	5	14	1	1
21-25	8	14	13	10	5	14	6	8
26-30	1	2	3	2	-	-	2	3
31-35	3	5	7	5	2	6	5	6
36-40	6	10	14	10	3	8	9	11
41-45	24	41	48	36	11	31	27	34
>45	4	7	30	22	8	22	23	29
TOTAL	59		134		36		80	

W.S. = mandible wear stage (Grant 1982)
N = number of mandibles
% = percentage of mandibles at wear stage.

TABLE SHEJAW.1

Wear Stages of Sheep/Goat Mandibles in Iron Age Deposits

	3rd-2nd Century B.C. Deposits					
Stage	Pits	Ditches	Quarries	Total	Stage %	Cum. %
1	1	1	-	2	2	2
2	4	3	-	7	8	10
2/3	6	4	1	11	13	23
3	10	5	2	17	20	43
3/4	1	5	2	8	9	52
4	1	9	2	12	14	66
4/5	-	-	-	-	-	66
5	3	10	1	14	16	82
5/6	-	1	-	1	1	83
6	2	6	-	8	9	92
6/7	1	1	-	2	2	94
7	-	4	1	5	6	100
TOTAL	29	49	9	87		

	1st Century B.C. Deposits					
Stage	Pits	Gullies	Quarries	Total	Stage %	Cum. %
1	-	-	-	-	-	-
2	6	1	1	8	8	8
2/3	1	3	1	5	5	13
3	3	4	5	12	12	25
3/4	5	4	4	13	13	38
4	2	10	11	23	23	62
4/5	1	2	1	4	4	66
5	4	7	5	16	16	82
5/6	1	-	-	1	1	83
6	3	4	2	9	9	92
6/7	1	1	-	2	2	94
7	-	3	3	6	6	100
TOTAL	27	39	33	99		

Cum. % = cumulative percentage.

TABLE SHEJAW.2

Wear Stages of Sheep/Goat Mandibles in 1st Century A.D. Deposits

Stage	F75	F132	F133	F370	F642	Other	Total	Stage %	Cum. %
	Ditches/Gullies								
1	-	-	-	-	-	-	-	-	-
2	-	2	-	2	3	2	9	4	4
2/3	-	-	-	-	-	-	-	-	4
3	3	4	6	4	6	2	25	12	17
3/4	-	3	2	2	2	3	12	6	23
4	7	11	16	4	17	11	66	32	55
4/5	-	-	-	-	1	1	2	1	56
5	7	10	9	8	6	11	51	25	81
5/6	-	-	-	1	1	-	2	1	82
6	2	3	3	8	8	5	29	14	96
6/7	-	2	-	1	1	1	5	2	99
7	1	-	-	-	2	-	3	1	100
TOTAL	20	35	36	30	47	36	204		

Stage	F147	Oth.Tracks	Pits	Quarries	Overall Total	Stage %	Cum. %
	Other Features						
1	-	-	-	-	-	-	-
2	-	-	-	1	10	3	3
2/3	-	-	1	-	1	.3	4
3	5	-	2	2	34	11	15
3/4	1	3	-	2	18	6	21
4	12	3	2	7	90	30	51
4/5	-	-	-	2	4	1	53
5	8	5	2	6	72	24	77
5/6	-	2	-	-	4	1	78
6	6	3	-	4	42	14	92
6/7	1	1	1	-	8	3	95
7	4	3	1	4	15	5	100
TOTAL	37	20	9	28	298		

Cum. % = cumulative percentage.

TABLE SHEJAW.3

Wear Stages of S/G Mandibles in 1st-2nd Century A.D. Deposits

	1st-2nd Century A.D.					
Stage	F133	Pits	Quarries	Total	Stage %	Cum. %
1	-	-	-	-	-	-
2	2	2	-	4	8	8
2/3	1	-	-	1	2	10
3	3	1	-	4	8	19
3/4	2	-	-	2	4	23
4	20	-	-	20	42	65
4/5	-	-	-	-	-	65
5	8	-	-	8	17	81
5/6	1	-	-	1	2	83
6	3	1	-	4	8	92
6/7	-	-	-	-	-	92
7	3	-	1	4	8	100
TOTAL	43	4	1	48		

	2nd Century						
Stage	F642	Gullies	Quarries	Others	Total	Stage %	Cum. %
1	-	-	-	-	-	-	-
2	-	1	1	1	3	6	6
2/3	1	-	-	-	1	2	8
3	1	2	1	-	4	8	15
3/4	1	1	1	-	3	6	21
4	7	5	3	-	15	28	49
4/5	-	1	-	-	1	2	51
5	6	4	1	1	12	23	74
5/6	2	-	-	-	2	4	77
6	3	-	5	-	8	15	92
6/7	-	-	-	-	-	-	92
7	1	-	3	-	4	8	100
TOTAL	22	14	15	2	53		

Cum. % = cumulative percentage.

TABLE SHEJAW.4

Wear Stages on S/G Mandibles in 3rd-4th Century A.D. Deposits

Stage	F133	Ditches/Gullies F634	F642	Others	Total	Stage %	Cum. %
1	-	-	-	-	-	-	-
2	1	-	1	2	4	4	4
2/3	1	-	-	-	1	1	5
3	3	1	3	-	7	7	11
3/4	3	1	2	1	7	7	18
4	5	5	7	3	20	19	36
4/5	-	-	1	-	1	1	37
5	2	-	9	9	20	19	56
5/6	-	-	-	-	-	-	56
6	8	4	13	9	34	32	88
6/7	1	2	-	-	3	3	91
7	3	1	3	3	10	9	100
TOTAL	27	14	39	27	107		

Stage	Cess Pits	Oth. Pits	Tracks	Quarries	Ovens	Overall Total	Stage %	Cum. %
1	1	-	-	1	-	2	1	1
2	3	-	-	-	-	7	4	5
2/3	-	-	-	-	-	1	.6	6
3	6	1	-	-	-	14	8	14
3/4	3	-	-	-	-	10	6	20
4	11	1	3	4	2	41	24	43
4/5	-	-	-	-	-	1	.6	44
5	7	2	5	4	1	39	23	66
5/6	1	-	-	-	-	1	.6	67
6	4	1	1	1	-	41	24	91
6/7	-	-	1	-	-	4	2	93
7	1	1	-	-	-	12	7	100
TOTAL	37	6	10	10	3	173		

Cum. % = cumulative percentage.

TABLE SHEJAW.5

Grant Wear Stages of Sheep/Goat Mandibles from Owslebury

W.S.	3rd-2nd B.C. N	%	1st B.C. N	%	1st A.D. N	%	1st-2nd A.D. N	%	3rd-4th A.D. N	%
1-5	14	17	2	3	8	3	4	4	9	6
6-10	8	10	3	5	5	2	1	1	2	1
11-15	10	12	4	7	28	11	7	8	12	8
16-20	8	10	3	5	15	6	7	8	11	7
21-25	9	11	13	22	72	27	21	24	28	18
26-30	6	7	12	20	19	7	9	10	8	5
31-35	14	17	9	15	58	22	19	21	38	24
36-40	6	7	8	13	41	15	11	12	35	22
>40	9	11	6	10	19	7	10	11	17	11
TOTAL	84		60		265		89		160	

W.S. = mandible wear stage (Grant 1982)
N = number of mandibles
% = percentage of mandibles at wear stage.

TABLE SHEJAW.6

Grant Wear Stages of Sheep/Goat Mandibles in Other Middle Iron Age Assemblages in Hampshire

W.S.	Danebury %	Winnall Down %	Balksbury %	Old Down Farm %
1-5	16	16	18	13
6-10	26	26	15	25
11-15	8	18	23	16
16-20	9	2	2	4
21-25	6	4	7	4
26-30	5	5	2	4
31-35	13	14	12	25
36-40	12	10	15	5
>40	5	6	7	4
TOTAL	607	101	200	55

Danebury (Late (b) Phase) data adapted from Grant (1984a: 505).
Winnall Down data adapted from Maltby (1981a: 173 & 1985b: 106).
Balksbury data adapted from Maltby (1981a: 173).
Old Down Farm (Phase 5) data adapted from Maltby (1981b: 147).

TABLE PIGJAW.1

Wear Stages of Pig Mandibles in Iron Age Deposits

3rd-2nd Century B.C.

Stage	Pits	Ditches	Quarries	Total	Stage %	Cum. %
1	2	-	-	2	4	4
2	-	1	-	1	2	7
3	4	5	-	9	20	26
4	-	1	-	1	2	28
4/5	1	2	-	3	7	35
5	2	5	1	8	17	52
5/6	1	1	-	2	4	57
6	1	7	2	10	22	78
6/7	-	-	1	1	2	80
7	-	7	2	9	20	100
TOTAL	11	29	6	46		

1st Century B.C.

Stage	Pits	Gullies	Quarries	Total	Stage %	Cum. %
1	-	-	-	-	-	-
2	-	1	-	1	3	3
3	1	-	1	2	5	8
4	1	-	2	3	8	16
4/5	-	1	-	1	3	18
5	-	3	16	19	50	68
5/6	-	1	1	2	5	74
6	3	1	3	7	18	92
6/7	-	-	-	-	-	92
7	-	-	3	3	8	100
TOTAL	5	7	26	38		

Cum. % = cumulative percentage.

TABLE PIGJAW.2

Wear Stages of Pig Mandibles from 1st Century A.D. Deposits

Stage	Ditches/Gullies F133	F370	F642	Other	Total	Stage %	Cum. %
1	-	-	-	1	1	.8	.8
2	-	3	2	2	7	5	6
2/3	-	-	-	1	1	.8	7
3	-	9	4	5	18	14	21
3/4	-	4	-	-	4	3	24
4	3	5	2	-	10	8	31
4/5	2	3	1	2	8	6	37
5	16	10	10	9	45	34	72
5/6	-	2	1	2	5	4	76
6	5	6	4	8	23	18	93
6/7	-	-	3	-	3	2	95
7	2	2	1	1	6	5	100
TOTAL	28	24	28	31	131		

Stage	Other Features F147	Oth.Tracks	Pits	Quarries	Overall Total	Stage %	Cum. %
1	-	-	-	-	1	.6	.6
2	-	2	-	-	9	5	6
2/3	-	-	-	-	1	.6	6
3	1	1	-	1	21	12	18
3/4	2	-	1	1	8	5	23
4	2	-	-	1	13	7	30
4/5	1	-	-	1	10	6	36
5	6	6	2	6	65	37	72
5/6	1	-	-	-	6	3	76
6	5	-	1	1	30	17	93
6/7	1	-	-	-	4	2	95
7	1	-	1	1	9	5	100
TOTAL	20	9	5	12	177		

Cum. % = cumulative percentage.

TABLE PIGJAW.3

Wear Stages of Pig Mandibles in 1st-2nd Century A.D. Deposits

Stage	1st-2nd Century A.D. F133	Other	Total
1	-	-	-
2	-	-	-
2/3	-	-	-
3	3	-	3
3/4	1	-	1
4	-	1	1
4/5	2	-	2
5	11	-	11
5/6	2	-	2
6	11	1	12
6/7	2	-	2
7	3	-	3
TOTAL	35	2	37

Stage	F642	2nd Century A.D. Gullies	Quarries	Pits	Overall Total	Stage %	Cum. %
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
2/3	-	-	-	-	-	-	-
3	1	-	1	-	5	8	8
3/4	1	-	-	-	2	3	11
4	1	-	3	-	5	8	19
4/5	-	-	-	-	2	3	22
5	3	2	3	1	20	31	53
5/6	2	-	1	1	6	9	63
6	3	1	1	1	18	28	91
6/7	-	-	-	-	2	3	94
7	-	-	1	-	4	6	100
TOTAL	11	3	10	3	64		

Cum. % = cumulative percentage.

TABLE PIGJAW.4

Wear Stages of Pig Mandibles in 3rd-4th Century A.D.Deposits

	Ditches/Gullies			
Stage	F133	F642	Other	Total
1	-	-	-	-
2	-	-	1	1
2/3	-	-	-	-
3	-	5	3	8
3/4	-	-	1	1
4	-	1	1	2
4/5	-	-	1	1
5	5	3	4	12
5/6	4	-	-	4
6	1	2	2	5
6/7	2	-	-	2
7	1	4	2	7
TOTAL	13	15	15	43

Stage	Pits	Quarries	Track	Gullies	Other	Overall Total	Stage %	Cum. %
1	-	-	-		-	-	-	-
2	1	-	-		-	2	3	3
2/3	-	1	-		-	1	2	5
3	-	-	1		-	9	14	19
3/4	-	1	-		-	2	3	22
4	-	1	4		-	7	11	33
4/5	1	2	-		-	4	6	39
5	-	1	-		2	15	23	63
5/6	-	-	-		-	4	6	69
6	1	1	1		-	8	13	81
6/7	-	-	2		-	4	6	88
7	-	1	-		-	8	13	100
TOTAL	3	8	8		2	64		

Cum. % = cumulative percentage.

TABLE PIGJAW.5

Sexes of Ageable Pig Mandibles at Owslebury

	Iron Age		1st-2nd Century A.D.		3rd-4th Century A.D.	
Stage	M	F	M	F	M	F
3	2	-	1	-	-	-
3/4	-	-	-	1	-	-
4	-	1	1	3	-	-
5	1	7	9	10	2	1
5/6	1	1	-	3	-	-
6	5	2	7	6	-	1
7	2	2	1	-	2	-
TOTAL	11	13	19	23	4	3

M = male.
F = female.

TABLE HORJAW.1

Stages of Tooth Eruption and Wear of Horse Jaws

	Period				
	3-2 B.C.	1st B.C.	1st A.D.	1-2 A.D.	3-4 A.D.
Stage 1	1	-	1	1	1
Stage 2	-	-	1	-	-
Stage 3	-	1	4	1	2
Stage 4	1	1	1	1	-
Stage 4/5	5	1	9	5	16
Stage 5	1	-	-	1	6
TOTAL	8	3	16	9	25

Totals include evidence from mandibles, maxillae and incisives.

TABLE HORJAW.2

Sexes of Horse Jaws

		Period				
		3-2 B.C.	1st B.C.	1st A.D.	1-2 A.D.	3-4 A.D.
Stage 4	M	-	1	-	1	-
	F	1	-	1	-	-
Stage 4/5	M	1	-	1	1	-
	F	-	-	3	1	4
Stage 5	M	1	-	-	1	3
	F	-	1	-	-	1
TOTAL	M	2	1	1	3	3
	F	1	1	4	1	5

M = male; F = female.

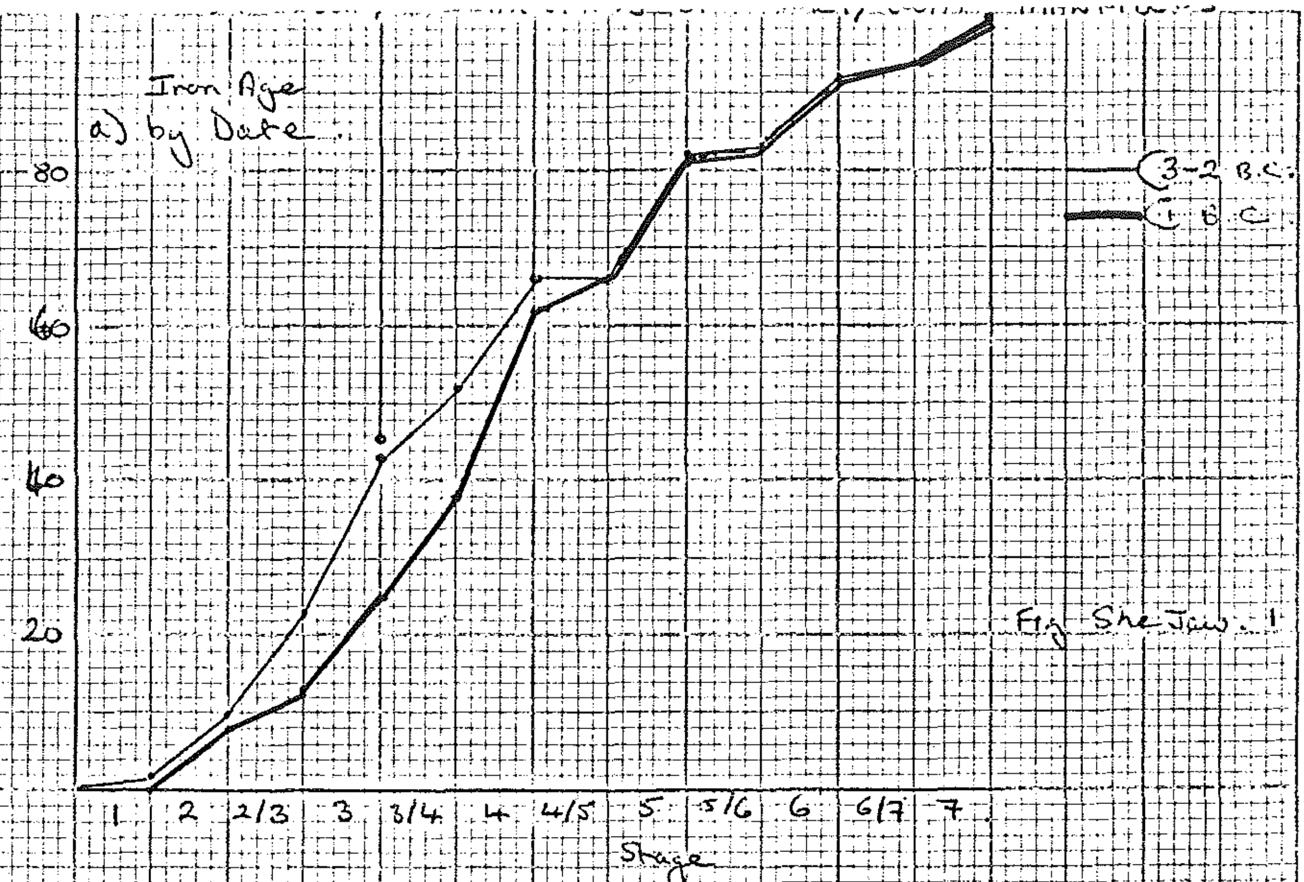


Fig. She Jaw. 1

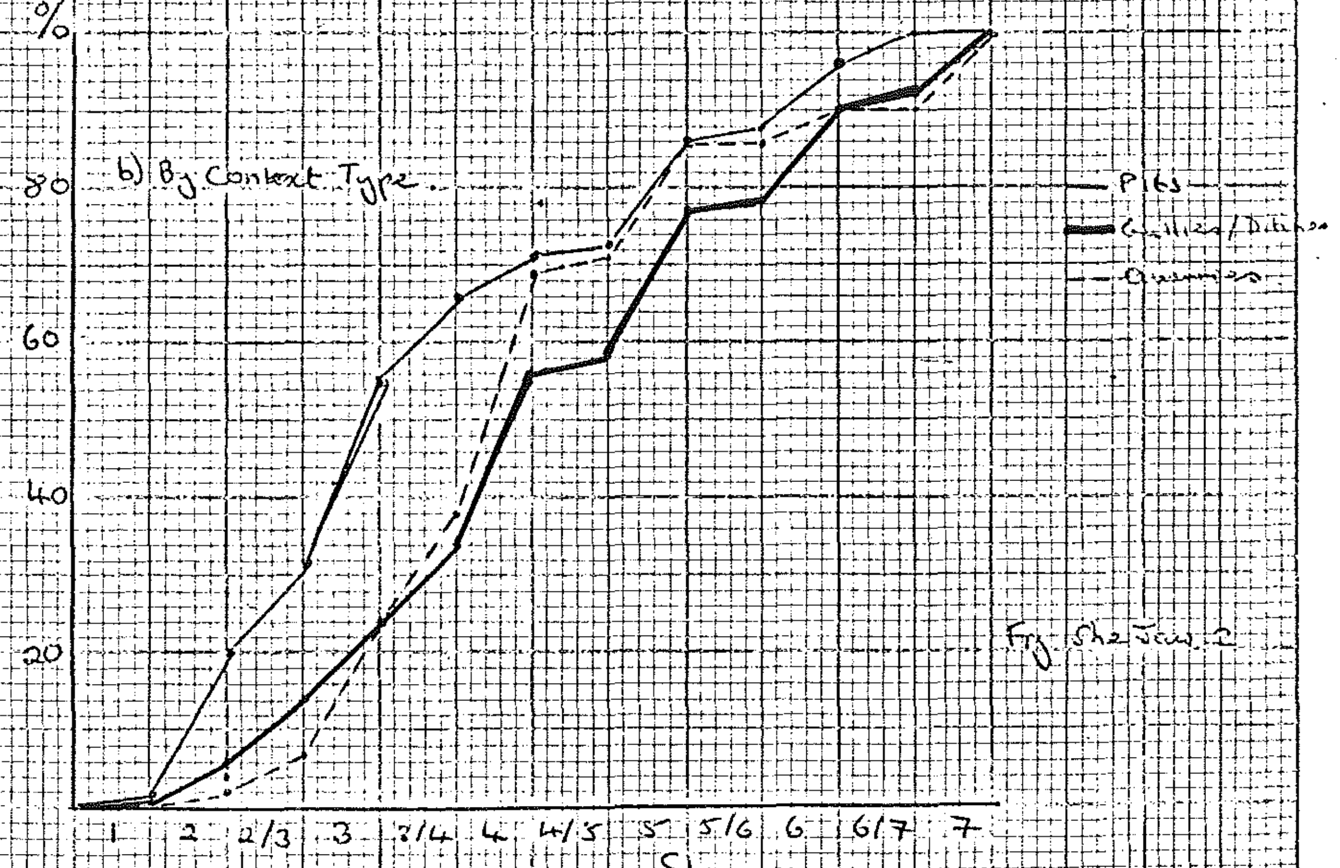


Fig. She Jaw. 2

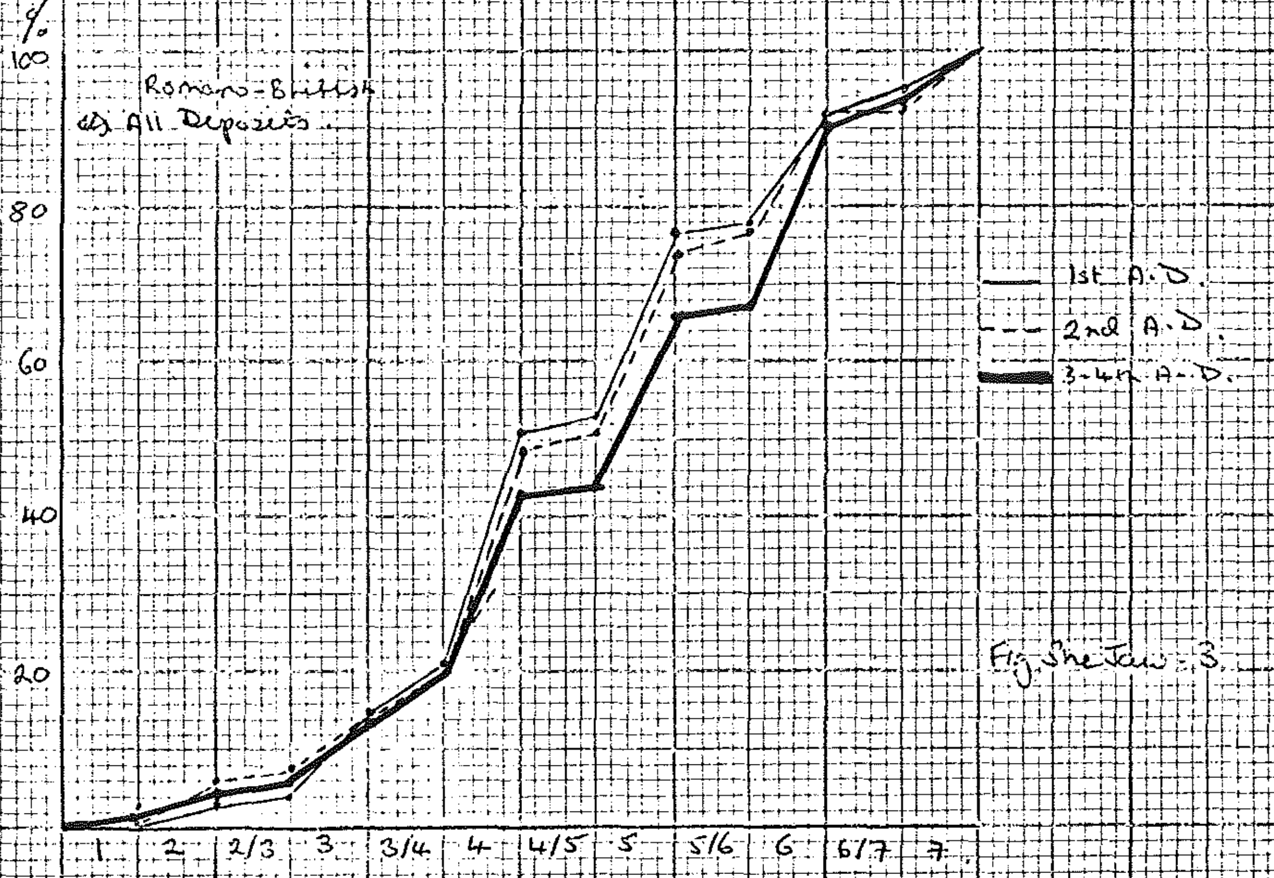


Fig. She Jaw. 3

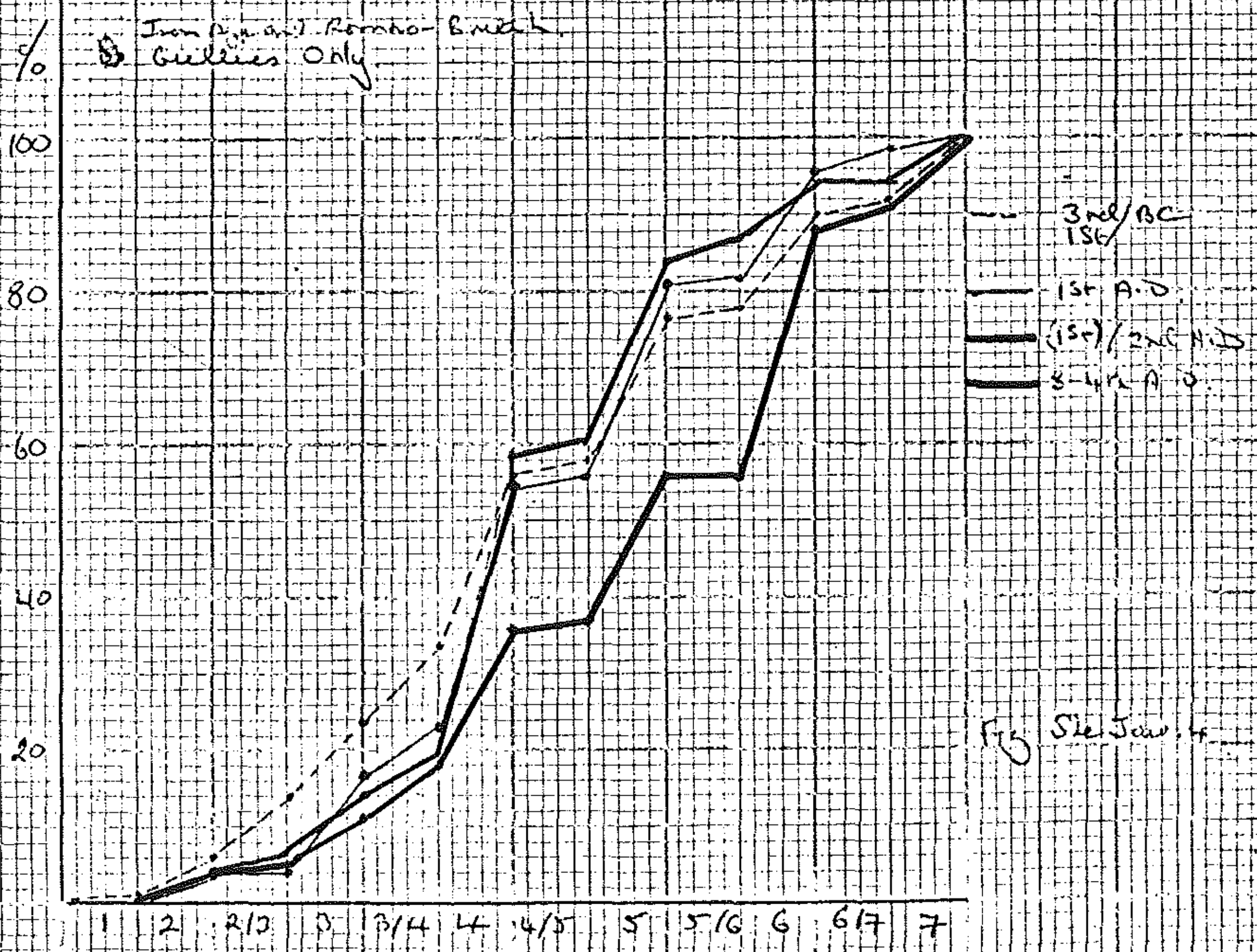


Fig. She Jaw. 4

SECTION 6

METRICAL ANALYSIS OF THE MAJOR SPECIES

INTRODUCTION

Metrical analysis can be used in attempts to sex some of the bones of certain species, in order to assess the relative abundance of male and female animals represented in the assemblage. It is also frequently used to assess the overall size of the stock. Variations in size are usually caused by complex combinations of environmental, genetic and nutritional factors and it is often difficult to determine which factors were of primary importance in such variations. It will be shown that there were significant changes in the sizes of all the major species represented at Owslebury. However, the causes of such changes are far from clear in some cases. We again lack sufficient research on modern material to explain how particular metrical variations are caused.

Measurements were taken wherever possible, using the Ancient Monuments Laboratory's Recording system. The majority were identical to the measurements described by von den Driesch (1976). All the measurements have been stored in an archival record. This section will attempt to summarize the results obtained from some of the more common measurements taken.

METRICAL ANALYSIS OF CATTLE

Metacarpus

Several attempts have been made to distinguish metacarpi of bulls, steers and cows in archaeological samples. In modern breeds, the distal articulation of the metacarpus is generally wider in bulls and steers than in cows (Fock 1966; Higham 1969). There are, however, problems with comparisons between different breeds. There is also the possibility that the distal articulations of plough animals may become more splayed (for a fuller discussion of the usefulness of cattle metapodia as indicators of sex, see Grigson 1982: 10-12).

At Owslebury, metrical analysis of cattle metacarpi revealed a large amount of variation. Fortunately, a relatively high number of the measurements were taken from complete specimens, which allowed the lengths of the bones to measured. In general, bulls have comparatively stouter metacarpi than cows. Consequently, breadth measurements can be compared against the maximum length to give an indication of the sex of the animal. Howard (1963) used the index of the distal breadth/length x 100 in attempts to distinguish between the sexes of cattle metacarpi. Those with indices below 29.5 were assigned to cows; those above to castrates and bulls. The specimens at either end of the scale are indeed likely to be females and bulls, but the separation of "bulls" from "castrates" and "cows" from "castrates" is more questionable. The results of this analysis are given in Table Cowmet.1.

The results indicate that specimens falling into the "male" (bull and steer) catagory outnumbered those of "cows" in most periods at Owslebury. Given the fact that most of these measurements would only be taken on metacarpi with fused distal epiphyses, the seemingly high proportion of specimens belonging to males over three years of age (approximately the time by which the distal epiphysis has fused), is interesting. Although these samples are relatively small, there seems have been no bias towards the killing of immature male cattle.

These results are supported by analysis of measurements of the distal articulation only. This increased the sample sizes by allowing the inclusion of fragmentary metacarpi. Measurements of the maximum distal breadth plotted against the depth at the fusion point have separated samples into two seemingly distinct groups in some assemblages (Maltby 1979: 34-35). These have tentatively been assigned to female and male catagories. Similar plots were made of the samples from Owslebury (Figures CowMet.1-4). The complete specimens provisionally assigned to "male" and "female" catagories are indicated in these figures. In both the Iron Age and 1st Century A.D. samples, specimens in the latter catagory are in the minority (Figures CowMet.1-2). The Iron Age sample was possibly too small for detailed analysis. However, in the 1st Century A.D. sample, 19 specimens could tentatively be placed in the "male" group with wide articulations, compared to 12 specimens in the smaller "female" size group. In the smaller 1st-2nd Century A.D. sample, seven specimens fell into the "female" catagory and five into the "male" (Figure CowMet.3). The 3rd-4th Century A.D. sample included seven "female" and eight "male" specimens (Figure CowMet.4).

Interpretation of this pattern depends on the reliability one places upon successful separation of "male" and "female" specimens by this method of analysis. If the wider distal articulations are sometimes caused by the effects of ploughing, it can perhaps be said that the Owslebury samples contained a high proportion of metacarpi belonging to "male" or plough animals.

The results become extremely interesting when compared with other samples. At Exeter (Maltby 1979: 34) the majority of metacarpi fell into the smaller "female" catagory. The same is true of other samples from various parts of the country, for example at Alcester, Warwickshire (Maltby n.d. 1), Cirencester (Maltby n.d. 2), Silchester (Maltby 1984c) and at Colchester (Luff 1982). The results from Owslebury also contrast with the results obtained from Portchester Castle, where the majority of complete specimens fell into the "female" catagory when Howard's (1963) indices were calculated (Grant 1975: 400-402). The explanation for the variability may lie in the marketing and redistribution of cattle in the Romano-British period. There may, for example, have been a preference for adult cows rather than bulls or plough oxen, to provide meat for the urban market. Inhabitants of rural settlements like Owslebury, may therefore have sold (or had levied from them), more female than male animals to the markets at Winchester. At Fishbourne, measurements of the distal articulation of the metacarpi (Grant 1971), would appear to show a bias towards "female" animals in Period 1 and a much more even representation of "males" and "females" in Periods 2/3. These changes coincide with the change in the function of Fishbourne from a militry depot (Period 1), to the "Palace". Samples from other rural settlements have in general been too small for realistic comparisons. However, this phenomenon could be tested on other material as it becomes available. Direct comparisons with the assemblages from Roman Winchester should enable us to test this hypothesis further.

It is also apparent from Figure CowMet.1 that the range in size of cattle metacarpi at Owslebury increased in the later deposits and that in general, more larger specimens were represented in the later periods, particularly in the 3rd-4th Century A.D. deposits. Figure CowMet.5 is a bar graph of the maximum proximal breadths of cattle metacarpi from Owslebury. This shows clearly the increase in the range in size of specimens from the 1st Century A.D. onwards. The complete bones sexed in Table CowMet.1 are indicated accordingly. The good representation of "male" specimens is further supported by the results. They clearly outnumber "female" specimens in the 1st Century A.D. deposits, although "female" animals are better represented in the 3rd-4th Century A.D. sample. The results are similar to those obtained from the measurements of the distal end of the metacarpus. The ranges and other statistics relating to the metrical analysis of the proximal breadth and distal breadth of cattle metacarpi are included in Table CowMet.2. It has to be remembered, however, that in bones apparently displaying such a degree of sexual dimorphism, changes in the mean size may be related to changes in the ratio of male to female animals represented, rather than the overall size changes in the stock.

Metatarsus

This bone too displays sexual dimorphism with specimens with wider articulations more likely to be from steers or bulls. Figure CowMet.6 shows the sizes of the proximal breadth measurements from the major periods at Owslebury. This shows the small range in size of the Iron Age specimens and a much greater range in the 1st Century A.D. sample, particularly of large specimens. The 3rd-4th Century A.D. sample would seem to indicate a further increase in the overall size of the cattle. The mean size increased from 42.9 mm in the Iron Age deposits to 43.4 mm in the 1st Century A.D. deposits to 46.1 mm in the later Romano-British layers, with corresponding increases in the coefficient of variation (Table CowMet.2)

The larger metatarsi measurements are likely to have been from bulls and steers, although the degree of sexual dimorphism is not as clear as from the metacarpi. If we assume that the majority of the 1st Century A.D. specimens belonged to males (as suggested by the metrical analysis of the metacarpi), the majority of the specimens with proximal breadths of over 43 mm probably belonged to males. The increase of the size of cattle in the early Romano-British deposits has been witnessed on other sites in Hampshire, for example Winnall Down (Maltby 1985b: 110). It is a development that did not take place throughout Britain. The cattle metatarsi from Roman Exeter (Maltby 1981a: 188), are in general no larger than the Iron Age specimens represented at Owslebury. The 3rd-4th Century A.D. metatarsi from Owslebury are of a similar size range to those from deposits from Alcester, Warwickshire (Maltby 1981a: 188). However, most of the Alcester specimens probably belonged to females, whereas male and female specimens appear to be represented in roughly equal numbers at Owslebury. Consequently, the distribution of specimens at Alcester is skewed towards specimens of 40-45 mm, whereas there is a much more even distribution at Owslebury.

Other Measurements

Table CowMet.2 summarises the results of the metrical analysis of some of the other most common measurements taken at Owslebury. Most of them show quite clearly the gradual increase in overall size in the cattle represented between the Iron Age and the late Romano-British period. The Romano-British samples displayed a much wider size range. This is indicated by the increasing values of the coefficients of variation for the various measurements.

The bar chart comparing the greatest lengths of the lateral side of the astragalus in the different periods (Figure CowMet.7) shows the typical pattern for these results and in many ways replicates the results obtained from the metapodia. The small sample from the Iron Age deposits had a restricted size range and is similar in distribution to the samples from the Early and Middle Iron Age from Winnall Down (Maltby 1985b: 110). The early Romano-British samples witnessed a much greater diversity in size with the bulk of the specimens measuring between 60-62 mm. Bartosiewicz (1984) suggests that variations in this measurement are not caused primarily by sexual dimorphism, but the skewed distribution towards larger specimens at Owslebury in the 1st Century A.D. sample would suggest that more males were represented. This would support the observations made from the metapodia measurements. The changes in the distribution of the sizes of the astragali in the 1st Century A.D. deposits at Owslebury has close similarities with the changes observed in the early Romano-British deposits at Winnall Down (Maltby 1985b: 110). The 3rd-4th Century A.D. samples of astragali showed a further increase in the diversity of size but with a further overall size increase. The distribution is not as skewed towards larger specimens and this may again reflect a more even representation of male and female specimens in the later Roman deposits.

Some of the observed variability in the measurements taken on the other bones may also be due to sexual dimorphism. It is noticeable that the smallest increase in mean size in the 3rd-4th Century A.D. samples was obtained from the metacarpi measurements. This is partially explained by the relative increase of "female" specimens. Other measurements are probably less affected by sexual dimorphism and therefore possibly reflect better the overall size changes. However, more research is needed to explain more fully why some measurements seem to show greater changes than others.

Withers Heights

Withers heights can be calculated from the complete lengths of limb bones using various conversion factors. At Owslebury the conversion factors for the radius (4.3) and tibia (3.45) followed those employed by Matolsci (1970). Those for the metapodia followed the estimates of Foch (1965). The conversion factors for the male and female metapodia vary according to sex. For the metacarpus the conversion factor is 6.0 for cows and 6.25 for bulls. The appropriate figure was used on the metacarpi provisionally assigned to "male" and "female" catagories at Owslebury. For the metatarsi - which were not sexed - the intermediate conversion factor of 5.45 was employed. The results are expressed in centimetres.

Figure CowMet.8 shows the results of this analysis. The withers heights estimates were divided into 5 cm blocks (95-99.9 cm, 100-104.9 cm......130-134.9 cm). The bones from which the estimates are derived are also shown in Figure CowMet.8. It seems that the factors used to obtain withers height estimates for the metacarpus tend to produce lower figures than the conversion figures for the other bones. However, the steady increase in the overall size of cattle represented is clearly demonstrated. In the small Iron Age sample the range in withers heights was between 95-120 cm. In the 1st Century A.D. sample the range had increased to 100-130 cm, with a marked peak of specimens producing estimates of 100-115 cm. The smaller 1st-2nd A.D. sample revealed a similar range, but the peak had moved to 115-120 cm. Finally in the 3rd-4th Century A.D. sample, the estimates of withers height ranged from 105-135 cm with the highest peak between 120-125 cm. Although this trend shows a gradual improvement in the overall size of the cattle at Owslebury in the Romano-British period, comparisons with European sites shows that the Romano-British cattle were smaller by continental standards. In Germany, for example, within the Roman province, some cattle attained withers heights of 150 cm (Teichert 1984). However, the cattle were larger than those found at Exeter which had a mean withers height (from metapodia only), of 107-111 cm. The results from Owslebury are comparible to those of late Roman Alcester, where the mean withers height estimate was 115 cm (Maltby 1979: 37).

Discussion

The metrical analysis from Owslebury has given further evidence of the small size of Iron Age cattle in Hampshire. The mean measurements obtained from Owslebury (Table CowMet.2) are similar, for example, to those from the much larger samples from Danebury (Grant 1984a; 513). The more restricted range in size of the measurements from Owslebury are probably due to the smaller sample size.

However, the size of the 1st Century A.D. cattle bones at Owslebury showed greater variability than their Iron Age counterparts, even at Danebury, and the variability tended to increase during the Romano-British period. The appearance of larger cattle in the early Roman period may suggest that new breeds were being imported. However, some improvements could also have been caused by improved husbandry and nutrition. The smaller number of bones from the 1st Century B.C. deposits makes it difficult to be certain whether such changes began prior to the Roman invasion. However, the limited evidence suggests that there was little change in cattle size between the 3rd-2nd Century B.C. samples and those from the 1st Century B.C. deposits.

The Owslebury sequence also showed that cattle generally became larger in the Romano-British period. The mean sizes of various 3rd-4th Century Century A.D. measurements showed a 2-6% increase from their equivalent figures in the 1st Century A.D. sample (Table CowMet.2). This increase would again be the result of better husbandry or the importation of larger cattle. In either case the average size of cattle bones had increased by about 7-8% from the Iron Age levels by the end of the Romano-British period. A few animals were no larger than some of the smallest Iron Age stock, but the majority were larger animals which would have produced more meat/carcase.

The second major aspect of the metrical analysis of cattle bones at Owslebury is the change in the relative proportion of males and females represented. If interpretation of the sexing data is correct, there was a significant bias towards "male" cattle in the 1st Century A.D. deposits (and possibly the Iron Age sample too). By the 3rd-4th Century A.D., this bias was not as evident and it seems possible that males and females were represented in fairly equal numbers. Interpretation of this change is difficult without comparisons with Winchester. Since other urban samples have produced a bias towards female cattle, it is possible to postulate that some of the adult cows kept at Owslebury ended their lives at the hands of the urban butcher. If this is the case, it seems that the demand for cows was greater in the early Romano-British period than in the 3rd-4th Century A.D. Current work on the Roman assemblages from various parts of Winchester should provide for interesting comparisons.

METRICAL ANALYSIS OF SHEEP

The relatively high rates of immature mortalities of sheep and the poor survival of many articulations because of canid scavenging drastically reduced the number of bones available for metrical analysis. However, large enough samples were recovered for detailed analysis to be undertaken. In the following analysis the samples were divided into three chronological groups dated to the Iron Age, 1st-2nd Century A.D. and 3rd-4th Century A.D.

Metacarpus

O'Connor's (1982) thesis on the metrical attributes of sheep metacarpi has provided a useful set of data against which the metacarpi from Owslebury can be compared. Figure SheMet.1 plots the proximal breadth against the proximal depth measurements of metacarpi from three periods at Owslebury. It demonstrates how the sheep represented at the settlement increased significantly in size through time. Most of the Iron Age specimens were under 20 mm in breadth. The 1st-2nd Century A.D. sample contained some specimens as small as the majority of Iron Age metacarpi but more had a proximal breadth between 20-22 mm. The majority of the 3rd-4th Century A.D. specimens also had breadths of 20-22 mm but a group of eight larger metacarpi stood apart with breadths of over 22 mm. Only one 2nd Century A.D. example was of comparable size. Seven of the large specimens were recovered from F650 and the eighth was found in another cess pit, F664. These form part of the feet and head burials of sheep in these contexts. They were associated with some hornless sheep skulls, of a type not found in earlier deposits at Owslebury. The other 3rd-4th Century A.D. specimens were no larger than the 1st-2nd Century A.D. metacarpi. The evidence suggests that a new type of larger sheep was introduced in the late Romano-British period. Whether this "breed" replaced the smaller type of sheep or whether the two types were kept together is unclear, although the latter alternative is more probable.

Figure SheMet.2 reproduces the Romano-British metacarpi measurements taken on specimens from the Brook Street excavations in Winchester (O'Connor 1982: figure 51). These display a similar range in size as the Owslebury specimens but a higher proportion were found with breadths of over 21 mm. It is possible that chronological variability could partially explain this difference, if a higher proportion of the metacarpi from Winchester belonged to sheep of late Romano-British date. Alternatively, it is possible that larger sheep were found in varying numbers at different settlements in the area. The inhabitants of a rural settlement such as Owslebury may have continued to keep the traditional smaller type of sheep, while new types were introduced elsewhere. In turn more of the larger type may have been brought for slaughter to Winchester. More recent studies have tended to support the latter theory. In the sample from Staple Gardens, Winchester, only one metacarpus out of seven of mid-late Romano-British date had a proximal breadth of less than 21 mm. In addition, two of the three specimens of early Romano-British date from the same site were larger than any recovered from Owslebury, even in the 3rd-4th Century A.D. deposits.

Tibia

Morphological differences between sheep and goat are not apparent on the distal tibia. Measurements of the distal breadths of such bones, therefore, may include one or two specimens of goat. Figure SheMet.3 is a bar graph that shows th measurements of the maximum distal breadth of tibiae in successive periods at Owslebury. The measurements are grouped in 0.5 mm blocks (20.0-20.4 mm, 20.5-20.9 mm.....26.5-26.9 mm). The results show increasing variability in size through time, although the 1st-2nd Century A.D. tibiae showed relatively little change in size from the Iron Age specimens. However, there was a greater proportion of larger sheep in the late Romano-British sample.

Humerus

Figure SheMet.4 summarises the measurements obtained from the width of the distal trochlea of humeri from Owslebury. Again the results are presented in 0.5 mm blocks. The results are similar to those obtained from the tibia with little difference between the Iron Age and 1st-2nd Century A.D samples but a significant improvement in overall size in the 3rd-4th Century A.D. sample.

Other Measurements

Table SheMet.1 summarises the results of the analysis of the most common measurements of sheep from Owslebury. The results show that there was very little difference between the range and mean sizes of sheep in the Iron Age and 1st-2nd Century A.D. samples. However, the late Romano-British deposits contained a greater proportion of larger specimens, which resulted in mean values that were usually 3-6% higher than the 1st-2nd Century A.D. figures. There was, however, much less variability in the sheep/goat measurements than in the cattle samples. The coefficient of variation was usually less than 7.0 for the various measurements in all periods. These results can be compared with other samples from England. The ranges and means of the Iron Age measurements were similar to those obtained from contemporary samples from Wessex (Maltby 1981a: 189-190; Grant 1984a: 506). The figures obtained from the Romano-British samples were similar to those from Exeter (Maltby 1979: 181-185) and several smaller assemblages from rural settlements in Hampshire. However, there is some evidence to suggest that the sheep eaten in Winchester were usually slightly larger than those represented at Owslebury. The results from the metacarpus have already been discussed. These are supported by results from the measurements of other bones. For example, the mean for the distal breadth of 11 tibiae measured from mid-late Romano-British deposits at Staple Gardens, Winchester (Maltby n.d.3) was 25.1 mm, 8% greater than the equivalent figure obtained from the 3rd-4th Century A.D. deposits at Owslebury.

Withers Heights

Withers heights of sheep were calculated on complete bones using the conversion factors of Teichert (1969). The results were therefore obtained mainly from metapodia, particularly from the 3rd-4th Century A.D. cess pits. Complete bones with fused epiphyses were rarely encountered in other deposits and consequently the samples are small and from a resticted range of contexts. The results are shown in Figure SheMet.5, in which the estimated withers heights have been put in divisions of 1 cm (53.0-53.9, 54.0-54.9.....67.0-67.9 cm). Most of the estimates were of less than 60 cm in all periods and in this instance there is no clear indication that the 3rd-4th Century A.D. samples contained a higher proportion of sheep with greater wither heights. It seems that the improvement in size in some of the sheep represented at Owslebury was reflected more in the breadth measurements than in the lengths of the limb bones. The animals in other words tended to be stouter rather than taller.

Discussion

The sheep represented in the Iron Age deposits at Owslebury were of a build typical of the small, slender animal found on other Iron Age sites in Wessex. These therefore showed no evidence of any attempts to improve the size of the carcase for meat production. This would tally with the ageing evidence, which showed that relatively few sheep were culled at the optimum age for meat production (see Section 5). Indeed it is only in the late Romano-British deposits at Owslebury that there appears to have seen improvements in carcase size. It seems that a larger type of (usually?) hornless sheep was introduced there at that time. However, it seems that in comparison with Winchester, these larger sheep were found in much fewer numbers at Owslebury and appeared at a later date. Further investigations of the variation in the size of sheep in the area from other contemporary sites would repay study.

METRICAL ANALYSIS OF PIG

The combination of the high proportion of immature pig bones, poor preservation and small sample sizes meant that metrical analysis of this species was more restricted. Indeed, the 3rd-4th Century A.D. deposits produced very few measureable pig bones and so it was not possible to monitor changes in the size of pigs within the Romano-British period. Most of the measurements were obtained from contexts dated to the 1st and 2nd Centuries A.D. In some cases it was possible to compare these with samples obtained from the Iron Age deposits.

Mandibular Third Molar

Figure PigMet.1 compares the lengths of these teeth in samples obtained from the Iron Age, 1st-2nd Century A.D. and 3rd-4th Century A.D. deposits. The measurements were assigned to 1mm divisions (26.0-26.9 mm, 27.0-27.9 mm......43.0-43.9 mm). In a few cases it was possible to determine the sex of the animals to which these teeth belonged by the examination of the canines in the same mandible. The results of this metrical analysis showed that there was little change in the overall size of the pigs represented in the Iron Age and early Romano-British samples, although the measurements tended to be slightly larger in the latter period. The small sample from the 3rd-4th Century A.D. deposits showed more variation in size and included one large specimen that fell into the size range of wild boar. This, however, was the only example and the vast majority of the pig bones belonged to domestic stock.

Humerus

Figure PigMet.2 plots the sizes of the breadth and height of the distal articulation (trochlea) of pig humeri at Owslebury. These show that although there was greater variation in the size of these bones in the 1st-2nd Century A.D. deposits, there is no evidence for any improvement in carcase size from the Iron Age. Comparisons with measurements taken on bones from the Staple Gardens excavations in Winchester (Maltby n.d.3) showed that some of the pig humeri of Romano-British date were larger than any from Owslebury.

Radius

Measurements taken on the proximal articulation of the radius are plotted in Figure PigMet.3. Again these show that there was no noticeable improvement in the size of pigs represented at Owslebury in the Romano-British period. However, nearly all the radii measured from the Romano-British levels at Staple Gardens, Winchester were of a greater size. Again it appears that the pigs eaten at Winchester were generally larger than those from Owslebury. Whether these were derived from improved stock imported into the area or obtained from herds bred and fattened especially for the urban market remains to be established. The fact that there was such a variability in size of stock represented in settlements from a local area is in itself extremely interesting.

Other Measurements

Summaries of the analysis of the more common pig measurements are given in Table PigMet.1. They confirm that there was little evidence for improvement in the average size of pigs represented at Owslebury in the 1st-2nd Centuries A.D. It was not possible to establish whether changes occurred in the late Romano-British period because the samples were too small for detailed analysis.

METRICAL ANALYSIS OF HORSE

The fact that most of the cattle bones belonged to adult animals and also had not been fragmented to the same extent as cattle, sheep and pig meant that a relatively large proportion of their bones could be measured.

Withers Heights

Calculations of withers heights were derived from the conversion factors employed by Kiesewalter (1888) on the lateral lengths of the major limb bones. The results of this analysis are given in Figure HorMet.1. These are presented in the form of bar graphs in which the measurements have been divided into 5 cm units (110-114 cm, 115-119 cm......145-149 cm). Most of the Iron Age and 1st-2nd Century A.D. bones belonged to ponies with shoulder heights of 115-130 cm. However, there was a significant increase in the average size of the horses represented in the 3rd-4th Century A.D. deposits. Although smaller ponies were still present, most now had withers heights of over 135 cm. Figure HorMet.1 also compares the withers heights of horses from Iron Age deposits at Winnall Down and Balksbury and these tended to be of a similar size to those represented in the earlier periods at Owslebury.

Third Metatarsal

Plots of the maximum proximal breadth and depth of these bones showed that specimens of late Romano-British date were usually of a larger size than those of Iron Age and 1st-2nd Century A.D. date at Owslebury (Figure HorMet.2).

Other Measurements

Table HorMet.1 summarises the results of the more common measurements taken on horse bones. These confirm that more larger animals were represented in the 3rd-4th Century A.D. deposits. In most cases there was also a small increase in the mean size of bones of 1st-2nd Century A.D. date compared to those from Iron Age contexts. However, the Iron Age samples were very small and these results may be misleading.

METRICAL ANALYSIS OF DOG

Although the sample of measurable dog bones was comparatively small, some interesting results were obtained. The majority of the bones belonged to complete or partial skeletons. This meant that the lengths of a relatively large number of the bones could be recorded, and this allowed estimates of shoulder heights to be made using the conversion formulae of Harcourt (1974: 154). The results of this analysis are given in Table DogMet.1. Unfortunately only one Iron Age skeleton was found (in F212-1). The lengths of its major limb bones produced shoulder height estimates ranging from 36.6-38.1 cm. This was, therefore, a relatively small animal, falling into the lower range of the Iron Age specimens studied by Harcourt (1974: 162-3).

Complete limb bones of five dogs were recovered from deposits dating from the 1st Century A.D. The most complete sets were found in F42-2-4 and F133-1-15. Shoulder height estimates ranged from 30.8-35.2 cm and 48.9-51.8 cm respectively. The former was a small, stocky individual, as was another dog in F42-3-2 whose radius gave an estimated shoulder height of only 30.5 cm. Small dogs were also found in the 3rd-4th Century A.D. levels. F133-6-16 produced a skeleton of a dog with an estimated shoulder height of 34.3-35.2 cm. Another from F147-3-11 produced estimates of 31.4-34.3 cm. F632-6 contained a skeleton of a dog with an estimated shoulder height of 35.0-39.5 cm. The skeleton in F724-2 had an estimated shoulder height ranging from 33.2-37.1 cm. The cess pit F664 produced partial skeletons of six adult dogs, all of these belonged to animals with shoulder heights of 42-50 cm.

Harcourt (1974: 164-166) showed that there was great variability in the size of Romano-British dogs. This is reflected at Owslebury where the figures estimated for the coefficients of variation were consistently higher for dog measurements than for any of the other species studied. Figure DogMet.1 plots the greatest lengths of the radii against the minimum shaft width. Middle Iron Age specimens from Winnall Down (Maltby 1985b) and Balksbury 1973 (Maltby AML Report) are included for comparison. These were all substantially larger than the Iron Age specimen from Owslebury and are more typical of the size of Iron Age dogs in Britain. The figure also shows that a small group of short bones with stout shafts stood apart from the majority of the bones. Harcourt (1974: 166) also noted such specimens in other Romano-British collections. Measurements on other limb bones produced similar results. Figure DogMet.2 shows the greatest lengths of tibiae plotted against the maximum distal breadth. Four of the Romano-British specimens had markedly wider distal articulations than the majority of the specimens of Iron Age and Romano-British date from Owslebury and other Iron Age sites in Hampshire. Such small stocky dogs do not appear until the Romano-British period at Owslebury, but one of the tibiae from the Late (a) Phase at Danebury (dated 400-300 B.C.) falls into the group (Grant 1984a: 524).

No complete bones of very large dogs were found at Owslebury but occasionally large incomplete specimens were recovered. Figure DogMet.3 plots the maximum distal breadth of humeri against the greatest height of the distal articulation (trochlea). It shows that although the majority of the 3rd-4th Century A.D. specimens were smaller than the 1st Century A.D. bones, two specimens belonged to much larger animals. The largest belonged to a very large hound indeed. The same diagram shows that the only complete Iron Age humerus in F212-1 was indeed smaller than four other broken specimens, which were more typical of the size of Iron Age dogs in Southern England. This metrical analysis, however, did not separate out the small stocky individuals from the more typical slender specimens.

The Owslebury data, therefore, broadly supports Harcourt's observations about the sizes of Iron Age and Romano-British dogs. The great diversity in the size and proportion of Romano-British dogs lends support to the theory that new breeds of dog were introduced into Britain during that period. However, the presence of a small stocky dog at a much earlier date at Danebury and the recovery of some very small animals from the late Iron Age levels at Skeleton Green, Hertfordshire (Ashdown and Evans 1981: 234) - found significantly on a settlement which included Romans or Romanized Gauls who were involved with overseas trade (Partridge 1981: 351) - suggests that a few of these types of small lap dogs may have been imported before the Roman invasion.

TABLE COWMET.1

Metrical Analysis of Complete Cattle Metacarpi from Owslebury

a) Iron Age

Context	GL	Bd	%Bd/GL	Sex
F55-1-45	171.9	51.2	29.8	F?
F55-4-44	172.2	54.1	31.4	M?
F55-5-8	164.1	54.4	33.2	M
F55-5-11	184.0	60.8	33.0	M
F55-6-9	173.0	61.0	35.3	M
F55-6-9	158.2	55.3	35.0	M

b) 1st Century A.D.

Context	GL	Bd	%Bd/GL	Sex
F633-17	167.5	57.5	34.3	M
F633-40	162.0	57.0	35.2	M
F42-1-1	183.6	57.2	31.2	M?
F42-3-4	191.1	65.2	34.1	M
F51-1-2	169.3	48.3	28.5	F
F75-4-8	183.3	63.4	34.6	M
F75-4-24	180.1	65.4	36.3	M
F132-2-26	183.7	59.3	32.3	M
F132-2-27	168.7	50.8	30.1	F?
F132-7-26	185.3	53.1	31.5	M?
F147-1-21	173.8	53.8	31.0	M?
F147-1-21	182.6	56.4	30.9	M?
F147-2-25	163.4	59.1	36.1	M
F367-3-2	167.9	49.8	29.7	?
F370-3-9	167.8	52.2	31.1	M?
F370-5-5	177.3	57.7	32.5	M
F627-1-2	172.3	59.2	34.4	M
F642-3-17	183.3	54.3	29.6	?
F642-4-9	178.4	49.7	27.9	F

c) 1st-2nd Century A.D.

Context	GL	Bd	%Bd/GL	Sex
F133-4-10	184.7	67.0	36.2	M
F133-4-10	182.2	52.3	28.7	F
F642-5-4	186.4	55.8	29.9	F?
F642-5-4	190.9	64.6	33.8	M
F642-5-16	180.3	59.5	33.0	M
F691-2-6	177.3	47.7	26.9	F

d) 3rd-4th Century A.D.

Context	GL	Bd	%Bd/GL	Sex
F107-2	193.0	59.7	30.9	M?
F650-16	178.6	59.0	33.0	M
F707-9	181.5	54.9	30.2	F?
F707-9	180.4	52.3	29.0	F
F724-3	203.8	55.3	27.1	F
F75-8-18	188.4	60.0	31.8	M
F634-1-39	180.0	52.2	29.0	F
F634-2-1	193.6	65.9	34.0	M
F634-2-6	200.8	62.8	31.3	M
F642-11-22	194.9	63.8	32.7	M

GL = greatest length.
Bd = greatest breadth distal end (von den Driesch 1976: 92).
%Bd/GL = index of distal breadth/greatest length x 100.
Sex = probable sex of animal (after Howard 1963).
M = male (bull or steer).
F = female.

TABLE COWMET.2

Analysis of some of the Common Cattle Measurements

Bone	Meas.	Date	N	Range(mm)	Mean	s.d.	c.v.	%1C
Metacarpus	Bp	IA	23	46.8-57.4	50.0	2.80	5.60	95.1
		1C	68	44.9-64.5	52.6	4.72	8.97	100
		1-2C	19	45.1-63.2	52.3	5.68	10.86	99.4
		3-4C	30	45.3-63.8	53.5	5.15	9.63	102.0
Metacarpus	Bd	IA	15	49.0-62.6	55.0	4.13	7.51	98.6
		1C	40	47.5-65.2	55.8	4.84	8.67	100
		1-2C	16	47.7-67.0	54.1	5.05	9.33	97.0
		3-4C	20	50.3-65.9	56.7	4.66	8.22	101.6
Metatarsus	Bp	IA	11	40.7-46.6	42.9	1.72	4.01	98.8
		1C	44	38.2-50.9	43.4	3.29	7.58	100
		1-2C	22	37.3-49.1	43.1	3.57	8.28	99.3
		3-4C	37	39.5-52.7	46.1	3.66	7.94	106.2
Astragalus	GL1	IA	10	55.6-60.5	58.8	1.73	2.94	97.4
		1C	46	54.5-70.2	60.4	3.12	5.17	100
		1-2C	18	56.2-72.2	60.3	3.78	6.27	99.8
		3-4C	59	53.9-75.6	62.9	4.87	7.74	104.1
Scapula	BG	IA	32	35.3-47.5	42.7	2.53	5.93	100.7
		1C	51	35.3-50.3	42.4	3.89	9.17	100
		1-2C	26	37.8-54.9	44.8	4.94	11.03	105.7
		3-4C	30	37.8-56.0	45.2	4.49	9.93	106.6
Humerus	BT	IA	14	62.6-74.0	66.1	3.13	4.74	98.5
		1C	33	60.6-75.9	67.1	3.58	5.34	100
		1-2C	15	62.6-78.2	68.8	5.24	7.62	102.5
		3-4C	24	58.0-86.1	71.0	7.78	10.82	104.5
Radius	Bp	IA	26	65.1-84.1	71.8	4.11	5.72	98.2
		1C	53	60.2-82.3	73.1	4.85	6.63	100
		1-2C	19	66.7-84.2	73.7	5.38	7.30	100.8
		3-4C	35	65.8-87.3	75.4	6.69	8.87	103.2
Tibia	Bd	IA	26	47.2-58.7	53.0	3.04	5.74	95.0
		1C	47	48.1-62.5	55.8	3.34	5.99	100
		1-2C	17	50.3-63.2	56.8	4.15	7.31	101.8
		3-4C	48	43.3-69.3	57.6	5.29	9.18	103.2

Bp = maximum proximal breadth.
Bd = maximum distal breadth.
GL1 = maximum length lateral.
BG = breadth glenoid cavity.
BT = breadth trochlea.
N = number of specimens.
s.d. = standard deviation.
c.v. = coefficient of variation.
%1C = percentage of 1st Century A.D. mean.

IA = Iron Age.
1C = 1st Century A.D.
1-2C = 1st-2nd Century A.D.
3-4C = 3rd-4th Century A.D.

TABLE SHEET.1

Analysis of some of the Common Sheep Measurements

Bone	Meas.	Date	N	Range(mm)	Mean	s.d.	c.v.	%1C
Metacarpus	Bp	IA	11	18.7-21.4	19.6	0.80	4.08	96.1
		1-2C	21	18.3-22.7	20.4	1.14	5.59	100
		3-4C	30	17.8-24.3	21.1	1.46	6.92	103.4
Metatarsus	Bp	IA	8	16.2-19.2	17.8	1.05	5.90	100
		1-2C	21	16.5-19.8	17.8	0.80	4.49	100
		3-4C	32	16.9-21.0	18.9	1.05	5.56	106.2
Astragalus	GL1*	IA	25	23.3-27.5	25.0	1.18	4.72	98.0
		1-2C	42	22.6-29.8	25.5	1.73	6.78	100
		3-4C	32	24.3-30.3	26.9	1.71	6.36	105.4
Scapula	GLP	IA	7	25.7-31.2	28.2	1.92	6.80	100.7
		1-2C	12	25.2-29.7	28.0	1.58	5.64	100
		3-4C	9	26.7-31.1	29.3	1.56	5.32	104.6
Humerus	BT	IA	13	22.4-27.9	25.2	1.78	7.06	100
		1-2C	43	22.4-29.2	25.2	1.36	5.40	100
		3-4C	17	24.4-29.6	26.4	1.49	5.64	104.8
Radius	Bp	IA	10	24.5-28.7	26.6	1.27	4.77	96.7
		1-2C	29	24.6-31.1	27.5	1.54	5.60	100
		3-4C	18	23.6-32.4	28.6	2.05	7.17	104.0
Tibia	Bd*	IA	15	21.6-25.1	23.1	1.02	4.41	101.3
		1-2C	56	20.4-25.2	22.8	1.03	4.52	100
		3-4C	27	19.4-26.9	23.3	1.70	7.30	102.2

Bp = maximum proximal breadth.
Bd = maximum distal breadth.
GL1 = maximum length lateral.
GLP = greatest length of glenoid process.
BT = breadth trochlea.
N = number of specimens.
s.d. = standard deviation.
c.v. = coefficient of variation.
%1C = percentage of 1st Century A.D. mean.
* = may include goat

IA = Iron Age.
1-2C = 1st+2nd Century A.D.
3-4C = 3rd-4th Century A.D.

TABLE PIGMET.1

Analysis of some of the Common Pig Measurements

Bone	Meas.	Date	N	Range(mm)	Mean	s.d.	c.v.
Mandible	LM3	IA	17	26.7-33.9	30.8	1.92	6.23
		1-2C	25	28.1-35.2	31.4	1.75	5.57
		3-4C	7	28.1-43.6*	32.9	5.30	16.11
Maxilla	LM3	IA	12	27.2-32.9	30.2	1.73	5.63
		1-2C	18	25.2-32.6	29.1	2.07	7.11
Os Coxae	LA	IA	10	29.0-36.0	31.8	2.16	6.79
		1-2C	27	29.6-36.1	32.9	1.61	4.89
Humerus	BT	IA	9	26.3-33.7	30.1	2.24	7.44
		1-2C	21	24.4-32.5	29.2	2.00	6.85
Radius	Bp	IA	6	25.3-28.2	27.1	0.99	3.65
		1-2C	16	23.7-29.8	26.3	1.48	5.63
Tibia	Bd	1-2C	14	26.2-29.6	27.8	0.96	3.45

Bp = maximum proximal breadth.
Bd = maximum distal breadth.
LM3 = maximum length 3rd molar.
LA = length of acetabulum.
BT = breadth trochlea.
N = number of specimens.
s.d. = standard deviation.
c.v. = coefficient of variation.
* = largest measurement probably belongs to a wild boar.

IA = Iron Age.
1-2C = 1st+2nd Century A.D.
3-4C = 3rd-4th Century A.D.

TABLE HORMET.1

Analysis of some of the Common Horse Measurements

Bone	Meas.	Date	N	Range(mm)	Mean	s.d.	c.v.
Metacarpus	Bp	IA	5	40.2-45.6	43.6	2.07	4.75
		1-2C	17	40.2-48.7	44.6	2.40	5.38
		3-4C	15	39.8-48.7	45.2	2.96	6.55
Metatarsus	Bp	IA	7	40.2-47.7	44.1	2.54	5.76
		1-2C	14	41.2-48.7	44.8	2.31	5.16
		3-4C	10	41.0-50.5	46.9	3.51	7.48
Astragalus	Bd	IA	5	41.3-52.5	46.0	4.16	9.04
		1-2C	19	42.8-49.9	47.5	2.05	4.32
		3-4C	23	46.3-58.3	49.9	2.77	5.55
Scapula	BG	1-2C	13	44.0-58.4	52.1	4.08	7.83
		3-4C	7	51.4-58.8	55.8	2.73	4.89
Tibia	Bd	IA	5	56.9-65.2	61.4	3.94	6.42
		1-2C	4	59.3-66.3	62.1	3.08	4.96
		3-4C	12	55.3-71.8	66.1	4.45	6.73

Bp = maximum proximal breadth.
Bd = maximum distalx breadth
BG = breadth glenoid cavity.
N = number of specimens.
s.d. = standard deviation.
c.v. = coefficient of variation.

IA = Iron Age.
1-2C = 1st+2nd Century A.D.
3-4C = 3rd-4th Century A.D.

TABLE DOGMET.1

Estimates of Shoulder Heights of Dogs from Owslebury

a) Humerus

Feature	Date	Art.No.	GL(mm)	ESH(cm)
F212-1	2BC	169	114.9	36.8
F42-2-4	1AD	302	106.6	33.9
F133-1-15	1AD	295	158.7	51.2
F133-6-16	3-4AD	282	107.8	34.3
F632-6	3-4AD	504	117.9	37.8
F664-2	3-4AD	185	152.3	49.6
F664-3	3-4AD	218	133.4	43.1
F664-6	3-4AD	129	141.8	46.0
F664-10	3-4AD	197	131.3	42.3
F724-2	3-4AD	520	112.7	36.0

b) Radius

Feature	Date	Art.No.	GL(mm)	ESH(cm)
F212-1	2BC	169	113.8	38.1
F42-2-4	1AD	302	95.5	32.3
F42-3-2	1AD	-	89.7	30.5
F133-1-15	1AD	295	147.5	48.9
F133-6-16	3-4AD	282	104.0	35.0
F369-3-2	3-4AD?	-	142.3	47.2
F632-6	3-4AD	504	105.0	35.3
F634-2-48	3-4AD	539	152.4	50.4
F664-2	3-4AD	185	147.1	48.7
F664-3	3-4AD	218	132.8	44.1
F664-6	3-4AD	129	135.2	44.9
F664-10	3-4AD	197	127.3	42.4
F724-2	3-4AD	520	100.3	33.9

c) Ulna

Feature	Date	Art.No.	GL(mm)	ESH(cm)
F212-1	2BC	169	132.0	37.3
F42-2-4	1AD	302	108.7	30.8
F133-1-15	1AD	295	174.2	49.1
F133-6-16	3-4AD	282	122.6	34.7
F632-6	3-4AD	504	123.8	35.0
F664-2	3-4AD	185	171.8	48.4
F724-2	3-4AD	520	124.6	35.2

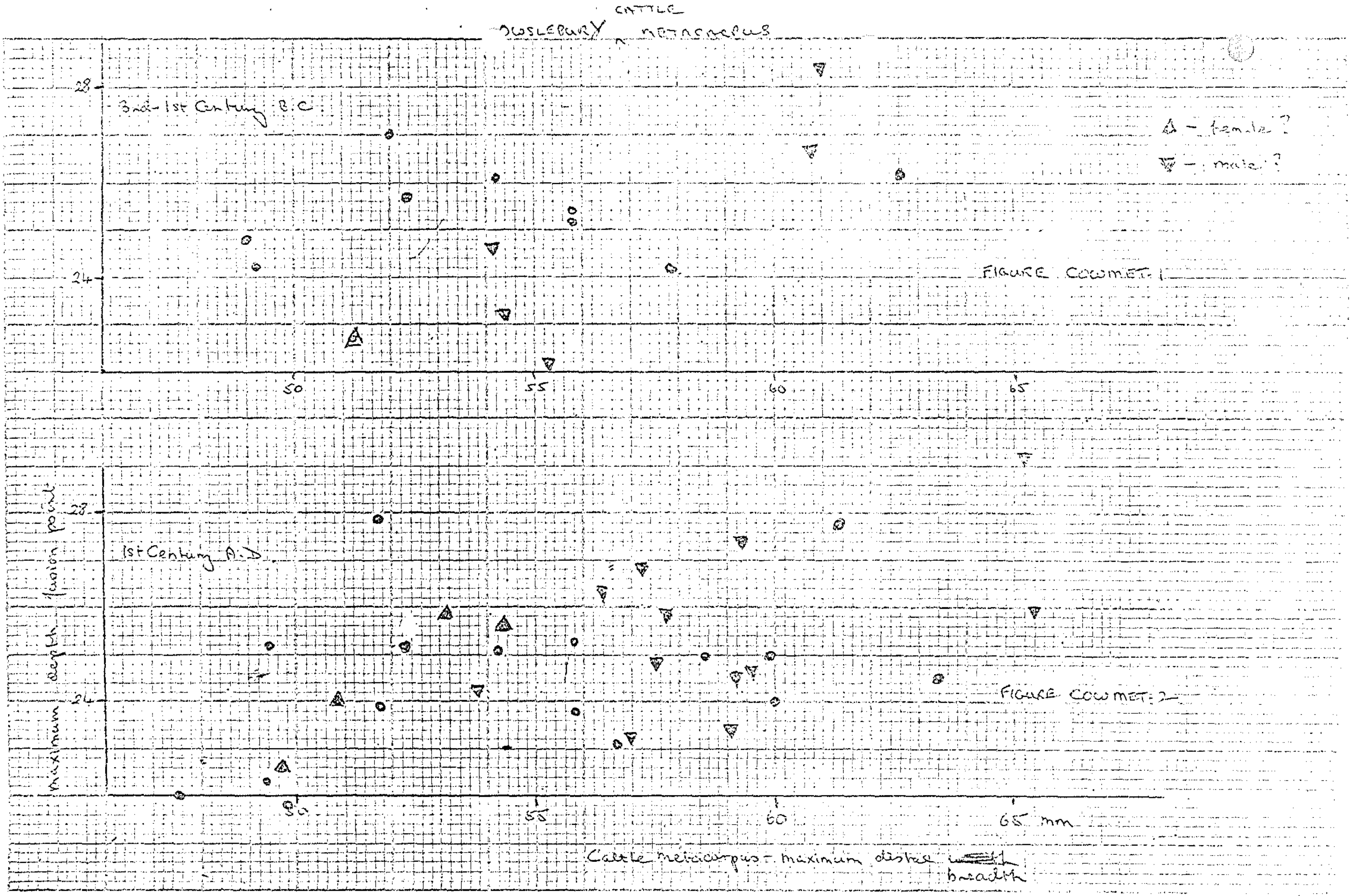
d) Femur

Feature	Date	Art.No.	GL(mm)	ESH(cm)
F212-1	2BC	169	120.8	36.6
F42-2-4	1AD	302	116.2	35.2
F133-1-15	1AD	295	169.0	51.8
F133-6-16	3-4AD	282	114.5	34.7
F632-6	3-4AD	504	129.9	39.5
F634-2-46	3-4AD	539	164.0	50.2
F664-3	3-4AD	218	146.8	44.8
F664-6	3-4AD	127	152.7	46.7
F664-7	3-4AD	121	147.7	43.5
F724-2	3-4AD	520	122.2	37.1

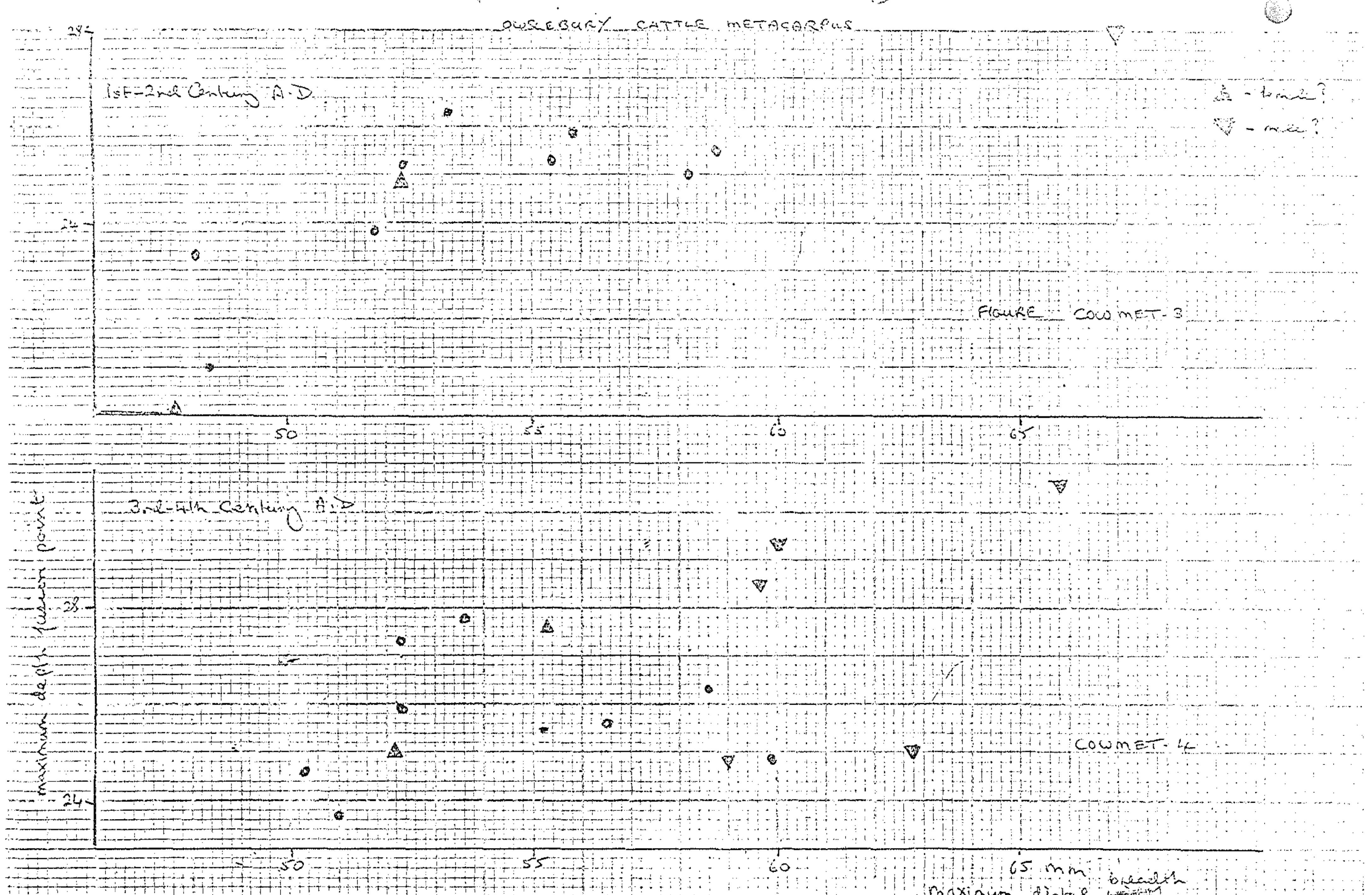
e) Tibia

Feature	Date	Art.No.	GL(mm)	ESH(cm)
F212-1	2BC	169	124.4	37.3
F42-2-4	1AD	302	104.4	31.4
F133-1-15	1AD	295	167.2	49.8
F642-3-4	1AD	-	111.7	33.6
F246-1	2AD?	-	200.7	59.6
F133-6-16	3-4AD	282	117.4	35.2
F150-1-1	3-4AD	-	125.7	37.7
F632-6	3-4AD	504	117.0	35.1
F634-2-46	3-4AD	539	167.3	49.8
F664-2	3-4AD	185	165.4	49.2
F664-3	3-4AD	218	144.7	43.2
F664-6	3-4AD	127	153.7	45.8
F664-9	3-4AD	198	145.3	43.4
F724-2	3-4AD	520	110.3	33.2

Art.No. = articulation number.
GL = greatest length.
ESH = estimated shoulder height (using conversion factors of Harcourt (1974)).



Owslebury cattle metacarpus
3rd-1st Century B.C.
Δ - female?
∇ - male?
Figure Cowmet 1
1st Century A.D.
Figure Cowmet 2
maximum depth fusion point
28
24
50
55
60
65 mm
Cattle metacarpus - maximum distal breadth



FIGURES COWMET. 1-4, metrical Analysis of cattle metacarpi from Owslebury.

OWSLEBURY CATTLE METACARPUS

FIG COWMET.5

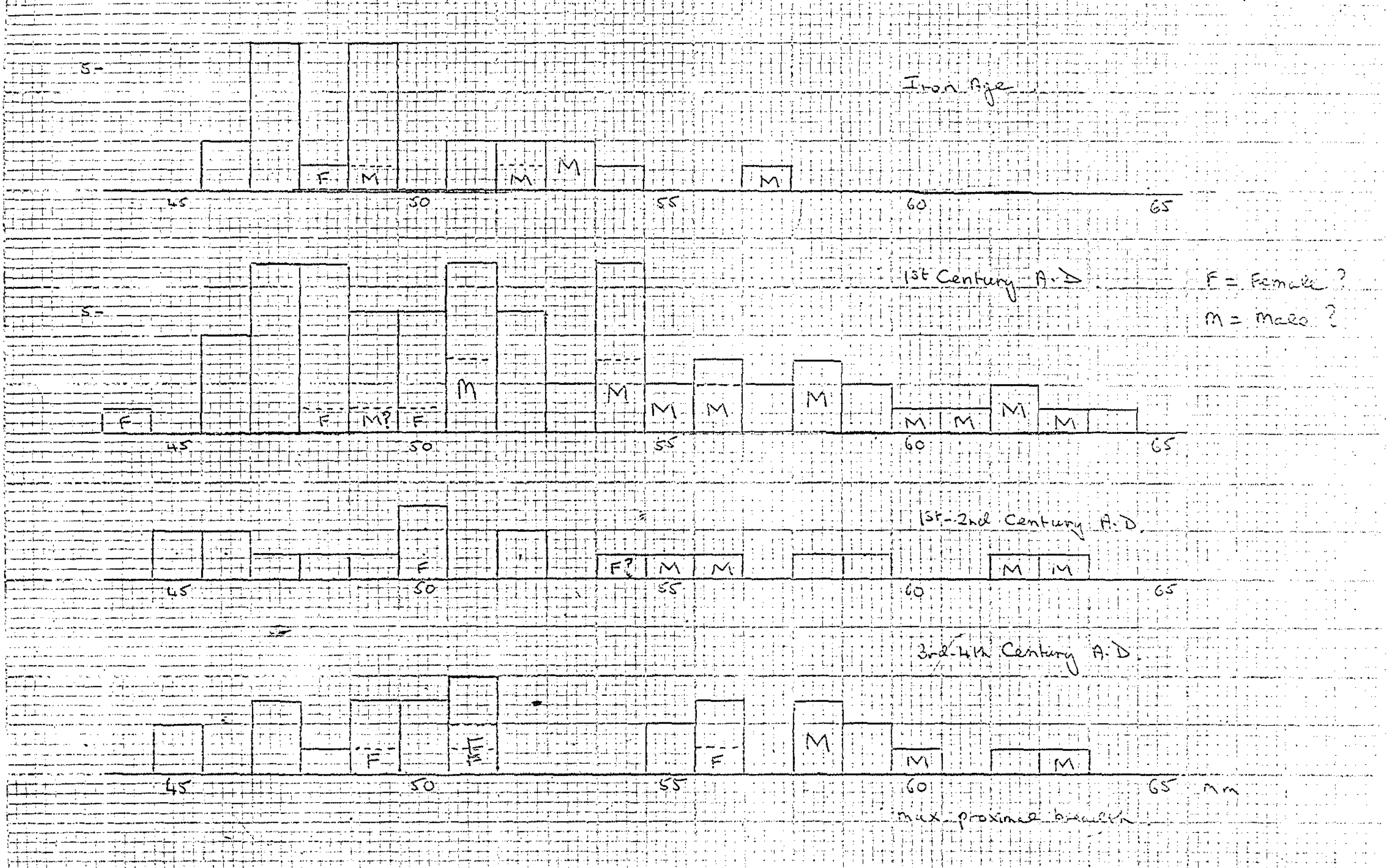


FIGURE COWSMET.5 Proximal breadth measurements of cattle metacarpi from Owslebury

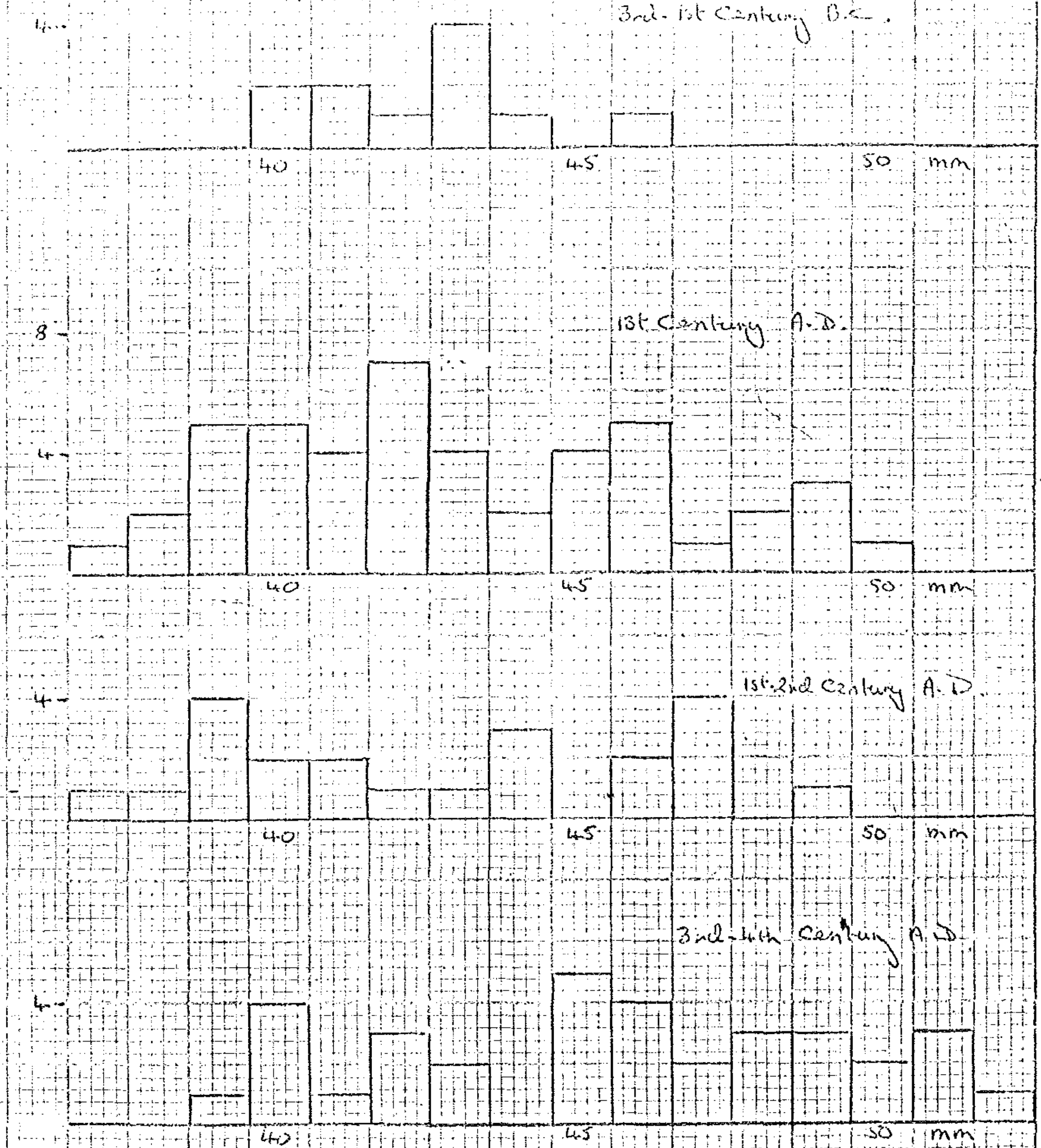


FIGURE COWMET. 6

Maximum Proximal Breadth Measurements of Cattle Metatarsi from Owslebury.

OWSLEBURY CATTLE ASTRAGALUS FIG COWMET 7

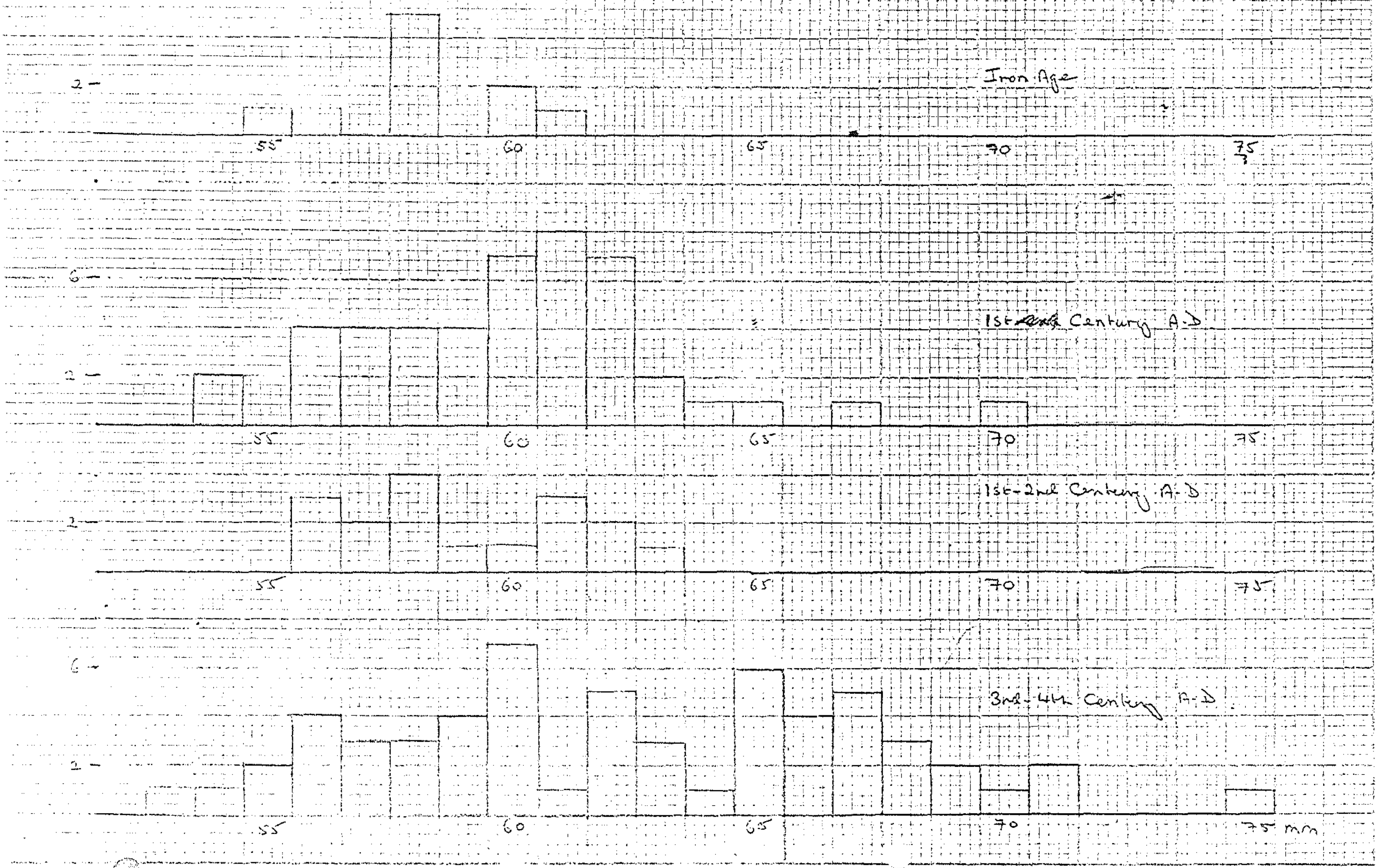


FIGURE COWMET. 7 Lateral lengths of cattle Astragali from Owslebury.

OWSLEBURY/ CATTLE WITHERS HEIGHTS

FIG. COWMET 8

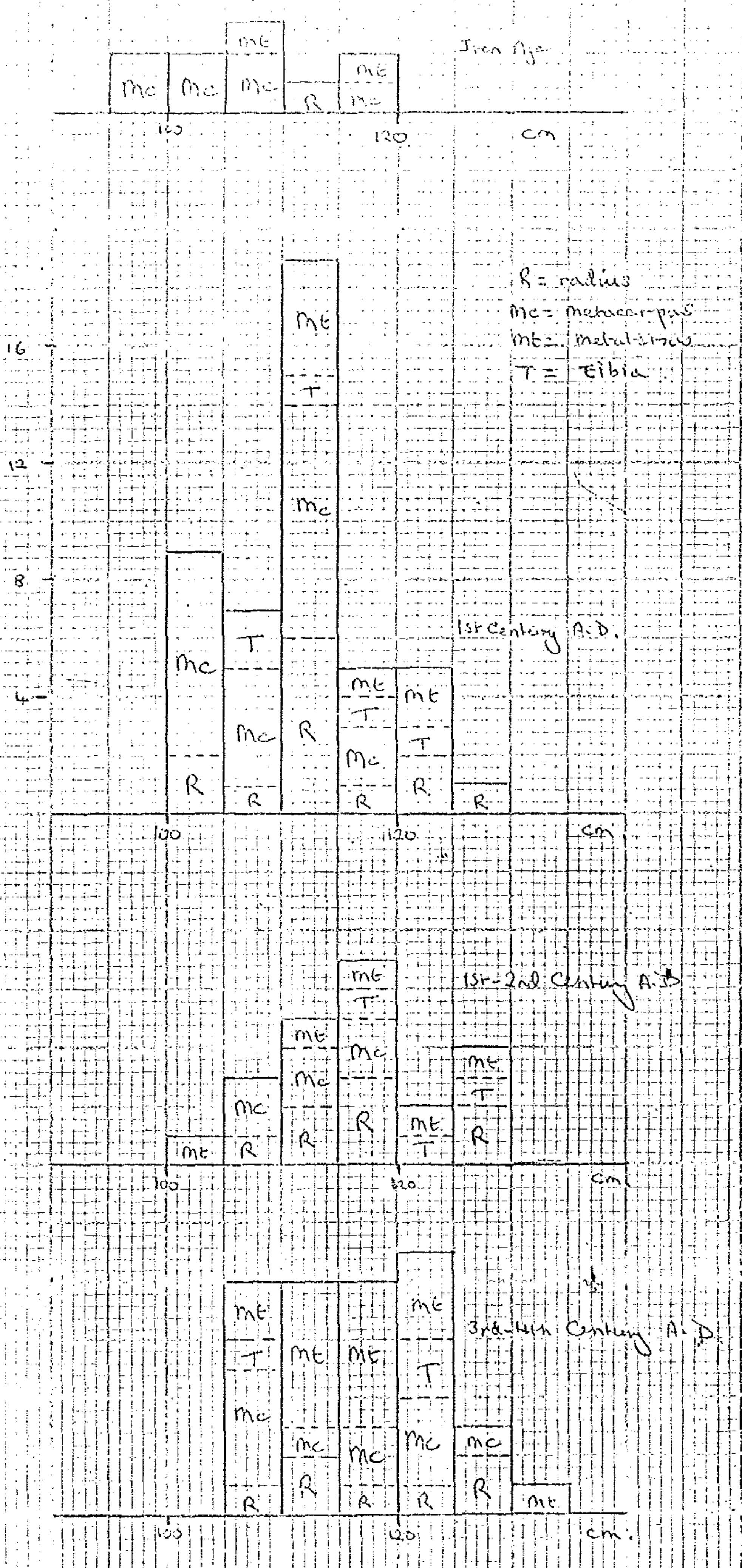
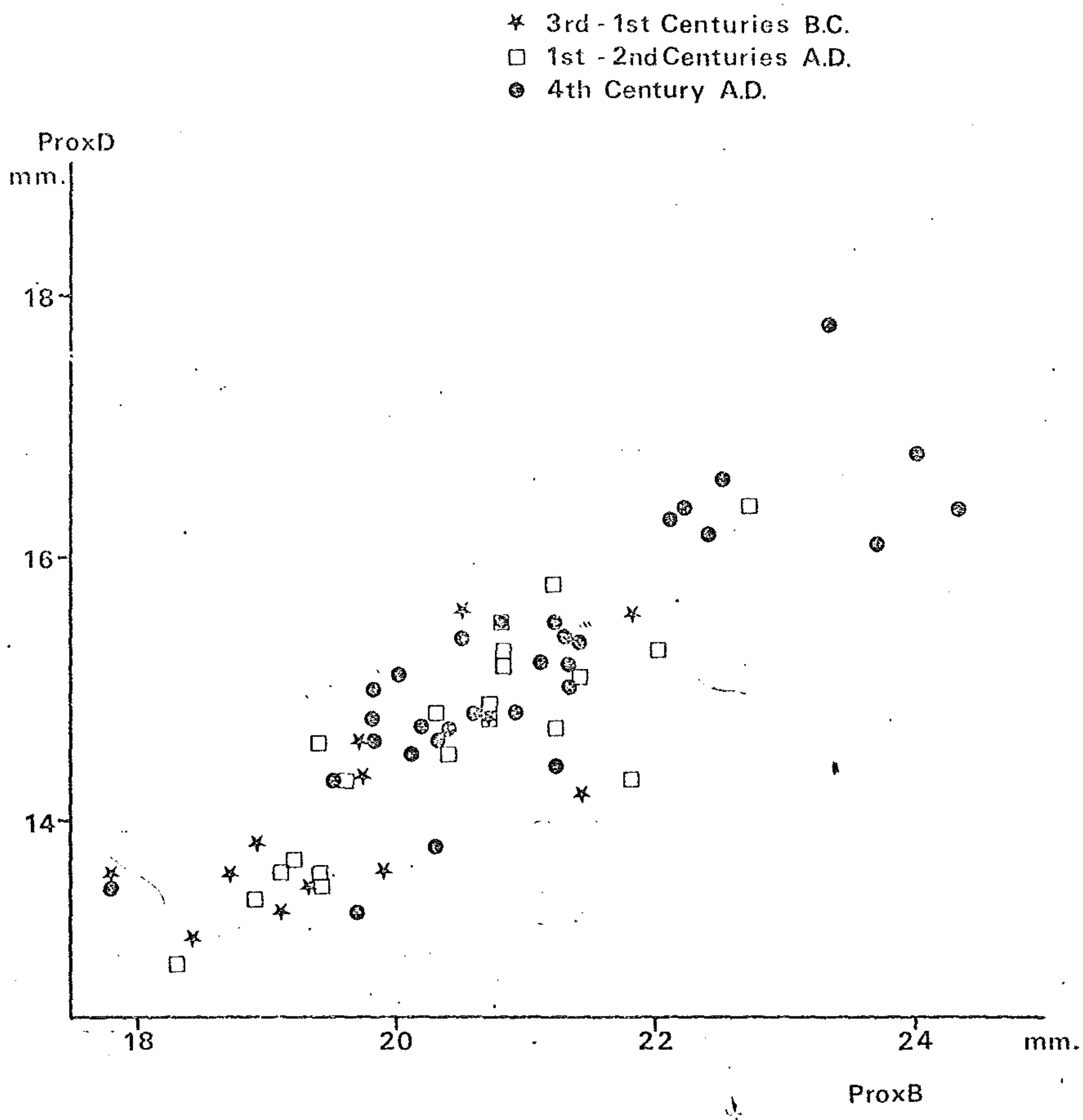


FIGURE COWMET 8.
Estimated withers height ... cattle ... [illegible]


3rd - 1st Centuries B.C.
1st - 2nd Centuries A.D.
4th Century A.D.
ProxD
mm.
18
16
14
18
20
22
24
mm.
ProxB

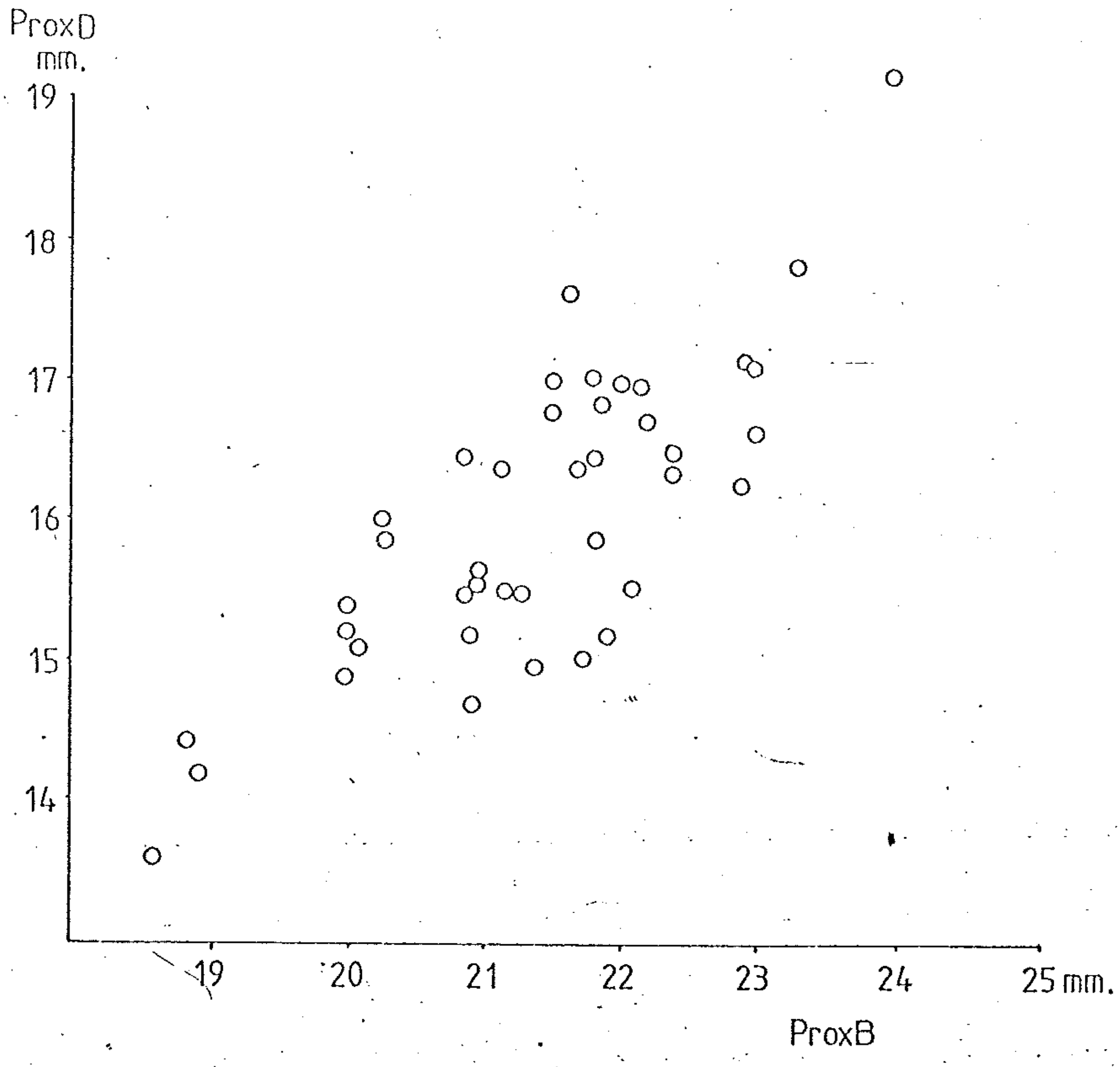
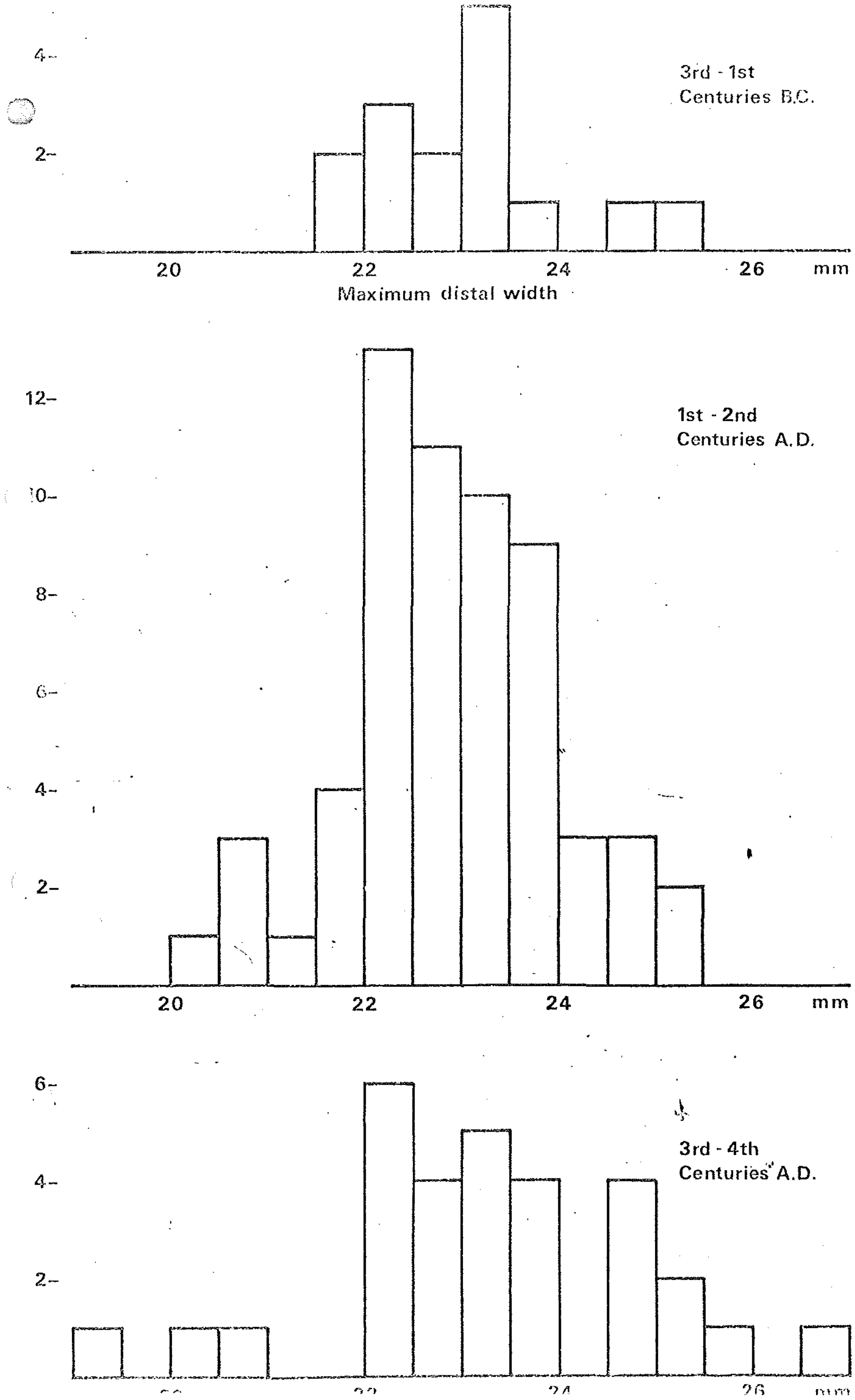
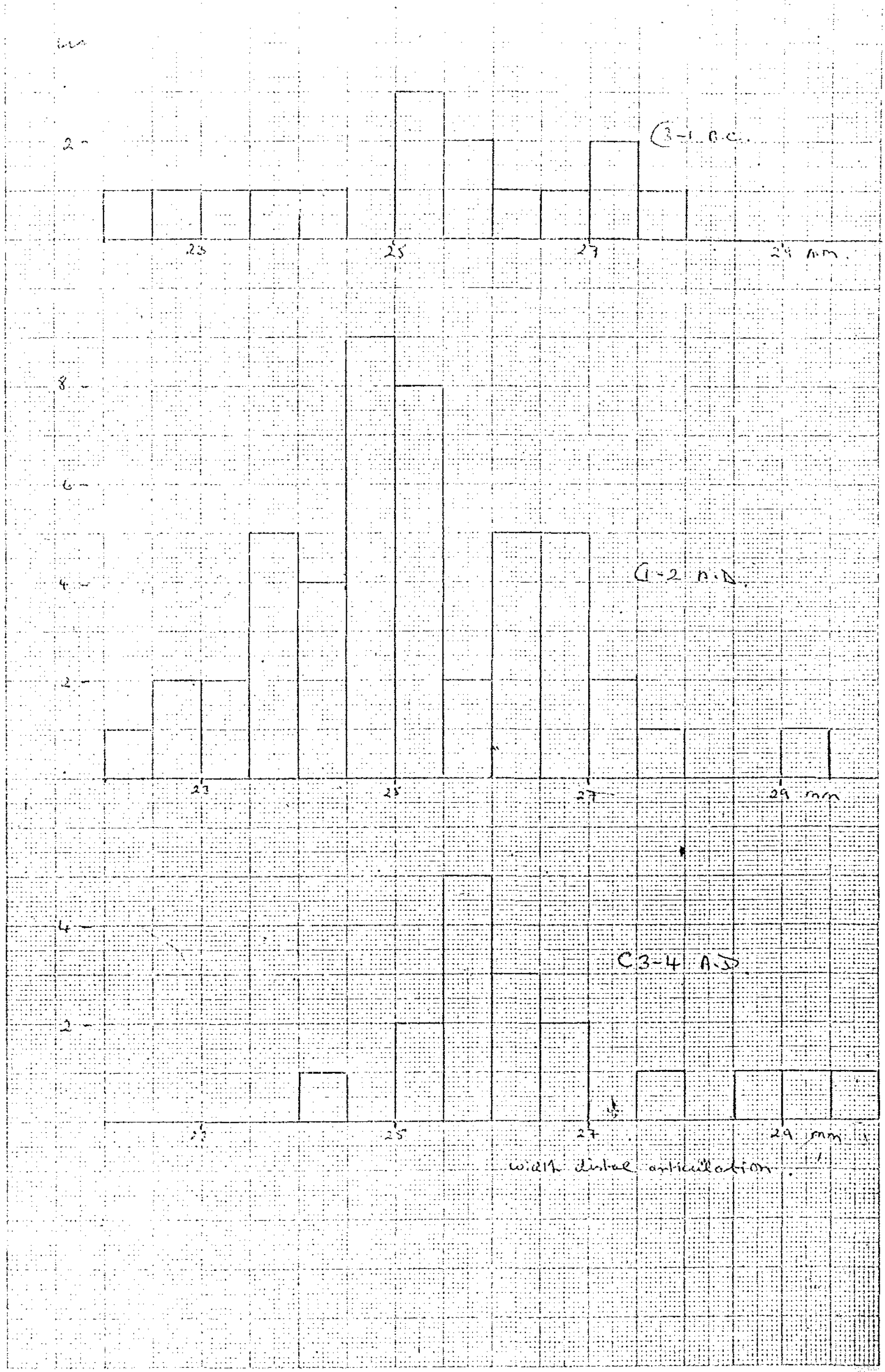


Fig. 51. Winchester Brook Street, Roman. Measurements of metacarpal proximal epiphysis showing considerable size range.


3rd - 1st
Centuries B.C.
Maximum distal width
mm
1st - 2nd
Centuries A.D.
3rd - 4th
Centuries A.D.


C3-1 B.C.
2
23
25
27
29 mm.
C1-2 A.D.
8
6
4
2
23
25
27
29 mm
C3-4 A.D
4
2
25
27
29 mm
width distal articulation

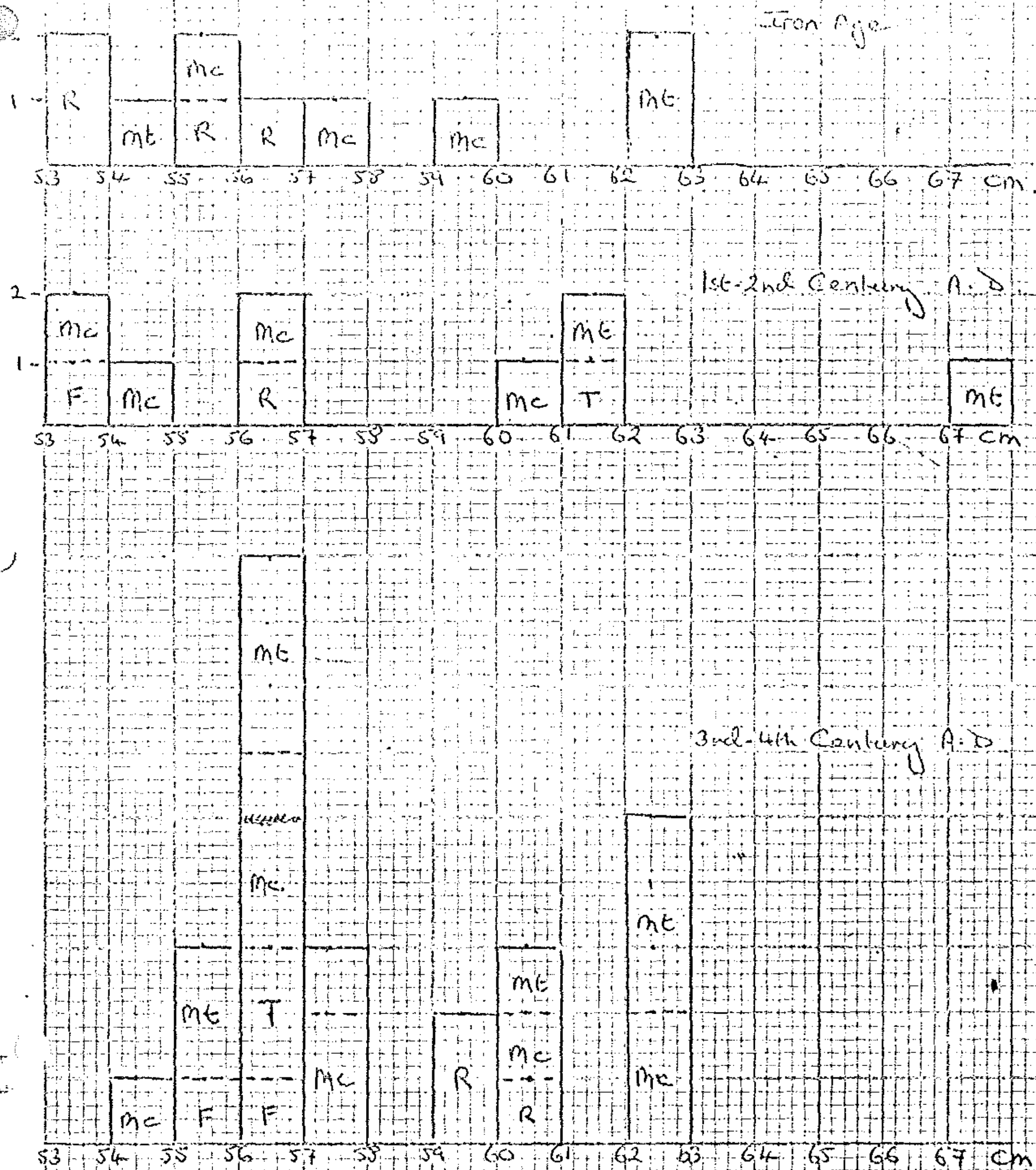


FIGURE SHEMET 5

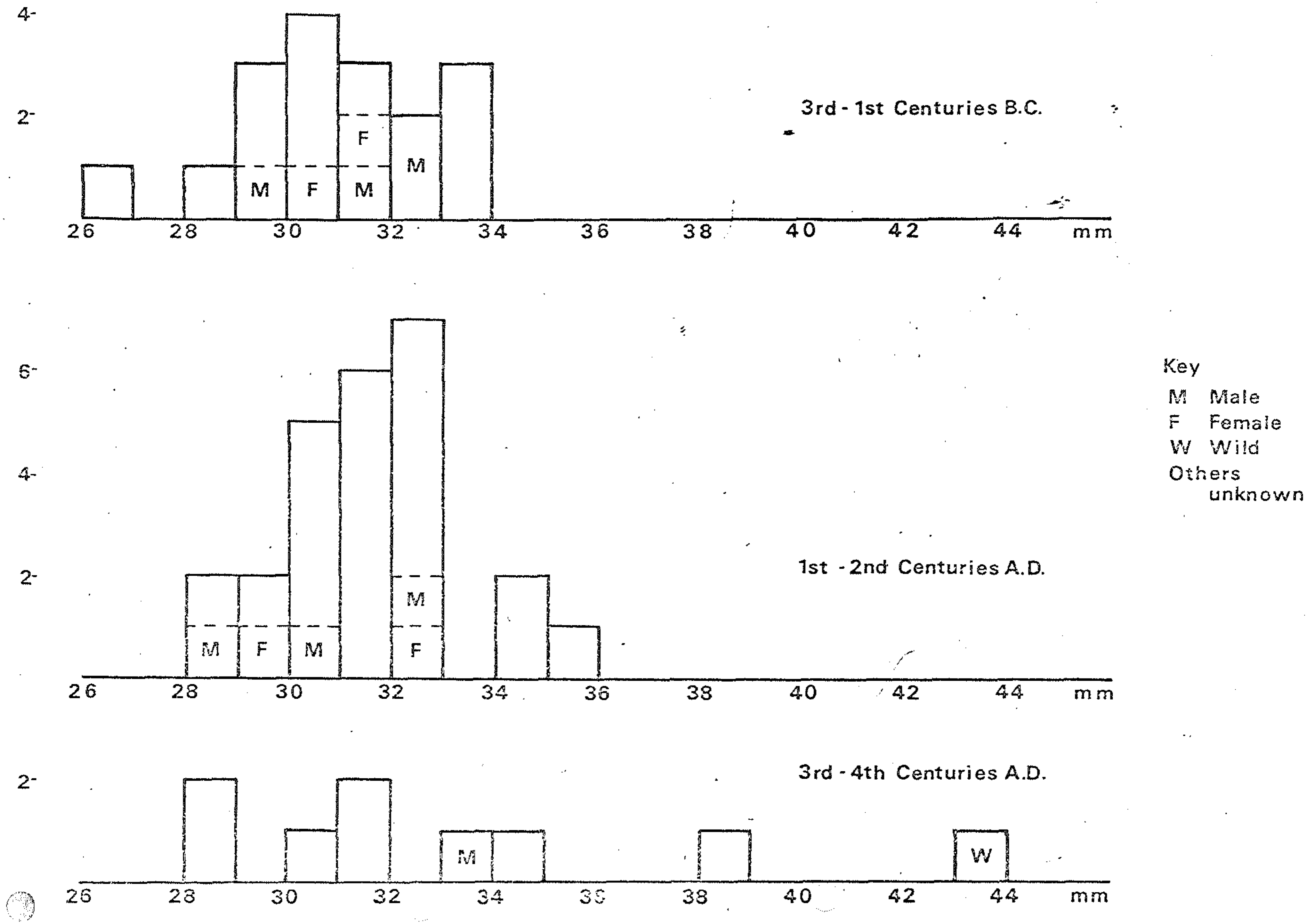
Estimated withers heights of sheep at Owslebury.

R = radius, F = femur, T = tibia,

mc = metacarpus, mt = metatarsus

Heights calculated by converting maximum lengths using Teichert's (1969) factors

OWSLEBURY PIG LOWER THIRD MOLAR



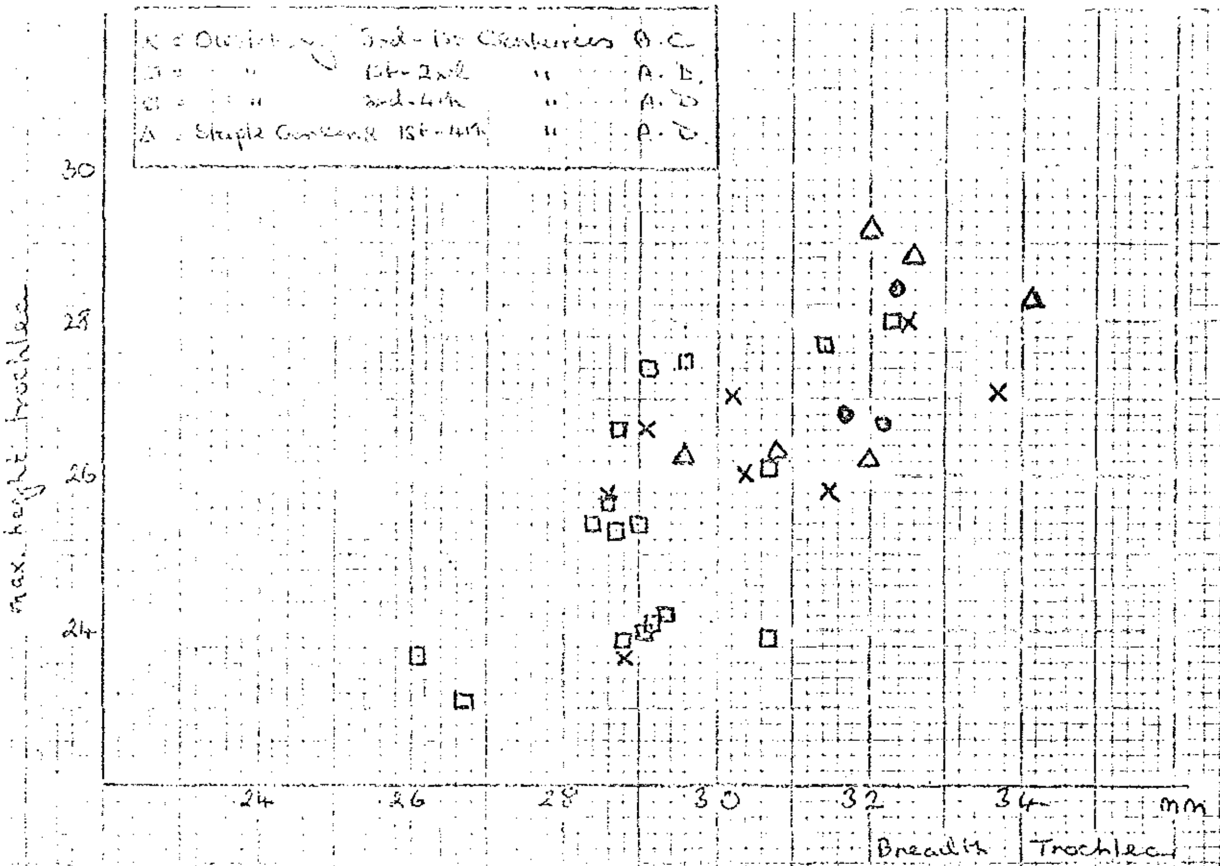


FIGURE PIGMET. 2

Pig humeri measurements from Owslebury and Staple Gardens, Winchester.

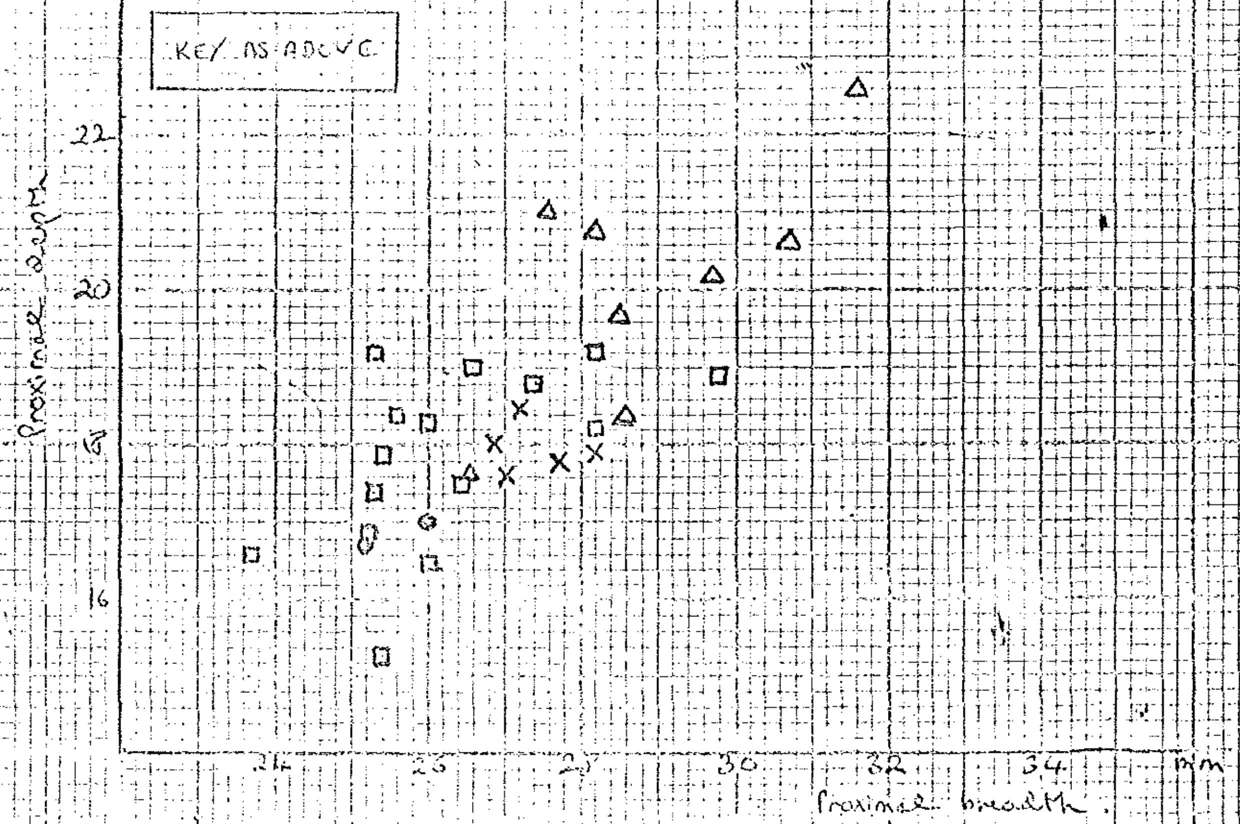
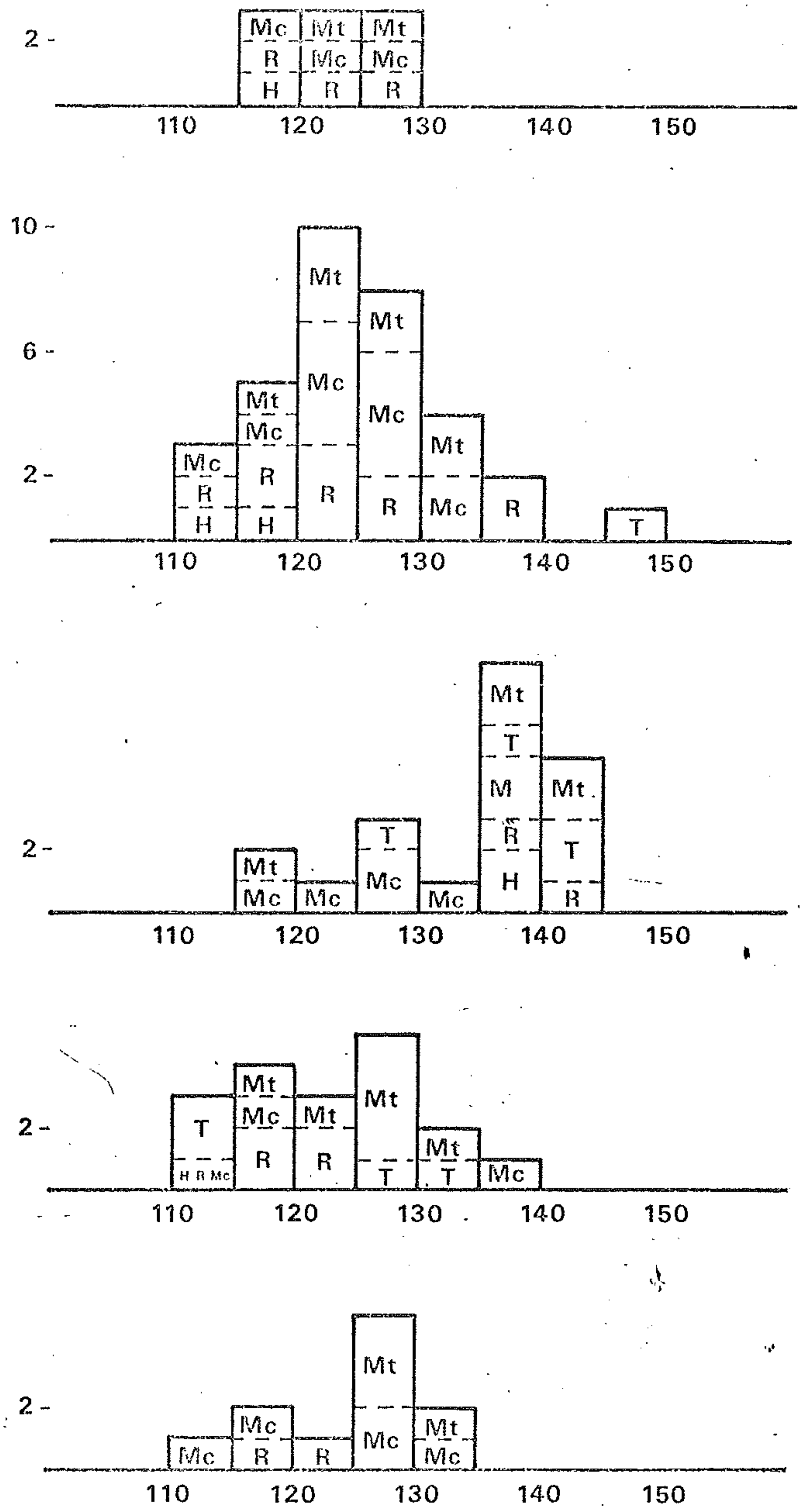


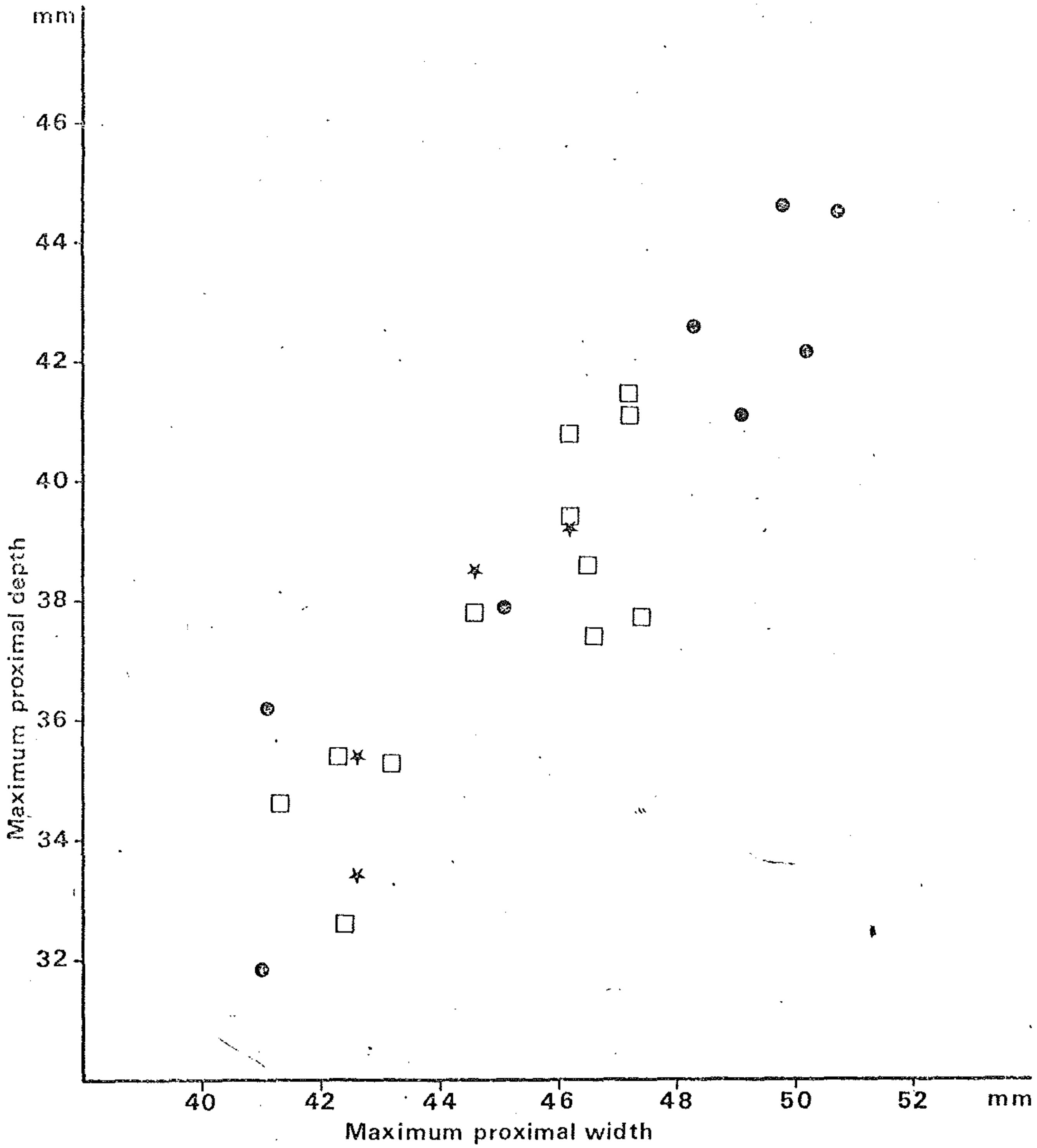
FIGURE PIGMET. 3

Pig radii measurements from Owslebury and Staple Gardens, Winchester.



2
Mc Mt Mt
R Mc Mc
H R R
110 120 130 140 150
10
6
2
Mc R H
Mt Mc R H
Mt Mc R
Mt Mc R
Mt Mc
R
T
110 120 130 140 150
2
Mt Mc
Mc
T Mc
Mc
Mt T M R H
Mt T R
110 120 130 140 150
2
T H R Mc
Mt Mc R
Mt R
Mt T
Mt T
Mc
110 120 130 140 150
2
Mc
Mc R
R
Mt Mc
Mt Mc
110 120 130 140 150

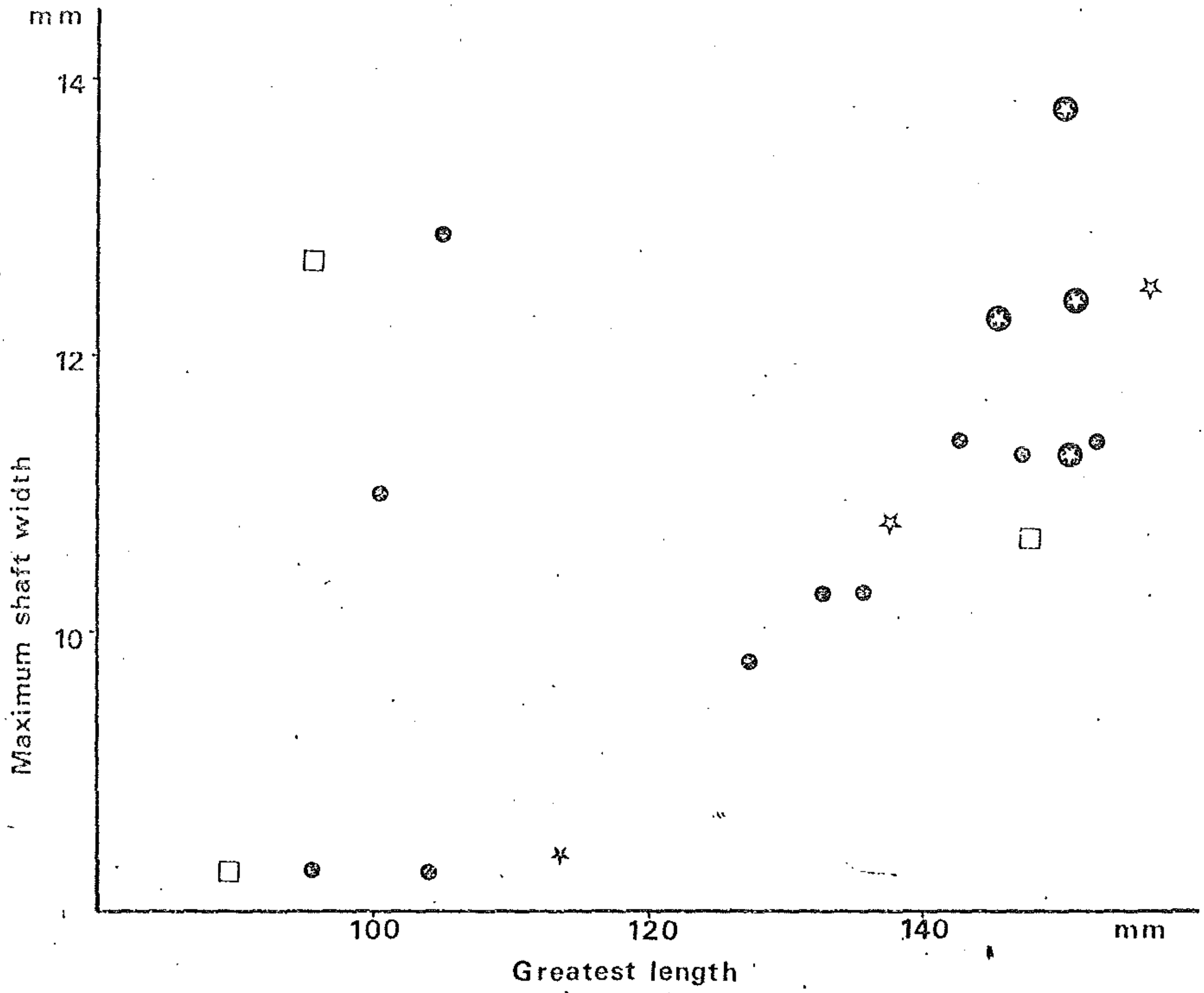
OWSLEBURY HORSE 3rd METATARSAL



Key

- ✶ 3rd - 1st Centuries B.C.
- □ 1st - 2nd Centuries A.D.
- ⊛ 3rd - 4th Centuries A.D.

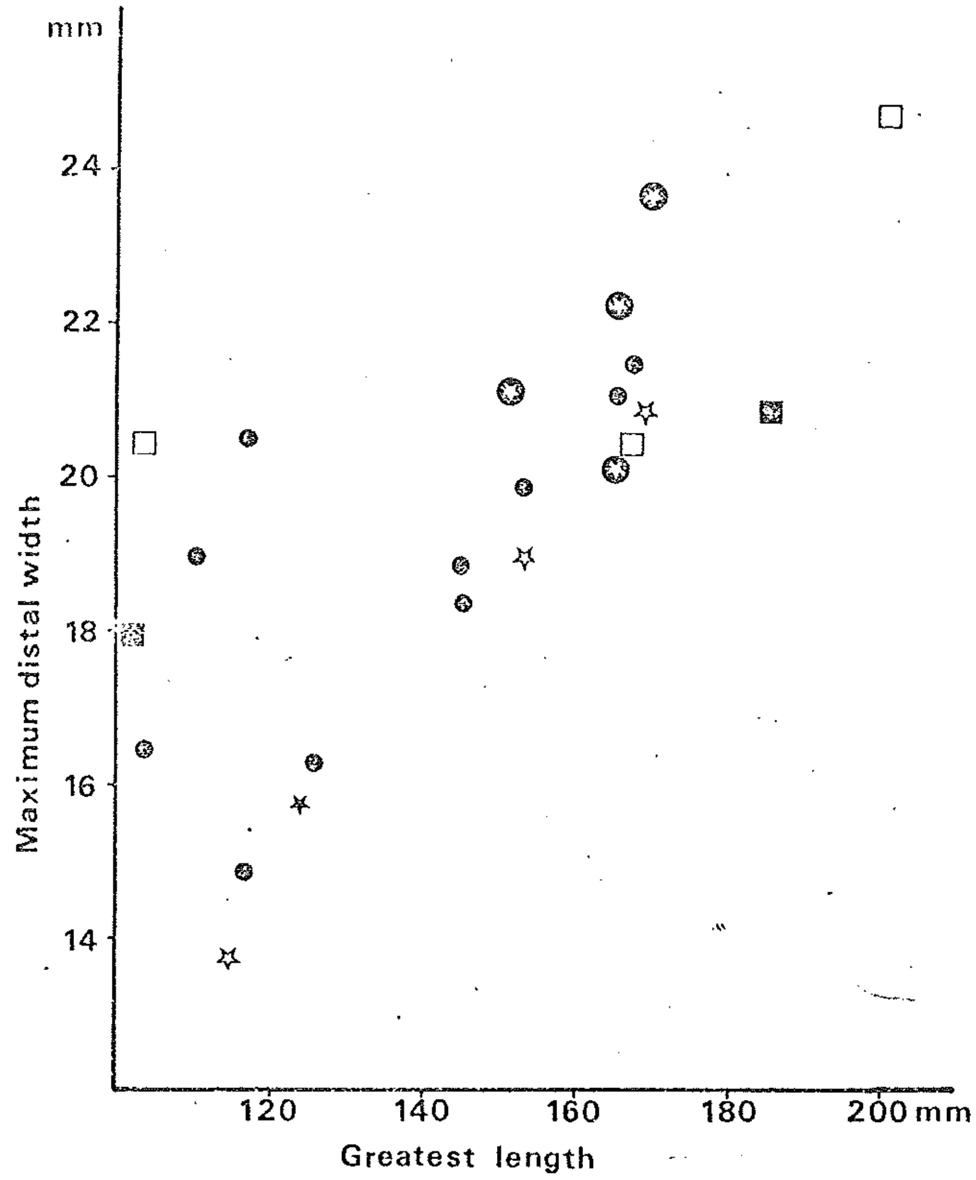
DOG RADIUS



Key

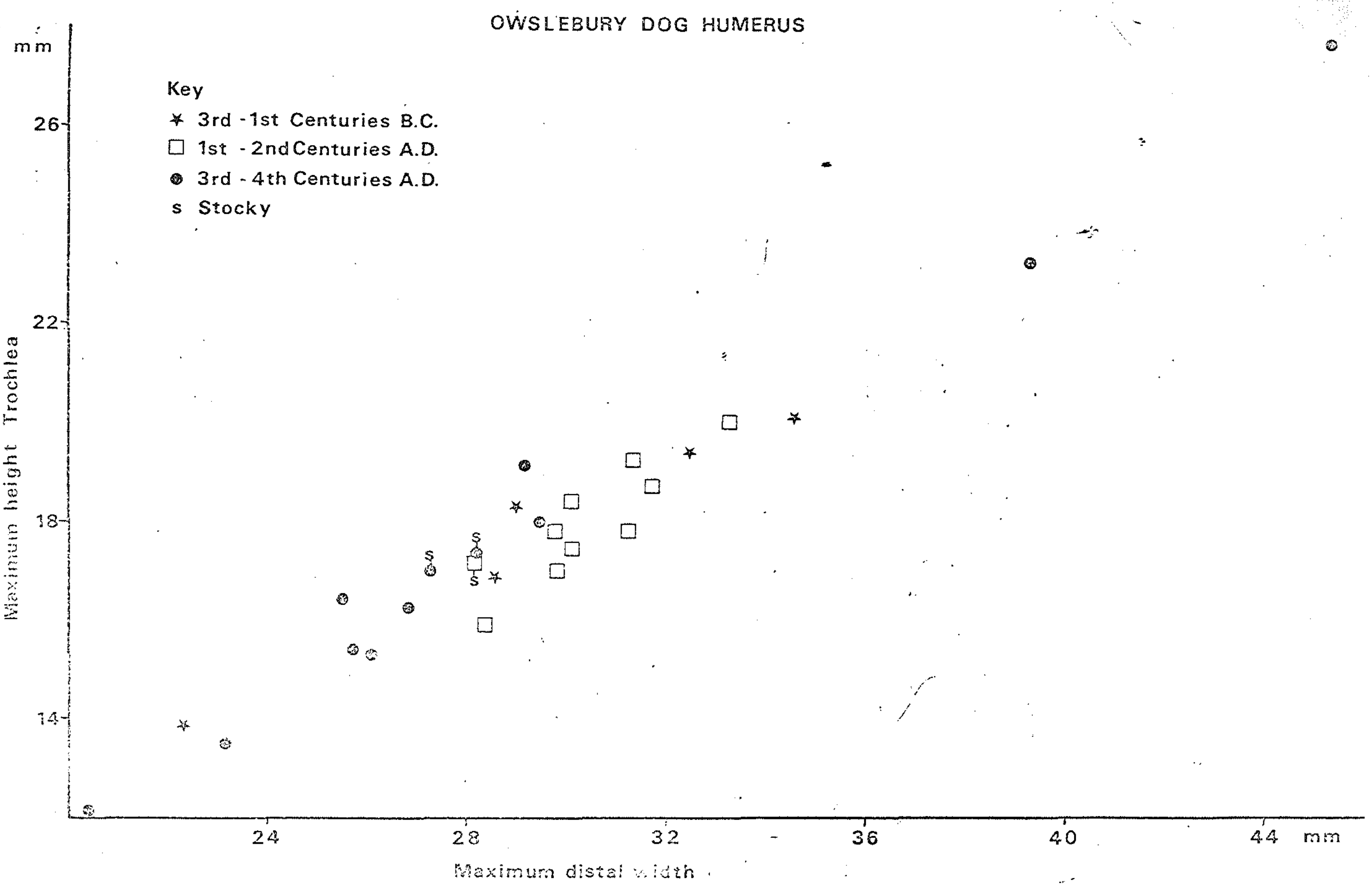
- ✶ Owslebury 3rd - 1st Centuries B.C.
- □ Owslebury 1st - 2nd Centuries A.D.
- ● Owslebury 3rd - 4th Centuries A.D.
- ☆ Winnall Down Middle Iron Age
- ✪ Balksbury 1973 Middle Iron Age

DOG TIBIA



Key

- Owslebury 3rd.-1st Centuries B.C.
- Owslebury 1st - 2nd Centuries A.D.
- Owslebury 3rd - 4th Centuries A.D.
- Winnall Down Middle Iron Age
- Balksbury 1973 Middle Iron Age
- Danebury Late Phase (a)



OWSLEBURY DOG HUMERUS
mm
Key
3rd - 1st Centuries B.C.
1st - 2nd Centuries A.D.
3rd - 4th Centuries A.D.
s Stocky
26
22
18
14
Maximum height Trochlea
24
28
32
36
40
44 mm
Maximum distal width

SECTION 7

BUTCHERY ANALYSIS OF THE MAJOR DOMESTIC SPECIES

INTRODUCTION

The analysis of butchery techniques from the evidence of animal bones is a study which is in its early stages as a systematic discipline. Although there have been a reasonable number of reports where butchery marks on bones have been described, there are relatively few that have attempted a statistical analysis of such marks. Binford (1981) has shown that different types of cut can occur during different processes of butchery. Marks made during the disarticulation of joints are likely to be in different positions to those made during filleting or skinning, for example. Although Binford does not cover every type of cut mark encountered in archaeological samples, the emphasis in attempting to understand why the marks were made rather than simply recording them is an important step forward.

In Britain, systematic descriptions of butchery marks - in some cases accompanied by statistical data - have now appeared in several reports on assemblages contemporary with those from Owslebury. Detailed descriptions of cut marks found in Iron Age samples have appeared in the reports from the Ashville Trading Estate site at Abingdon (Wilson 1978) and Old Down Farm (Maltby 1981b). The most detailed descriptions of Romano-British butchery have been found in reports in Cirencester (Thawley 1982) and Brancaster (Jones et al. 1985). In addition, it has been noted that several urban Romano-British samples have produced concentrations of particular bones butchered in a systematic manner (Maltby 1984d). The Owslebury sample therefore provides an opportunity to expand the knowledge of Iron Age butchery practices in Wessex and to compare a substantial sample from a rural settlement with those from urban sites.

However, statistical assessments of butchery data can ve quite complicated (Maltby 1985c). The major problem with the Owslebury material is its generally poor preservation. Surface erosion and gnawing have destroyed a substantial amount of evidence. Figure Butch.1 shows how the Butchery Index was negatively correlated to the amount of surface erosion in the samples. Consequently, apart from the cess pits, the frequency of observations of butchery was generally lower in the more poorly preserved 3rd-4th Century A.D. samples. Indeed, the frequency of butchery observations was low at Owslebury. To an extent this may reflect the skill of the butcher, since it is possible to deflesh and disarticulate a carcase without leaving any traces on the bones. Butchery with knives is likely to leave fewer marks than if axes or choppers are used. Since both choppers and knives were used at Owslebury, it is likely that observations of the latter will be under-represented since they would leave less obvious traces and because they would be more susceptible to obliteration by surface erosion and gnawing. However, it is still possible to give some indication of the trends and changes in the treatment of the carcases from the settlement.

METHODS OF ANALYSIS

All observations of butchery were computer-recorded and the results here are based on information from that archive. Only butchery observations on bones from deposits assigned to the major periods are analysed here. In addition, the 3rd-2nd Century and 1st Century B.C. observations have been amalgamated into one Iron Age group, since there appears to have been little variation between the butchery techniques employed in these periods. The frequency of butchery marks on fragments of the major identified species is given in Table Butch.1. The types of butchery observed in each species are then discussed, with particular emphasis on the cattle assemblage, which produced by far the largest sample of butchery observations. For certain bones, fragmentation evidence will also be considered. Marrow extraction is a common (but by no means the only) cause for bone breakage and the degree of fragmentation of limb bones in particular can provide some indication of the intensity of marrow extraction.

CATTLE BUTCHERY

915 cattle fragments from the deposits in question had butchery marks recorded on them. This represents 8% of the total cattle sample excluding loose teeth and articulated bones. The frequency of the butchery mark observations lay between 9-10% of the Iron Age and early Romano-British assemblages but decreased to 4% in the 3rd-4th Century A.D. samples. This is the result of the poorer preservation of the bones in those deposits.

Skull and Mandible

Only 6% of the cattle skull fragments bore butchery marks (Table Butch.1). The location of these marks is given in Table Butch.2. To an extent the frequency of recorded butchery on skull fragments is a reflection of how well different elements of the skull have survived. Nevertheless, there were some commonly recurring locations. Maxillae from all periods had knife cuts running along the sides of the bone, most commonly just above the cheek teeth but also higher up the bone. These are most likely to have been made during the removal of the cheek meat from the bones.

24 of the butchery marks on frontal fragments were associated with the removal of the horn or horn cores from the rest of the skull. In nine cases this was done with a chopper; in the other cases a knife was used. The former method may sometimes have removed the horn cores along with the horns, whereas the latter may have removed the horn sheath only. Most of the chopped frontals were found in the 1st Century A.D. deposits. Nine frontal fragments had knife cuts on other areas of the bone, particularly near the eye socket. These were mostly of Iron Age date. Nearly all the butchered horn cores had chop marks in all periods.

The only other skull bone which consistently displayed chop marks was the occipital. Only four bore evidence of butchery but the marks were all located near the condyles and were associated with the separation of the skull from the vertebral column.

Knife cuts on the incisive (premaxilla) usually ran dorso-ventrally on the lateral aspect. The most likely process that would result in these marks would be skinning. A similar mark was located on the anterior of one of the maxilla fragments and these cuts are paralleled by cuts on the mandible (see below). Knife cuts on other skull fragments are likely to have been mainly caused during the removal of meat (or possibly skinning). The exceptions were the marks on the temporal bones which would have been made during the separation of the skull from the mandibles. Although there was little evidence from butchery marks to indicate that the skulls were broken open to remove the brain, the fragmentary nature of the material suggests that this was probably commonly practised.

Mandibles were the most frequently encountered butchered bones of cattle (185 examples) but these represented only 9% of the total number of mandible fragments recorded. The sample from the 1st Century A.D. deposits contained the highest percentage (14%) of butchered specimens (Table Butch.1).

The locations of these marks are shown in Table Butch.3. Throughout the deposits mandibles were found in some numbers with knife cuts on the diastema. Most of the marks were on the buccal (lateral) aspect and in 54 cases the knife cuts ran in a dorso-ventral direction, corresponding to the knife cuts on the incisive. In some cases the cuts ran closer to the ventral aspect of the bone and in a few instances cut marks on the lingual (medial) aspect near the ventral surface were encountered. These marks do not seem likely to have been made during the removal of the tongue nor during the separation of the mandible. It is more probable that they were skinning marks.

There was less consistency in the location and type of butchery marks on the mandibular ramus. Most marks, however, consisted of knife cuts and were located on the lateral aspect close to the condyle. These would have been made during the disarticulation of the mandibles from the skull. A smaller number had marks made by a heavier implement in the same area. These would have served the same purpose. Although always in a minority mandibles with these superficial chop marks became relatively more abundant in the later Romano-British deposits. The sample from the 3rd-4th Century A.D. is smaller and less well preserved, however, and we should recall that chop marks are easier to observe than knife cuts on eroded specimens. There were no clear indications to explain why different instruments were used for this task.

Butchery marks near the ventral part of the ramus and on the buccal aspect of the toothrows are best explained as filleting cuts. There was no evidence for any of the mandibles being chopped through, although some may have been broken for their marrow content. Whatever process was used to remove the tongues appears to have left little trace on the bones.

Scapula

114 (13%) of the scapula fragments were recorded with butchery marks. As in the case of mandibles these produced a combination of knife cuts and chop marks. Occasionally both types of mark were found on the same bone. Knife cuts were more

common in all periods except in the 3rd-4th Century A.D. deposits, in which chop marks were dominant (Table Butch.4). Again this may partly be due to differential preservation, but it may also reflect a genuine trend towards the greater use of heavier implements. The most characteristic butchery of scapulae was one which involved the removal of part or all of the spine that runs along the anterior of the lateral aspect of the bone. This axial butchery, possibly made in some cases with a heavy-bladed implement or with a cleaver seems to have been a method to remove the meat from the bone. It is a technique that has been observed in several Romano-British samples, for example at Portchester Castle (Grant 1975: 392) and Cowdery's Down (Maltby 1983a: 191). At Owslebury, this operation was also observed on one specimen of 3rd Century B.C. date (F55-1-33). Thereafter it was the most frequently observed type of butchery mark recorded on cattle scapulae. The practice may have become more common in the late Romano-British period.

Axial knife cuts on the lateral part of the blade were, however found almost as frequently as the axial chop marks in the Iron Age and 1st Century A.D. samples. This was an alternative method of removing meat from the blade, which may have become less favoured in the later Romano-British period. Knife cuts near the proximal end of the scapula may have been made during the detachment of the scapula from the trunk of the carcase. Disarticulation from the proximal humerus was indicated by knife cuts found close to the glenoid cavity (distal articulation). In the Iron Age sample these cuts appeared invariably on the medial aspect, whereas only one of the 1st Century A.D. specimens (from F370-3-10) had cuts in that location. The remaining Romano-British specimens had knife cuts on the posterior and/or lateral aspects of the articulation. Occasionally disarticulation from the humerus was facilitated by chopping. Four Iron Age specimens had been chopped through axially from the medial aspect. This method of dismemberment was not encountered in the Romano-British sample.

Os Coxae

52 (11%) of the os coxae fragments were butchered. They again produced a combination of knife cuts and chop marks in all periods. Disarticulation from the femur occasionally produced marks near or on the acetabulum. The five specimens that had been chopped were all of Romano-British date. Six had knife cuts around the acetabulum, including two examples of Iron Age date. Five shafts of ilium had been chopped through completely. These were of 1st Century A.D. and one of 2nd Century A.D. date. They may have been made during a crude method of removing the hindlimb from the skeletal column, in which the majority of the pelvis was removed with the limb.

14 shafts of ilium had knife cuts. The majority of these may also have been made during the disarticulation of the hindlimb. Cuts on the shaft of the ischium were comparatively rare and consisted entirely of knife cuts. The pubis was a more common location for butchery, with almost equal numbers of specimens with knife cuts and chop marks. The majority of these were again probably associated with dismemberment.

Humerus

The locations of butchery marks on humeri are shown in Table Butch.5. 73 (13%) bones bore butchery marks, mostly towards the distal articulation. Poor preservation limited the number of observed butchery marks at the proximal articulation. Where found, these consisted of knife cuts apart from one 3rd-4th Century A.D. specimen whose articulation had been chopped through during separation from the scapula. Knife cuts on the shaft were found in all periods and were associated with filleting. Only two specimens had superficial chop marks on the midshaft. One of these consisted of axial scrapes along the edge of the shaft removing small scoops of bone. This may have been done with a heavy blade. It is a technique of filleting which appears quite commonly in some Romano-British urban assemblages, for example at Cirencester (Maltby 1984d: 132), Silchester (Maltby 1984c: 210) and Winchester (Pfeiffer pers. comm.), but this was an isolated example at Owslebury. Butchery marks on the shaft towards the distal articulation may also have been caused mainly by filleting, although one or two could conceivably have been made during disarticulation of the distal end from the radius and ulna.

The majority of cut marks on the humerus were, however, located near the distal articulation. These most commonly consisted of knife cuts on the medial or lateral aspects, made during the disarticulation of the radio-cubitus joint. Marks of this sort were found commonly throughout the deposits. In contrast chop marks on or near the distal articulation were found on only seven specimens, indicating that the cleaver or similar instrument was used comparatively rarely for this purpose at Owslebury.

Humeri were commonly broken open for marrow and characteristic spiral fractures were found on the shafts of several specimens. However, fragmentation also results from scavenging, erosion, weathering and trampling. In most cases it was not clear which process was the principal cause of fragmentation. Table Butch.6 shows the number of humeri in each of the different size categories (where it was possible to make such an assessment). The sample from the Iron Age, 1st Century A.D. and the 1st-2nd Century A.D. deposits produced similar results. About half the specimens consisted of less than 25% of the bone and this figure decreased as the fragments got larger. This pattern changed slightly in the 3rd-4th Century A.D. assemblages, in which there were a higher proportion of specimens consisting of 75% of the bone, although small fragments continued to be the most frequently recovered. The bones from the late Romano-British deposits were less well preserved and one would expect a greater degree of fragmentation. This does not appear to have been the case and it is conceivable that marrow extraction was considered less important in that period.

Femur

34 (7%) of the femora fragments bore butchery marks (Table Butch.1). Only six specimens bore chop marks. Two had chops near the proximal articulation (one of 1st Century A.D. date and the other of 3rd-4th Century A.D. date) made during the separation of the femur from the acetabulum. Two specimens had

superficial chop marks on their shafts; one was of Iron Age date, while the other from the cess pit F650-2 had a superficial marks running axially, similar to the one described above on a humerus. Two specimens had chop marks associated with the disarticulation of the femur from the tibia (one Iron Age; one 3rd-4th Century A.D.). The majority of butchery marks on the femur consisted of knife cuts. Eight were associated with the disarticulation of the proximal end from the os coxae; 15 were located on various parts of the shaft and were probably all made during filleting; and six located near the distal articulation were the result of dismemberment. Knife cuts on the shaft occurred in all periods but cuts near the articulations were not found on any of the 3rd-4th Century A.D. specimens.

Table Butch.7 records the fragmentation data for the femur. These are less robust bones than the humerus and consequently the higher proportion of small fragments is to be expected. Again, however, there were relatively more fragments consisting of 75% of the bone or more in the later Romano-British deposits, despite the poorer preservation conditions. This again may imply that fewer bones were broken open for the extraction of marrow.

Radius and Ulna

53 (11%) of the radius fragments bore butchery marks. Better preservation meant that a greater frequency of butchered bones were observed in the samples from the earlier periods (Table Butch.1). These consisted entirely of knife cuts. 37 specimens from all periods had knife cuts associated with the disarticulation of the radio-cubitus joint. Most of the cuts were on the medial aspect just beneath the articulation surface. 14 radii bore cuts on the shaft and these were probably associated with filleting. Only three distal articulations had knife cuts. These were mainly made during the disarticulation of the feet from the upper limbs but it seems that most of the cuts were made slightly lower down the leg leaving marks on the carpals or proximal metacarpi. Only two examples of chop marks were found on radii, both of 1st-2nd Century A.D. date. They were associated with the disarticulation of the proximal and distal ends respectively.

The radius was generally less fragmented than the humerus and femur (Table Butch.8). Fewer small fragments consisting of less than 25% of the bone were present throughout the deposits. The percentage of these did increase in the later samples, however, probably as the result of poorer preservation. At the same time, however, fragments of 50% of the bone and more were again more frequent in the 3rd-4th Century A.D. samples, suggesting that the bones were not broken up quite as frequently as in the previous periods.

Only 17 (5%) of the ulnae bore butchery marks. These again mostly consisted of knife cuts near the radio-cubitus joint made during disarticulation. Several specimens also had knife cuts on the shaft made during filleting. Three specimens (all of Romano-British date) bore chop marks.

Tibia

Butchery marks on tibiae fragments were relatively scarce.

Only 4% of the fragments were recorded as butchered. 18 specimens from all periods had various small knife cuts on the shaft, most probably associated with filleting. Disarticulation marks were rare. The proximal articulations were generally not preserved which accounts for the paucity of butchery observations from that part of the bone. Most of the butchery marks associated with the disarticulation of the upper hindlimb from the feet seem to have been made on the tarsals rather than the tibia. Three specimens, two of 3rd-4th Century A.D. date and one from the 1st Century A.D. deposits, had been superficially chopped.

Tibiae were often broken open for marrow extraction, although (as usual) other factors also caused fragmentation. Despite poorer preservation, a larger proportion of fragments of 75% of the bone and above were again represented in the 3rd-4th Century A.D. sample (Table Butch.9). These results were consistent with fragmentation patterns observed on the other major limb bones.

Carpals and Tarsals

The astragalus and centroquartal produced the greatest relative frequency of butchery marks per fragment in the cattle sample. 34 (18%) of the astragali bore butchery marks (Table Butch.1). All the butchery marks in the Iron Age and early Romano-British samples consisted of knife cuts running medio-laterally on the anterior aspect. These were disarticulation marks. Of the eight butchered specimens in the 3rd-4th Century A.D. sample, four bore similar knife cuts to the earlier examples but four also bore superficial chop marks on the same surface. The incidence of observed butchery marks decreased dramatically in this sample but fine knife cuts would often have been obliterated by the severe erosion marks on many astragali. Consequently, although a heavier implement may sometimes have been used for disarticulation at this point, most carcases would still have been dismembered using a more traditional implement.

All 20 records of butchery on the centroquartal (which lies between the astragalus and the proximal articulation of the metatarsus) consisted of knife cuts. Apart from one specimen of 3rd-4th Century A.D. date, all the cuts were on or close to the anterior aspect of the bone. These marks were made in the same process as the cuts on the astragalus.

Butchery marks were found much less frequently on calcanea. Only knife cuts were recorded and most were probably associated with the disarticulation of the ankle joint. Five carpals and two other tarsals were recorded with knife cuts made during the disarticulation of the feet of the forelimbs and hindlimbs respectively.

Metapodia

Only 6% of the metapodia fragments bore observable butchery marks (Table Butch.1). Chop marks were found on eight metacarpi and six metatarsi fragments and were found occasionally in all periods (Table Butch.10). As usual knife cuts were more frequently recorded. The metatarsus quite often had knife cuts around the proximal articulation. Most examples were found on the anterior surface of the bone, corresponding with the disarticulation marks on the astragalus and centroquartal. Knife cuts on the posterior aspect were recorded more rarely but observations of such cuts would be handicapped by the fact that the posterior part of the proximal articulations of metapodia suffer greater destruction from canid scavenging (Maltby 1985c: 23). Cut and chop marks near the distal articulations were mostly made during the separation of the metapodia from the phalanges, although a few may have been skinning marks.

Fragmentation data for cattle metapodia are shown in Table Butch.11. The metacarpus had a relatively low degree of fragmentation in comparison with most of the upper limb bones. Fragments consisting of 75% or more of the bones provided 32% of the Iron Age sample. Most of the 75% fragments bore evidence of gnawing and had not been broken open for marrow. Although this was a relatively high percentage, it was substantially smaller than the number of complete bones or 75% fragments recovered from Iron Age levels at Winnall Down and Balksbury (Maltby 1985c: 32). A similar pattern was found with comparisons of the metatarsi, where only 24% of the Owslebury Iron Age sample consisted of complete or 75% fragments. This may be partly be the result of differential preservation, although a high proportion of metapodia were also gnawed or eroded (Maltby 1985a: 51). Alternatively it could be that a greater proportion of the cattle metapodia were broken open for marrow at Owslebury. There may have been chronological variation in the intensity of such a practice.

The highest proportion of complete bones at Winnall Down was found in the Early Iron Age deposits. The Middle Iron Age samples were slightly more fragmented. At Owslebury a greater proportion of the smaller fragments were dated to the 1st Century B.C. and there could have conceivably been a gradual increase in the amount of marrow processing in the later Iron Age, although differential preservation is again a problem here.

The 1st Century and 1st-2nd Century A.D. deposits contained lower percentages of complete or 75% fragments of metapodia. The fragmentation pattern of the 1st Century A.D. assemblage bore some similarities with the contemporary samples from Winnall Down. To an extent this suggests that more of the metapodia were broken open for marrow, although poorer preservation conditions in the 1st-2nd Century deposits in particular may also have increased fragmentation. However, complete or almost complete bones were still found in some numbers and this pattern is different from contemporary urban assemblages. No complete and very few 75% fragments were recovered from the early Romano-British levels of the South Gate excavations at Silchester, for example (Maltby 1985c: 32). Breakage of cattle bones for marrow extraction appears to have been less intensive on rural settlements.

The 3rd-4th Century A.D. samples at Owslebury produced an increase in the percentage of complete or 75% metapodia fragments to levels comparable to the Iron Age samples from the site. This mirrored the trend observed on the other major limb bones, which included a higher proportion of substantially complete bones in the late Romano-British deposits. Breakage of bones for their marrow appears to have become less important at this time.

Phalanges

Cut marks were restricted almost entirely to first phalanges. 49 specimens (14%) bore observable butchery marks. In all periods most of the knife cuts were located on the shaft on the anterior and lateral aspects. These were probably skinning marks. In a few cases knife cuts were found closer to the proximal and distal articulations. Most of these probably were skinning marks as well, particularly the cuts situated on the lateral and anterior aspects. One Iron Age specimen and three from the 1st Century A.D. deposits had knife cuts located on the posterior aspect towards the lateral. These may have been disarticulation marks, although once again skinning cannot be ruled out.

The few marks observed on second phalanges were all fine knife cuts on the shafts probably made during the skinning of the carcases.

Vertebrae and Ribs

These produced a variety of knife cuts and chop marks but none of these were frequently observed (Table Butch.1). The most frequent locations for cut marks were on the lateral processes of lumbar vertebrae. These processes had often been removed when the flanks of the carcase were stripped from the vertebral column. Chop marks were more frequently found on cervical vertebrae than knife cuts. These appear to have been made during disarticulation and possibly filleting. Knife cuts were rarely found on thoracic vertebrae and ribs specifically identified to cattle. There was evidence though for the detachment of the ribs from the thoracic vertebrae in a process analogous to the butchery of the lumbar vertebrae.

Discussion of Cattle Butchery

The major interest in the butchery evidence from cattle bones from Owslebury lies in the fact that several methods of carcase processing evident in samples from Romano-British urban and military sites were either not found or were only rarely encountered. There was, for example, no evidence for the axial splitting of the longbones to remove marrow. Some urban deposits contain large numbers of fragments chopped in this way. Such processes have been observed in Winchester (Pfeiffer pers. comm; Maltby in prep.), Silchester (Maltby 1984c: 210), Cirencester (Maltby 1984d: 132) and Colchester (Luff 1982: 102-4). They have not been found on bones from contemporary rural settlements in Hampshire. Apart from Owslebury, smaller samples from Cowdery's Down (Maltby 1983a: 189), Little Somborne (Maltby 1984b) and Winnall Down (Maltby 1985b: 111) did not have cattle bones butchered in this manner.

Similarly, with the exception of the scapula, these rural assemblages have failed to produce evidence for the systematic stripping of meat using a heavy bladed implement from any of the major limb bones. This method of filleting has again been noted at Winchester, Silchester and Cirencester. Only two specimens from Owslebury bore similar butchery marks.

Although chop marks were observed on some bones at Owslebury throughout the deposits, butchery with knives appears to be more common. There is perhaps evidence, judging from the relative increase in the number of chop marks on the bones in the 3rd-4th Century A.D. samples, that the use of an axe or a cleaver became more common at that time. However, the sample was relatively small and the much poorer preservation conditions in most of these deposits would have biased observations against knife cuts. Again, however, this contrasts totally with evidence from urban sites. At Staple Gardens, Winchester, for example, nearly all the disarticulation marks on cattle bones consisted of chop marks, often completely through the articulations (Maltby in prep.).

Finally, the proportion of complete or almost complete bones - particularly of metapodia - tends to be greater in samples from rural settlements such as Owslebury or Winnall Down, suggesting that marrow extraction was less intensive than on urban settlements.

Such contrasts in butchery techniques from contemporary settlements require explanation. One possibility is that the greater volume of carcase processing in towns required different procedures employing different tools and methods to those used on contemporary rural sites. There must have been specialist butchers resident in towns and their methods (probably imported by the Romans) became widespread there. Butchery methods on rural sites, such as Owslebury, however, were slow to change and there was a tendancy to continue the methods seemingly practised for hundreds of years during the Iron Age.

This does not explain, however, why different types of implement were used in the butchery of cattle carcases of contemporary date at Owslebury. Certain bones such as the scapula and mandible had more chop marks than other elements, although knives were used to perform the same function on other bones throughout the settlement's history. The reasons for this disparity are not clear and require further detailed analysis.

SHEEP/GOAT BUTCHERY

Including all the bones from the cess pits but excluding other articulated bones and loose teeth, butchery marks were found on only 3% of the sheep/goat fragments. The bones on which 385 observations of butchery were made are listed in Table Butch.1. The frequency of observations was slightly higher in the Iron Age and 1st Century A.D. samples (4%) mainly because of the better preservation of the bones. The low frequency of butchery marks on sheep/goat bones in comparison with cattle can be explained by a combination of several factors.

The first factor is that their smaller carcases required less butchery than those of cattle. The second is that a greater proportion of the butchery was performed with knives which leave less trace and are more easily obliterated by surface erosion and gnawing. Another important factor is that the fragments of sheep/goat that survived the best - the mandible, radius, tibia and metapodia - were all bones that had comparatively few butchery marks made on them in any case (Table Butch.1). The major meat-bearing bones, such as the scapula, humerus, os coxae, femur, ribs and vertebrae all produced much higher frequencies of butchered bones but they survived considerably less well than the bones mentioned above. The astragalus produced the highest frequency of butchery marks but bones of such a small size were under-represented in the sheep/goat sample.

Skull and Mandibles

50 skull fragments bore butchery marks. 22 skull fragments had been split open along the midline of the skull in order to remove the brain. This practice was found consistently through all periods. Six maxillae (three each of Iron Age and 1st Century A.D. date) had knife cuts running along the lateral surfaces above the cheek teeth. These marks also found on cattle maxillae, were probably made during the stripping of meat. Seven parietal fragments bore knife cuts running along the dorsal surface. Specimens with such marks were found in Iron Age, 1st Century A.D. and 3rd-4th Century A.D. contexts.

Apart from several fragments displaying the marks made during the splitting of the skull, six occipital fragments bore other butchery marks. These were all of 1st Century A.D. date. Three bore knife cuts near the condyles and were made during the severance of the skull from the cervical vertebrae. The other three were on the dorsal aspect and ran in the same direction as the similar knife cuts observed on some of the parietals. Four skull fragments bore butchery marks associated with the detachment of the horn from the skull. An Iron Age specimen revealed that this had been done with a cleaver. The others (two of 1st Century A.D. date; the other of 3rd-4th Century A.D. date) appear to have been cut off with a knife. An incisive (premaxilla) of 3rd-4th A.D. date had been cut with a knife in a dorso-ventral direction, analogous to the marks on cattle incisives thought to be the result of skinning.

Only 16 mandibles bore evidence of butchery marks, just one of which had chop marks. Most consisted of knife cuts located on the diastema. Unlike the cattle mandibles, six of these were on the lingual (medial) aspect of the bone. Although these may have been skinning marks, it is also probable that that they were made either during the removal of the tongue or during the separation of the mandibles. The specimen which bore chop marks had the mandibles separated by such means leaving a mark on the lingual surface.

Only four specimens had knife cuts on the ramus near the condyle made during disarticulation from the skull. Three of these were of 1st Century A.D. date and the other was found in a 1st Century B.C. deposit. In the vast majority of cases, however, this process left no trace on the bones.

Scapula and Os Coxae

12 scapulae bore knife cuts near the glenoid associated with the disarticulation of the scapula from the humerus. Five specimens had knife cuts on the blade probably due to filleting. One specimen of 1st Century A.D. date had superficial chop marks on the medial aspect of the blade. This was the only scapula which bore chop marks.

Only two of the os coxae fragments bore chop marks. Two 1st

Century A.D. specimens had superficial chop marks on the acetabulum made during the detachment of the femur. Most of the knife cuts were located on the ilium, either on the ventral surface near the acetabulum, or further along the shaft on the lateral, medial or ventral surfaces. All of these were also probably associated with disarticulation of the femur.

Humerus and Femur

58 (11%) had butchery marks observed on them, the highest number for any bone of the sheep/goat skeleton. Most of the marks were located near the distal articulation and were associated with the disarticulation of the radio-cubitus joint. 37 specimens from all periods had evidence of knife cuts inflicted during this process. Six proximal articulations bore knife cuts associated with the disarticulation of the scapula. 20 specimens had cuts on the shaft, most of them probably made during filleting. No chop marks were observed on any specimen.

Knife cuts associated with the disarticulation of the upper hindlimb from the os coxae were found on 10 proximal femora from all periods. Most of the cuts were situated close to the medial surface. Nine specimens had knife cuts on various parts of the shaft probably made during filleting. No cuts were found close to the distal articulation (although not many survived). No chop marks were found.

Radius, Ulna and Tibia

All the knife cuts located on the radius and ulna were associated with the disarticulation of the radio-cubitus joint. Most of the cuts on the radius were located on the medial aspect just below the proximal articulation. As with the butchery observed on the other sheep/goat bones the techniques appeared to have remained unchanged between the Iron Age and Romano-British periods. The totals included three radii and one ulna of goat butchered in an identical manner.

Only 13 of the tibia fragments were recorded with knife cuts and again these consisted both of disarticulation and filleting marks. No chop marks were recorded on any fragment.

Carpals and Tarsals

These displayed an identical pattern of butchery to that observed on the equivalent bones in the cattle carcase. Disarticulation of the lower hindlimb was invariably performed with a knife which frequently left marks on the anterior surfaces of the astragalus and centroquartal and less commonly, on the calcaneus. Several carpals (including one of a goat) had knife cuts attesting to a similar process on the forelimb.

Metapodia and Phalanges

The groups of metapodia and phalanges in the 3rd-4th Century A.D. cess pits give clear evidence that these were separated from the rest of the carcase at an early stage in the butchery process. However, only 10 metapodia, including a few from the cess pits bore knife cuts. All those on the metacarpi were located around the proximal articulation. The only Iron Age metatarsus with butchery marks had knife cuts on the shaft near the distal epiphysis, possibly associated with skinning. There was no evidence for disarticulation of the phalanges from the distal metapodia and indeed none of them had knife cuts on them.

Vertebrae and Ribs

Where they survived in an identifiable state, these bones produced a high incidence of butchery. In all periods the skull appears to have been severed from the vertebrae using a knife. This often left marks on the cranial part of the atlas (1st cervical vertebra). Most of the other marks on the cervical vertebrae consisted of chop marks, particularly from the cess pit, F650. The articulated vertebrae from at lesat two sheep had been chopped consistently towards their lateral surface from the ventral side. This method would have removed most of the meat from the bones and could have been done at the same time as the splitting open of the skull using the same implement.

There was evidence from all the periods of the removal of the flanks of the animal from the vertebral column. The lateral process of the lumbar vertebrae had often been cut off, often on both sides. Cuts occasionally observed on the thoracic vertebrae and more commonly on or near the dorsal articulation of the ribs showed how the ribs were separated from the thoracic vertebrae in the same process.

Discussion

Butchery of sheep was consistent throughout the life of the settlement. Whereas different implements were sometimes used to perform the same tasks on cattle carcases, there appears to have been one traditional long-standing method of sheep butchery. This involved the use of the knife for skinning, disarticulation of the joints and filleting. An axe or cleaver was only used to split open the skull to remove the brain and to trim the cervical vertebrae of meat. The forelimb was commonly disarticulated between the scapula and humerus and between the humerus and radius/ulna. The hindlimb was disarticulated at the acetabulum and possibly between the femur and tibia. The feet were cut off leaving marks on the carpals and tarsals. The flanks of the animal were removed from the vertebral column. It is not clear how much the bones were broken open for their marrow since the severe disturbance of the sheep/goat assemblage by scavengers has made a study of fragmentation unfeasible.

Such methods of sheep butchery have been consistently found to have been practised on other Iron Age sites in Hampshire (Maltby 1981b; Maltby 1985b). Once again, however, there is evidence that whilst the methods of butchery remained constant at Owslebury, new techniques were being introduced in Winchester, where more chopping of sheep bones has been found (Maltby in prep.)

PIG BUTCHERY

217 of the pig bones bore butchery marks. This represents about 5% of the pig fragments excluding loose teeth and articulated fragments (Table Butch.1). As in the case of sheep, the highest frequencies of butchery marks were found on the major

meat-bearing bones, such as the scapula, humerus, os coxae, femur, ribs and vertebrae. There is also some evidence to suggest - at least from the earlier periods - that the lower limbs were usually separated at the carpals and tarsals.

Skull and Mandibles

Only one of the pig skull fragments with butchery marks bore superficial chop marks running along the underside of the skull near the occipital. The remainder consisted of knife cuts on various parts of the skull. Marks on the mandible were more abundant and quite consistent in all periods. There were 13 examples of knife cuts running along the outer surface of the anterior of the bone. These were probably associated with skinning. There were 13 specimens also covering all the periods which bore chop marks on the lingual aspect. These were made during the separation of the mandibles and could have facilitated the removal of the tongue. Knife cuts associated with the disarticulation of the mandible from the skull were found on the rami of 13 specimens, mostly of 1st Century A.D. date. Knife cuts were occasionally found on the lingual and buccal aspects of the mandibles below the cheek teeth. One Iron Age and one 1st Century A.D. specimen bore chop marks on the ventral part of the ramus.

Scapula and Os Coxae

Butchery on the scapula was more varied. In all periods disarticulation from the humerus seems to have been done mainly with a knife (12 examples). Two 1st Century A.D. scapulae, however, had superficial chop marks on the glenoid cavity indicating that a heavier implement was used. Cuts appeared on both the medial and lateral aspects of the blades of scapulae in all periods (10 examples). These were associated with filleting. However, five specimens, all of Romano-British date bore superficial chop marks on the blade presumably made during the same process.

Most of the marks observed on the os coxae were again situated on the acetabulum or shaft of the ilium. Knife cuts were more common (13 examples from all periods), but four shafts of ilia bore chop marks. Three of 1st Century A.D. date and one of 2nd Century A.D. date. All these marks were probably associated with the disarticulation of the hindlimb from the pelvis. Knife cuts were also occasionally located on the ischium and pelvis.

Humerus and Femur

All but one of the 40 pig humeri with butchery marks bore knife cuts only. The exception was a specimen of 1st Century A.D. date which had a superficial chop mark near the distal articulation. Once again the most common location for knife cuts was near the distal articulation. These were produced during the separation of the humerus from the radius and ulna. Knife cuts further up the shaft attested to the filleting of meat from the bone.

10 of the 15 butchery marks on the femora were knife cuts on the shaft again probably associated with filleting. Examples of

this were found in all periods. The only proximal articulation displaying butchery had superficial chop marks. This and a specimen bearing chop marks on the distal articulation were of 1st Century A.D. date. Another distal articulation of 3rd-4th Century A.D. date had been chopped through during dismemberment of the tibia. However, another distal femur of the same date had knife cuts similar to those found on an Iron Age specimen.

Radius, Ulna, Tibia and Fibula

Most butchered specimens were of 1st Century A.D. date (Table Butch.1). Apart from two ulnae with knife cuts on the posterior of the shaft, all the butchery marks on the radius and ulna were made during the disarticulation of these bones from the humerus. In all but one instance these consisted of knife cuts. One 1st Century A.D. ulna did bear superficial chop marks.

All but one of the 1st Century A.D. tibiae with butchery marks had knife cuts on the shaft associated with filleting. The other specimen had a knife cut near the proximal articualtion associated with dismemberment. Both butchered tibiae from the later periods had been chopped. The first of 2nd Century A.D. date had superficial chop marks near the proximal end presumably made during disarticulation. The second consisted of a shaft fragment of 3rd-4th Century A.D. date which had been chopped through completely, probably to extract marrow.

One fibula bore butchery marks at the distal articulation made during the removal of the feet from the upper limbs.

Carpals, Tarsals, Metapodials and Phalanges

Observations of butchery on these bones were rare because the bones were not well represented in the deposits. However, there is evidence, from the Iron Age and 1st Century A.D. deposits at least, that the feet were removed from the upper limbs using a knife. This process sometimes left cuts on the carpals and astragalus. A metatarsal from a 1st Century A.D. deposit had superficial chop marks on the shaft. Another metatarsal and a metacarpal each had knife cuts near the proximal ends made during their disarticulation. One first phalanx had knife cuts on its shaft, possibly as the result of skinning.

Vertebrae and Ribs

Most butchery marks on pig vertebrae consisted of chop marks. Two Iron Age atlases did have knife cuts made during the detachment of the skull but most of the other butchered cervical vertebrae had been chopped in a similar manner to those of sheep/goat. The lumbar and thoracic vertebrae also bore evidence that the flanks, including the rib cage were detached from the vertebrae.

Discussion

The butchery of pig carcases was comparable to that of sheep/goat, although a cleaver or similar heavy implement was more frequently employed to perform some tasks. There is insufficient evidence to determine whether butchery practices changed during the life of the settlement. Once again the methods of butchery employed are similar to those encountered on other Iron Age and rural Romano-British settlements in Hampshire, but these differ from some of the styles of butchery practised on urban settlements such as Winchester (Maltby in prep.).

HORSE BUTCHERY

Despite the relatively high proportion of horse bones in the Owslebury samples, comparatively few bones bore butchery marks. Only 24 observations were recorded from the phased deposits, representing only 2% of the horse assemblage (excluding loose teeth). The frequency of butchery observation decreased in the later assemblages, as was the case with the other domestic species. The low proportion of butchered bones makes an interesting comparison with the cattle assemblage, in which the incidence of butchery marks was consistently much higher (Table Butch.1). It seems likely that horse carcases may not have been butchered as frequently or as intensively as those of cattle.

All the butchery marks consisted of knife cuts apart from three specimens. An ilium of 1st Century A.D. date had chop marks close to the junction with the sacrum and these must have been produced during the disarticulation of the pelvis from the vertebral column. A tibia of 3rd-4th Century A.D. date had superficial chop marks running axially along the anterior of the shaft towards the proximal end. These were probably made during filleting. Finally, the 3rd-4th Century A.D. cess pit F650-15 produced a proximal portion of a third metacarpal which appears to have been split axially. The knife cuts on the other bones all had parallels with ones observed on cattle bones and consisted of a combination of marks produced during filleting of the scapula and disarticulation of the distal humerus, proximal radius, distal tibia, astragalus and acetabulum. Probable skinning cuts were observed on a mandible, three first phalanges and a metacarpus.

Analysis of fragmentation data for horse (Table Butch.12) also showed differences from the cattle assemblage. A much greater proportion of limb bones of horse were complete or consisted of 75% of the bone. The evidence suggests that the horse carcases were less frequently broken open for marrow. Indeed, it seems possible that horse carcases were in general less heavily exploited than those of cattle.

DOG BUTCHERY

22 dog bones bore butchery marks. Eight of these were located on an articulated skeleton from the 1st Century A.D. track gully F42-2-4 (Table Butch.1). The knife cuts on the distal tibiae, fibulae, astragalus and calcaneus were probably made during the skinning of the carcase, rather than disarticulation of the metatarsals since these were found articulated with the rest of the skeleton. The other cuts on the bones from this skeleton could also have been produced during skinning.

The other knife cuts found on a metatarsal, a carpal another tibia and an ulna could also have been made during skinning. However, other cuts on scapulae, humeri, a femur, a rib and vertebrae attest to the dismenberment and filleting of the carcases of some dogs for their meat. However, the large number of complete and partial skeletons of dogs on the site during all periods, suggests that most dogs were not butchered.

Butchery of dogs is not unusual on Iron Age sites in southern England (Maltby 1981a: 192). At Danebury, Grant (1984a: 524) noted that, although butchery marks were observed on dog bones, the frequency of such observations was less than for cattle, sheep and pig. The same impression was gained from the assemblage from Balksbury (Maltby AML Report). At Owslebury, dogs continued to be occasionally eaten even in the late Romano-British period.

TABLE BUTCH.1

Butchered Fragments of Major Species at Owslebury

Cattle	I.A.	%	1st A.D.	%	1-2 A.D.	%	3-4 A.D.	%	Total	%
Skull frags.	25	6	68	7	17	6	17	4	127	6
Mandible	29	9	108	14	29	8	19	3	185	9
Hyoid	2	40	2	29	-	-	2	15	6	21
Scapula	25	18	51	17	17	13	21	8	114	13
Humerus	17	19	31	14	9	11	16	8	73	13
Radius	15	19	22	14	9	12	7	4	53	11
Ulna	5	10	8	7	2	4	2	1	17	5
Os Coxae	13	15	21	12	12	17	6	4	52	11
Femur	9	12	14	8	5	6	6	3	34	7
Tibia	2	2	12	7	4	6	7	3	25	4
Carpals	1	10	2	3	2	5	-	-	5	3
Calcaneus	1	3	4	4	4	15	3	3	12	6
Astragalus	5	26	14	25	7	32	8	8	34	18
Centroquartal	1	11	8	31	5	23	6	12	20	19
Other tarsals	1	50	-	-	1	9	-	-	2	5
Metacarpal	4	6	11	7	7	9	3	2	25	6
Metatarsal	10	15	13	6	4	4	5	3	32	6
Metapodial	-	-	1	3	-	-	-	-	1	1
1st Phalanx	5	15	23	21	11	5	10	7	49	14
2nd Phalanx	1	6	2	4	-	-	2	4	5	3
Sesamoids	-	-	-	-	1	20	-	-	1	3
Ribs	1	13	2	11	-	-	1	2	4	4
Cervical verts.	6	11	5	4	2	6	6	4	19	5
Thoracic verts.	-	-	1	2	-	-	1	1	2	1
Lumbar verts.	-	-	7	12	5	20	1	2	13	7
Sacrum	2	18	3	14	-	-	-	-	5	8
TOTAL	180		433		153		149		915	
%*	10		10		9		4		8	

Sheep/Goat	I.A.	%	1st A.D.	%	1-2 A.D.	%	3-4 A.D.	%	Total	%
Skull frags.	11	4	30	1	1	.6	8	3	50	3
Mandible	6	1	6	.8	3	.9	1	.2	16	.9
Scapula	6	12	10	12	-	-	1	2	17	8
Humerus	10	8	28	15	11	14	9	5	58	11
Radius	7	3	8	3	3	2	-	-	18	2
Ulna	1	2	6	13	-	-	-	-	7	4
Os Coxae	7	11	14	13	6	17	1	1	28	9
Femur	6	4	9	5	1	2	2	2	18	4
Tibia	4	1	4	.8	3	1	2	.5	13	.9
Carpals	1	7	2	11	-	-	3	4	6	5
Calcaneus	2	9	-	-	1	5	3	8	6	5
Astragalus	10	28	13	30	5	24	13	29	41	28
Centroquartal	-	-	3	14	-	-	4	16	7	13
Metacarpal	-	-	1	.5	-	-	5	3	6	1
Metatarsal	1	.5	1	.4	1	1	1	.3	4	.5
Ribs	5	17	2	4	1	13	2	1	10	4
Sternebrae	-	-	-	-	-	-	1	8	1	6
Cervical verts.	5	13	15	19	2	13	19	17	41	17
Thoracic verts.	-	-	1	2	1	7	4	4	6	4
Lumbar verts.	15	63	9	24	2	13	4	6	30	21
Caudal verts.	-	-	1	20	-	-	-	-	1	4
TOTAL	97		163		41		83		384	
%*	4		4		3		2		3	

Pig	I.A.	%	1st A.D.	%	1-2 A.D.	%	3-4 A.D.	%	Total	%
Skull frags.	5	3	6	1	2	2	1	.9	14	2
Mandible	12	6	18	4	10	6	3	2	43	4
Scapula	5	9	10	9	4	9	4	9	23	9
Humerus	14	20	16	12	6	11	4	6	40	12
Radius	-	-	3	7	-	-	-	-	3	3
Ulna	1	4	6	9	-	-	-	-	7	5
Os Coxae	3	9	11	17	4	17	3	17	21	15
Femur	2	4	6	7	2	5	5	16	15	7
Tibia	-	-	7	6	1	2	1	2	9	3
Fibula	-	-	1	5	-	-	-	-	1	2
Carpals	-	-	2	18	-	-	-	-	2	9
Calcaneus	1	10	-	-	-	-	-	-	1	2
Astragalus	2	17	3	12	-	-	-	-	5	10
Metacarpal	-	-	1	3	-	-	-	-	1	2
Metatarsal	1	11	1	4	-	-	-	-	2	4
1st Phalanx	-	-	1	2	-	-	-	-	1	.7
Ribs	1	5	-	-	2	25	3	9	6	6
Cervical verts.	5	31	1	3	3	20	-	-	9	13
Thoracic verts.	-	-	5	25	-	-	-	-	5	11
Lumbar verts.	2	22	5	15	2	40	-	-	9	16
TOTAL	54		103		36		24		217	
%*	6		5		5		3		5	

Horse	I.A.	%	1st A.D.	%	1-2 A.D.	%	3-4 A.D.	%	Total	%
Skull frags.	1	3	-	-	-	-	-	-	1	.8
Mandible	1	3	2	6	-	-	-	-	3	2
Scapula	-	-	1	5	1	8	-	-	2	3
Humerus	2	40	1	4	-	-	-	-	3	4
Radius	-	-	1	3	-	-	-	-	1	.9
Os Coxae	1	7	1	4	-	-	-	-	2	2
Tibia	-	-	-	-	1	9	1	3	2	2
Astragalus	1	20	1	6	1	11	-	-	3	5
Metacarpal	-	-	2	11	-	-	1	4	3	4
Metatarsal	1	7	-	-	-	-	-	-	1	1
1st Phalanx	-	-	2	7	-	-	1	3	3	4
TOTAL	7		11		3		3		24	
%*	3		2		1		.5		2	

Dog	I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Scapula	1	1	-	-	2
Humerus	-	-	1	1	2
Ulna	-	2+	-	-	2
Os Coxae	-	1+	-	-	1
Femur	-	1	-	-	1
Tibia	1	2^	-	-	3
Calcaneus	-	1+	-	-	1
Astragalus	-	1+	-	-	1
Metatarsal	-	1	-	-	1
Ribs	1	-	-	-	1
Cervical verts.	-	1	-	-	1
Thoracic verts.	1	-	-	-	1
Lumbar verts.	2	-	-	-	2
Caudal verts.	-	1+	-	-	1
TOTAL	6	14	1	1	22

* = percentage of butchered fragments in assemblage excluding loose teeth.
\+ = includes one butchered bone from skeleton in F42-2-4;
^ = includes two butchered bones from skeleton in F42-2-4.

TABLE BUTCH.2

Location of Butchery Marks on Cattle Skull Fragments

Bone	I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Incisive	2	7	3	-	12
Maxilla	6	24(2)	8	4	42(2)
Nasal	2	1	-	3	6
Zygomatic	-	7	1	2	10
Temporal	-	2(1)	-	-	2(1)
Frontal	10(2)	17(8)	4	3	34(10)
Horn Core	4(3)	5(3)	1(1)	5(4)	15(11)
Parietal	-	1	-	-	1
Occipital	1(1)	3(3)	-	-	4(4)
Basisphenoid	-	1	-	-	1
TOTAL	25(6)	68(17)	16(1)	17(4)	126(28)

( ) = number of specimens with chop marks. The rest have knife cuts only

TABLE BUTCH.3

Location of Butchery Marks on Cattle Mandible Fragments

		I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Diastema	K	10	40	7	13	70
	C	1	1	1	-	3
Toothrow	K	1	5	2	1	9
	C	1	-	-	-	1
Ramus -	K	11	53	12	3	79
condyle	C	4	19	6	2	31
Ramus -	K	3	5	1	-	9
ventral	C	1	1	-	-	2
TOTAL		32	124	29	19	204

K = knife cut; C = chop mark.

TABLE BUTCH.4

Location of Butchery Marks on Cattle Scapula Fragments

		I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Proximal	K	2	6	1	-	9
Blade Lateral	KA	3	12	7	-	22
	CA	3	14	6	12	35
Blade Other	K	3	11	3	2	19
	C	3	2	1	4	10
Distal	K	7	10	-	2	19
	C	1	1	2	1	5
	CA	4	-	-	-	4
TOTAL		26	56	20	21	123

K = knife cuts; C = chop marks; A = axial.

TABLE BUTCH.5

Location of Butchery Marks on Cattle Humerus Fragments

		I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Proximal	K	1	4	-	2	7
	C	-	-	-	-	1
Midshaft	K	5	10	2	2	19
	C	-	2	-	-	2
Shaft - dist.	K	2	4	1	-	7
	C	-	-	-	1	1
Distal	K	9	19	7	8	43
	C	1	4	-	2	7
TOTAL		18	43	10	16	87

K = knife cuts; C = chop marks.

TABLE BUTCH.6

Fragmentation Data for Cattle Humeri

% of Bone	I.A.	%	1st A.D.	%	1-2 A.D.	%	3-4 A.D.	%	Total
Complete	1	1	9	4	3	4	7	3	20
c.75%	7	8	23	9	5	6	31	15	66
c.50%	9	10	37	15	8	10	21	10	75
c.25%	26	29	60	24	23	29	36	17	145
< 25%	46	52	126	49	40	51	112	54	324
TOTAL	89		255		79		207		630

TABLE BUTCH.7

Fragmentation Data for Cattle Femora

% of Bone	I.A.	%	1st A.D.	%	1-2 A.D.	%	3-4 A.D.	%	Total
Complete	2	3	10	6	6	8	15	9	33
c.75%	6	7	5	3	7	9	23	13	41
c.50%	9	12	5	3	2	3	11	6	27
c.25%	18	23	48	28	20	26	25	14	111
< 25%	43	55	106	61	42	55	100	57	291
TOTAL	78		174		77		174		503

TABLE BUTCH.8

Fragmentation Data for Cattle Radii

% of Bone	I.A.	%	1st A.D.	%	1-2 A.D.	%	3-4 A.D.	%	Total
Complete	3	4	18	12	8	11	22	12	51
c.75%	7	9	15	10	4	5	22	12	48
c.50%	8	10	10	6	5	7	16	8	39
c.25%	35	43	65	42	23	31	42	22	165
< 25%	28	35	48	31	34	46	87	46	197
TOTAL	81		156		74		189		500

TABLE BUTCH.9

Fragmentation Data for Cattle Tibiae

% of Bone	I.A.	%	1st A.D.	%	1-2 A.D.	%	3-4 A.D.	%	Total
Complete	-	-	12	7	3	4	14	6	29
c.75%	7	7	14	8	6	9	49	22	76
c.50%	11	10	15	9	5	7	11	5	42
c.25%	45	42	56	33	28	40	43	19	172
< 25%	43	41	72	43	28	40	104	47	247
TOTAL	106		169		70		221		566

TABLE BUTCH.10

Location of Butchery Marks on Cattle Metapodia

Metacarpus		I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Proximal	K	-	2	2	-	4
	C	-	-	1	-	1
Midshaft	K	2	4	-	2	8
	C	-	1	-	1	2
Distal	K	1	2	2	-	5
	C	1	3	2	-	6
TOTAL		4	12	7	3	26

Metatarsus		I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total
Proximal	K	4	6	2	2	14
	C	1	1	-	-	2
Midshaft	K	2	2	2	-	6
	C	-	-	-	1	1
Distal	K	2	3	-	1	6
	C	1	1	-	1	3
TOTAL		10	13	4	5	32

K = knife cut; C = chop mark.

TABLE BUTCH.11

Fragmentation Data for Cattle Metapodia

Metacarpus % of Bone	I.A.	%	1st A.D.	%	1-2 A.D.	%	3-4 A.D.	%	Total
Complete	6	8	18	11	7	9	15	11	46
c.75%	17	24	20	12	8	11	28	20	73
c.50%	2	3	11	7	2	3	7	5	22
c.25%	21	30	58	36	31	41	40	29	150
< 25%	25	35	56	34	28	37	48	35	157
TOTAL	71		163		76		138		448

Metatarsus % of Bone	I.A.	%	1st A.D.	%	1-2 A.D.	%	3-4 A.D.	%	Total
Complete	3	5	9	4	5	5	28	14	45
c.75%	12	19	26	12	5	5	25	13	68
c.50%	6	10	16	8	9	9	10	5	41
c.25%	17	27	63	30	32	31	35	18	147
< 25%	25	40	95	45	51	50	99	50	270
TOTAL	63		209		102		197		571

TABLE BUTCH.12

Fragmentation Data for Horse Major Limb Bones

Humerus % of Bone	I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total	%
Complete	-	1	-	4	5	6
c.75%	2	7	4	16	29	35
c.50%	1	6	-	4	11	13
c.25%	2	2	1	9	14	17
< 25%	-	6	7	11	24	29
TOTAL	5	22	12	44	83	

Radius % of Bone	I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total	%
Complete	3	6	5	9	23	22
c.75%	1	9	-	7	17	16
c.50%	3	2	3	3	11	11
c.25%	3	7	1	6	19	18
< 25%	4	12	5	13	34	33
TOTAL	16	36	14	38	104	

TABLE BUTCH.12 (CONT.)

Femur % of Bone	I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total	%
Complete	3	2	-	5	10	13
c.75%	2	6	1	6	15	19
c.50%	-	2	-	-	2	3
c.25%	-	5	2	5	12	15
< 25%	4	4	9	23	40	51
TOTAL	9	19	12	39	79	

Tibia % of Bone	I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total	%
Complete	2	3	-	8	13	16
c.75%	2	4	3	7	16	20
c.50%	4	2	2	5	13	16
c.25%	1	2	-	8	11	13
< 25%	6	11	5	7	29	35
TOTAL	15	22	10	35	82	

Metacarpus % of Bone	I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total	%
Complete	3	11	4	12	30	43
c.75%	5	4	1	7	17	24
c.50%	2	1	1	2	6	9
c.25%	4	3	3	2	12	17
< 25%	-	-	-	5	5	7
TOTAL	14	19	9	28	70	

Metatarsus % of Bone	I.A.	1st A.D.	1-2 A.D.	3-4 A.D.	Total	%
Complete	3	10	-	5	18	25
c.75%	3	2	1	5	11	15
c.50%	1	5	3	1	10	14
c.25%	3	4	4	9	20	28
< 25%	4	4	2	2	12	17
TOTAL	14	25	10	22	71	

SECTION 8

PATHOLOGY AND BONEWORKING EVIDENCE

PATHOLOGY

Pathological conditions were noted and computer-recorded. This archive will be supported by a photographic record of the more interesting or unusual specimens. This will form an important part of a project to obtain a photographic archive of pathological bones from archaeological excavations in Wessex. Detailed discussion of the pathological animal bones from Owslebury should perhaps wait for this project to be undertaken, in order to view the observations in the context of a comprehensive comparative study of animal palaeopathology in the region. Consequently, this section will be resticted to some general observations.

Dental Pathology and Abnormalities of Teeth

Most of the dental abnormalities were recorded on sheep/goat jaws. The most common observations concerned the attrition of the mandiibular cheektooth row through the overcrowding of these teeth. In the phased deposits, 132 specimens were recorded with this condition. Attrition was only recorded when the wear surface of one or more of the teeth had become distorted by attrition from its neighbour. In addition it was noted that many more mandibles displayed less severe manifestations of the same condition. Attrition was recorded most frequently on the first molar (M1) but the deciduous and permanent third and fourth premolars (d3, d4, P3, P4) were also commonly affected. The M1 was rarely maloccluded by attrition from the deciduous teeth. It was only the subsequent eruption and consequent attrition from the P4 and the second molar (M2) that caused the abnormalities in this tooth.

The frequency of observations of this condition is therefore partially dependent upon the stage of tooth eruption of the mandibles. Specimens which have just lost their deciduous premolars and have the P4 either not fully erupted or in an early stage of wear are less likely to display dental attrition. This was indeed the case at Owslebury, where mandibles at Stage 5 of the tooth eruption sequence (P4 in wear but M1 not in heavy wear) contained a lower proportion of overcrowded teeth than those at Stages 4, 6 and 7.

The dental pathology at Owslebury was not recorded to the standards set by Levitan (1985), although all sheep/goat mandibles with toothwear have been kept together to facilitate possible further study. However, a rough guide to the frequency of attrition can be made by comparing the number of such observations against the total number of mandibles possessing cheek teeth (cf Tables SheJaw.1-4). The overall incidence of mandibles displaying dental attrition ranged between 17-18% in each of the samples from the 3rd-2nd Century B.C. deposits, the 1st Century A.D. deposits and the 1st-2nd Century A.D. contexts.

This figure rose to 24% in the 3rd-4th Century A.D. deposits, probably reflecting the higher proportion of older sheep represented in those layers. The 1st Century B.C. sample, however, produced a figure of only 5%. The reasons for such a low incidence of attrition in those contexts are not immediately clear. Generally, the overcrowding of teeth has been equated with poor nuitrition, but the condition may be common in most sheep flocks, particularly amongst older animals.

Periodontal disease is an inflammatory condition of the jaws caused by oral bacteria that infect the periodontal membrane. This leads progressively to recession of the bone of the alveolar region, the widening of it and the loosening of the teeth in the affected area. In more severe cases the tooth or teeth may be lost and new growth of bone will form in the alveolus (Levitan 1985: 44). The condition is particularly common in sheep/goat mandibles from British archaeological sites.

Again, the standards of recording of this condition at Owslebury were less sophisticated than those advocated by Levitan and Baker & Brothwell (1980: 154). In particular, minor cases of alveolar recession were not recorded consistently. Consequently only the more severe cases were noted in this initial analysis. The results do, however, support Levitan's (1985: 51) suggestion that since the most common area of infection is found between the P4 and the M1, the initial catalyst of the condition may often have been the eruption of the permanent premolars. Periodotal disease was recorded on only one specimen which still possessed its deciduous premolars. The remainder all possessed (or in some cases had lost) the permanent premolars. The incidence of periodontal disease appears to have been most prevalent in the 1st Century deposits, where infected specimens were encountered three times as frequently as in the rest of the pericds. Once again the reasons for this are not clearly apparent.

Nine cases were recorded of the absence of second permanent premolars (P2) in sheep/goat mandibles at Owslebury. It has been suggested that such absences are due to congenital factors (Andrews & Noddle 1975). At Owslebury was noted slightly more frequently in the 1st Century B.C. deposits (four specimens). Three examples were found in 1st Century A.D. contexts and two in 3rd-4th Century A.D. layers.

The absence of the P2 was recorded more frequently on cattle mandibles (38 specimens). The incidence of observations did, however, fluctuate in the different periods. The condition occurred most commonly in the 1st Century A.D. deposits (20 cases) and the 3rd-4th Century A.D. layers (12 specimens). Only five examples were recorded from Iron Age contexts.

15 cattle mandibles possessed third molars (M3) lacking their posterior cusp. This congenital condition has also been observed in most archaeological samples of this date. It was recorded consistently in relatively small numbers throughout the periods at Owslebury. The presence of this abnormality seems in turn to have caused abnormal wear on the upper third molar, as described by Bourdillon & Coy (1980: 91) in Saxon Southampton.

Other dental abnormalities were comparatively rarely encountered, apart from a reasonable proportion of the dog jaws

(10 cases) which had suffered ante-mortem tooth loss, particularly of the permanent premolars. Ante-mortem tooth loss was also recorded on four pig jaws. 28 pig mandibles bore evidence of attrition and two more had evidence of rotation of one of the teeth. Abscesses were observed occasionally in the jaws of cattle, sheep/goat and pig. One pig M3 in F55 possessed an extra projection on its lingual aspect. Another unusual occurrence was a sheep/goat mandible in F147, which had an M2 that possessed a third column as in the M3. This again was probably a rare congenital abnormality.

Other Pathology and Abnormalities

Other pathological abnormalities of animal bones occurred relatively infrequently in the deposits. Table Path.1 lists the number of observations of pathology recorded on the different skeletal elements of the major species of mammal. Although most such observations were made on cattle bones, pathological bones formed a higher proportion of the horse and dog assemblages. This is partially the result of the greater fragmentation of the bones of cattle, sheep/goat and pig. It is more likely that pathological conditions will be noted on complete bones and particularly on bones of articulated skeletons since those had suffered less post-depositional disturbance (butchery, gnawing etc.). A greater proportion of the dog and horse samples consisted of articulated and complete bones.

In addition, many of the horse bones belonged to mature animals, judging from the ageing evidence (Table HorJaw.1). Consequently we should expect to find a higher proportion of age-related pathological conditions amongst their bones. This was indeed the case at Owslebury. There were several examples in which the tarsals and metatarsals of horse had become fused through the growth of new bone (exostoses) around the ankle joint. This condition is comparable with spavin, which commonly affects the tarsal joints in horses and may in many cases have been connected with working, although several other causes can create this abnormality (Baker & Brothwell 1980: 117-20). Spavin can induce some lameness but, provided the condition is not too severe, rest can alleviate the problem and the animal can continue working, if required.

The same condition appears to have affected cattle. Its presence accounts for the reasonably high proportion of pathological tarsals and metatarsi that were recorded (Table Path.1). This would suggest that these cattle may have been working animals used either as plough animals or as beasts of burden.

The limb extremities were the areas that displayed the greatest number of abnormalities in most of the domestic species. Many of these conditions consisted of minor growths on, or distortions of the bone, which probably did not seriously handicap the animals. There were, however, a few good examples of joint surfaces that were severely affected by osteoarthritic conditions, mainly on cattle and horse metatarsi and phalanges. Again this condition is more likely to afflict older and working animals.

Other parts of the skeleton that occasionally showed evidence of arthritic conditions were the acetabulum (two examples of cattle, one of horse) and vertebrae. Examples of the latter were restricted to three sets of horse thoracic vertebrae and two thoracic vertebra of a cat skeleton in F91. Two cattle cervical vertebrae in F75 had fused together but the abnormality in that instance appears to have been of congenital origin.

Serious fractures of bones were restricted mainly to the radius, ulna and tibia of dogs. Three forelimbs and one hindlimb had fractured bones. All these breaks had healed with vigorous new bone growth and, although the animals would have carried a limp, they appear to have survived for some considerable time after the trauma. Other fractures were mainly confined to the ribs of various species, which would not have had serious consequences. The goat skeleton in the 3rd-2nd Century B.C. quarry did include a femur with a healed fracture. Fractures of limb bones of the larger mammals would have been more serious and it is more likely that such animals would have been put down, if such accidents happened. It so, such breaks are likely to go undetected since little new growth of bone, which would have resulted in distortion around the fracture, would have had time to develop.

The most common abnormality observed on pig bones was distortion and exostoses on the shaft of the tibia, usually towards the distal end and around the lateral aspect. Sometimes this also affected the fibula. Five examples were observed, four of 1st Century A.D. date. The causes of this trauma are not clear. More severe fractures of pig tibiae have been observed on the continent from Heuneberg and Manching, and there was a good example recovered from Saxon Southampton (Bourdillon & Coy 1980: 96). It has been suggested that these fractures may have resulted from pigs trying to break tethers attached to their hind limbs. Although, the tibiae from Owslebury were less severely damaged, it is possible that the distortion of the bones was a consequence of similar tethering.

Two horn cores of sheep had indentations in them. Hatting (1975) suggested that these might reflect periods of restricted growth due to malnutrition. Bourdillon & Coy (1980: 92), however, noted that nearly all instances of such indentations occurred on the horn cores of wethers and the abnormality may have been a consequence of castration.

BONEWORKING EVIDENCE

This analysis included the identification of fragments of worked bones discovered amongst the animal bone assemblages and the examination of the bone objects that were noted during excavation and kept as separate finds. The major interest in worked bones for the archaeozoologist lies in the potential biases such activities may create in the use and disposal of the bones used as raw material. However, it is thought that such biases would have been minimal at Owslebury since boneworking does not appear to have been an important activity.

Table Work.1 shows how infrequent these occurrences were. The 3rd-4th Century A.D. deposits produced the largest number of worked bone objects but as they consisted mainly of pins that were unidentifiable to species or element, they were not very informative. Most of the few worked bones identifiable to species were of Iron age origin.

No bones or offcuts of cattle were specifically identified, although the presence of saw marks near the base of a horn core in a 1st Century A.D. deposit suggests that the horn sheath may have been utilised in that instance. Butchery marks associated with the removal of horn cores were sometimes found on cattle skull fragments. This may also indicate that the horns were required as raw material. Similarly, although only one red deer antler fragment bore evidence of working, the presence of antler fragments on the settlement may in itself imply that they had occasionally been collected or imported as raw material.

The one worked object identified to pig consisted of a lower canine of a male animal in F55, which had a hole perforated in it. This could have been a pendant. From the same feature came the only evidence for the working of horse bones. This was an offcut consisting of a third metacarpal which bore evidence of sawing marks made during the removal of the "splint" second and fourth metacarpals. Horse lateral metapodials are of an ideal shape for working into points, awls or gouges. At Danebury, the only worked bones identified to horse consisted of six metapodial fragments including a point made from a lateral metapodial (Grant 1984a: 532).

Five worked sheep/goat bones were identified. The first of these consisted of the proximal half of a sheep's metacarpus in the 3rd-2nd Century pit, F186. This bone bore evidence of polish and shaping and had been perforated on the medial aspect near the proximal articulation. A distal fragment of tibia in F55 also had been perforated through the posterior-anterior aspects and had been shaped. Two other sheep/goat tibiae of 1st Century A.D. date had been worked. One was a distal fragment (in F133) which had been polished and burnt. The other (in F147) was from the proximal end and had again been perforated near the articulation. The other worked bone identified to sheep was a metatarsus in a 1st century A.D. pit that showed evidence of being shaped.

Metapodia and tibiae were the most commonly identified elements of sheep that bore evidence of boneworking at Danebury (Grant 1984a: 532). This is to be expected since these are sturdy bones with relatively thick, cylindrical shafts which can be relatively easily worked.

However, animals seem rarely to have been exploited for boneworking at Owslebury. This is typical of other Iron Age sites in the area. It seems possible that the practice, which was infrequent in the Iron Age, became almost non-existant by the late Romano-British period. Certainly this evidence contrasts with Winchester where some deposits have produced offcuts derived from boneworking on a large scale (Coy & Bradfield AML Report). Such enterprises are more likely to be encountered on urban sites, since much of the raw material could be imported in bulk (i.e. from the bones of animals slaughtered for the town's meat market) and there would be an easy outlet for the finished goods. It is perhaps likely that all the pins represented in the late Romano-British deposits at Owslebury were imported.

TABLE PATH.1

Animal Bones with Pathological Abnormalities at Owslebury

	Cattle	Sheep/G	Pig	Horse	Dog	Cat
Horn Core	-	2	-	-	-	-
Mandible	2	1	-	1	1	-
Scapula	-	-	1	-	1	-
Humerus	-	-	1	-	1	-
Radius	3	1	1	-	3	-
Ulna	-	-	-	-	4	-
Os Coxae	2	-	-	1	-	-
Femur	2	1	1	-	1	-
Tibia	1	-	5	-	3	-
Fibula	-	-	-	-	1	-
Carpals	2	-	-	-	-	-
Calcaneus	-	-	-	1	1	-
Astragalus	-	1	-	-	1	-
Centroquartal	7	-	-	-	-	-
Other tarsals	5	-	-	7	-	-
Metacarpal	2	1	-	2	3	-
Metatarsal	14	3	-	4	5	-
Lat. Metapodial	-	-	4	3	-	-
1st Phalanx	5	1	1	5	-	-
2nd Phalanx	2	1	-	1	3	-
3rd Phalanx	6	6	-	-	-	-
Sesamoids	-	3	-	-	-	-
Ribs	2	4	1	1	8	1
Cervical verts.	3	-	-	1	-	-
Thoracic verts.	1	1	-	6	3	2
Lumbar verts.	5	-	-	1	-	-
Caudal verts.	1	1	-	-	4	-
TOTAL	65	27	15	34	43	3

Totals exclude records of dental pathology.

TABLE WORK.1

Identifications of Worked Bone Objects and Offcuts

Species	3-2 B.C.	1 B.C.	1 A.D.	1-2 A.D.	3-4 A.D.	Total
	Period					
Cattle	-	-	1	-	-	1
Sheep/Goat	2	-	3	-	-	5
Pig	1	-	-	-	-	1
Horse	1	-	-	-	-	1
Red Deer	1	-	-	-	-	1
Unid. Large Mammal	-	1	-	-	-	1
Sheep-sized Mammal	1	-	-	-	-	1
Unid. Mammal	1	-	2	1	11	15
TOTAL	7	1	6	1	11	26

SECTION 9

OTHER MAMMALS, AMPHIBIANS, BIRDS AND FISH

CAT

Cat bones occurred in only 13 phased features from the excavations. 508 bones were identified but 485 of these belonged to articulated skeletons in F378, F642 (two individuals), F650 (see Section 2) and the fill of the 3rd Century A.D. oven, F91 (see Section 3). Four of these groups belonged to immature individuals.

The earliest occurrence of the species was in F380 (3rd Century B.C. enclosure ditch), which produced three bones. Cat bones were also found in two deposits dated to the 1st Century B.C. An isolated specimen was recovered from F400-7 and 51 bones from one animal were scattered in three layers of F378. The contents of the latter deposit were unusual for deposits dated to the Iron Age at Owslebury, in that several species (including cat, domestic fowl and flounder), not usually recorded from that period were recovered.

Bones of cat have been recorded in small numbers from a few Iron Age settlements in Southern England. Several pits at Danebury contained cat bones, including the complete skeleton of a kitten (Grant 1984a: 525). Five newborn kittens were recovered from one context from Gussage All Saints, Dorset along with several other immature specimens (Harcourt 1979: 154). On the other hand, cat bones were not recovered from Winnall Down (Maltby 1985b), Old Down Farm (Maltby 1981b), Balksbury (Maltby AML Report), Chilbolton Down (Maltby 1984a) and Micheldever Wood banjo enclosure (Coy AML Report 3288). The absence of cats from these sites would suggest that they were rarely exploited or kept in Hampshire in the Iron Age. The presence of neonatal mortalities and other immature cats at Gussage All Saints and Danebury has been taken as evidence that the animals were of the domesticated variety rather than from the wildcat.

Only three occurrences of cat bones (five fragments), were found in the 1st Century A.D. deposits, and only a single fragment was recovered from 2nd Century A.D. contexts. It is not until the 3rd-4th Century A.D. that cat bones were found more commonly. Partial skeletons were found in two cess pits, a gully and in the fill of an abandoned oven. Isolated fragments were recovered from four other contexts.

Apart from their bones, other indicators of the presence of cats at Owslebury lie in the discovery of tooth marks, probably made by a cat, on domestic fowl bones in F642-1-21 and F642-4-11 (1st Century A.D.).

No butchery or skinning marks were found on any of the cat bones and the high incidence of articulatd bones suggests that their bodies were simply dumped. The adult skeletons from F646 and F650 provided the opportunity for metrical analysis to be carried out. The former skeleton produced the following maximum length measurements:- radius 98.8 mm, ulna 115.3 mm, femur 109.0 mm, tibia 116.1 mm. The partial skeleton from F650 had maximum lengths of 112.3 mm and 115.5 mm for the femur and tibia respectively. These therefore belonged to quite large cats. They were larger, for example, than the Medieval and Postmedieval specimens from Exeter (Maltby 1979: 200). Most of the Romano-British cat bones that were measured have indicated that cats were generally quite large in that period (Maltby 1979: 64; Branigan and King 1965: 462-463). At Owslebury, however, there is little evidence that cats were kept consistently at all until the later Romano-British period. They may have been regarded as pets but would also have helped to keep down the numbers of vermin.

DEER

Only 48 fragments of red deer and 27 fragments of roe deer were recovered from the deposits. 16 of these identifications were made on antler fragments (12 from red deer; four from roe deer). The number of fragments of each species for each major chronological period is shown in Table Deer.1.

Red Deer

This species, provided at most only 0.3% of the identifiable fragments of the major species in any period. The highest figure was in the 3rd-2nd Century B.C. sample. All three antler fragments of that date were found in pits. Two of these were recovered from F212. One of them had been sawn and burnt and had obviously been used as raw material in tool manufacture. Another worked fragment was recovered from F186. Of the 11 other red deer bones of this date, five were recovered from the quarry, F236 (a radius, two os coxae, an astragalus and a loose tooth); four from the enclosure ditch F55 (a 1st phalanx and three metatarsi fragments) and two from the pit complex, F290 (a humerus and 1st phalanx). The humerus showed substantial numbers of knife cuts around the distal articulation made when it was dismembered from the radius and ulna. One of the os coxae in F236 also bore large numbers of knife cuts, and the astragalus had a single knife cut made during the disarticulation of the ankle joint.

Only two red deer fragments were recovered from the 1st Century B.C. deposits; a tibia in the gully, F567 and a femur in F400 which had a knife cut near the proximal articulation made during the disarticulation from the acetabulum.

None of the small fragments of antler from the 1st Century A.D. deposits bore evidence of working. Of the five postcranial bones, an articulated radius and ulna were recovered from the ditch, F36 and a complete radius of a young deer (proximal epiphyses unfused) was found in F370. Two small fragments of metatarsi were also represented. The elements represented in the 2nd Century A.D. deposits consisted of an antler fragment, a metatarsus, a skull fragment of a stag and two loose teeth.

None of the five antler fragments of 3rd-4th Century A.D. date bore signs of working. However, their presence would suggest that a little antler working was taking place. 14 other bones of the species were identified. These consisted of a radius (distal epiphyses unfused), a metacarpus, a 1st phalanx, a 2nd phalanx, two tibiae fragments, an astragalus, a centroquartal, two metatarsi and four loose teeth. None of these bore butchery marks but given the eroded nature of many of the bones, this is to be expected.

The few measurements that could be taken (Table Deer.2) indicated that the red deer were larger than modern specimens in Southern England. This has been found to be the case on most Romano-British settlements.

Roe Deer

Roe deer bones were best represented in the 3rd-2nd Century B.C. deposits (Table Deer.1). The 11 fragments included two cast antlers (in the pits F180 and F181), two radii, a metacarpus, two 1st phalanges, a patella, two tibiae and a skull fragment. The last fragment from the quarry F236 consisted of part of the frontal bone from which the antlers had been removed for working.

No roe deer bones were identified in the late Iron Age or 1st Century A.D. deposits when it appears not to have been exploited at all at Owslebury. Five bones were recovered from contexts of 1st-2nd Century A.D. date (a scapula, a metacarpus and three loose teeth).

Ten fragments were recorded from late Roman deposits, including two cast antlers. Other bones represented consisted of a radius, two tibiae, a calcaneus, an astragalus, a metatarsus, a skull fragment and a loose tooth.

No immature animals were represented. The few measurable bones are listed in Table Deer.2. No butchery marks were found on any of the roe deer bones but their presence would suggest that their meat was consumed occasionally.

Red and roe deer, however, seem to have supplied only an occasional addition to the diet throughout the settlement's history. However, it should be borne in mind that victims of the hunt may not necessarily have been brought back to the settlement but butchered at the kill site and only the filleted meat brought back.

Low numbers of deer bones, apart from worked antler, are the norm for Iron Age sites in Southern England (e.g. Grant 1984a; Coy 1982). They are also rare in most Romano-British samples, although a few villa sites have produced higher numbers of red deer in particular.

<u>HARE</u>

91 bones of hare were recovered from the excavations. Most of these formed parts of articulated skeletons in two of the 3rd-4th Century A.D. cess pits. F646-4/7 produced 34 bones, most of which probably belonged to the same immature animal (all epiphyses were unfused). F664-2 included 14 bones of another

leveret, and most of the other hare bones in this pit (from layers 9-11) also belonged to immature animals. The number of bones of hare represented in these pits and other deposits at Owslebury is given in Table Hare.1. There was no evidence for butchery on any of the bones from these pits and it is possible that the young animals had fallen in and been unable to escape.

Indeed none of the other hare bones represented showed evidence of butchery. One fragment of ilium showed gnawing marks, probably made by a dog. There is no direct evidence, however, that hares were exploited for human consumption. A relatively large number of young animals were represented and these could have been natural casualties or pitfall victims. There is also a possibility that some of the hare bones were modern intrusions into the deposits due to burrowing.

The few fully grown bones were similar in size to the modern brown hare (Lepus capensis) and it is more likely that it is this species rather than the slightly smaller mountain hare (Lepus timidus) that is represented. Coy (1984: 526) recorded 11 hare bones from Danebury, with only the brown hare positively identified. Similarly, the few hare bones recorded at Groundwell Farm, Wiltshire probably belonged to brown hare (Coy 1982a). Bones of hare have been found sporadically in most other Iron Age assemblages in Wessex but there is no positive evidence that they were exploited for food. Julius Caesar noted that the Britons had a taboo on eating hare (Matheson 1941: 378) and this observation may be of relevance here.

Hare bones are comparatively rare in Romano-British deposits and there is again no evidence of butchery on the bones obtained from the various rural sites in Wessex. In Devon, hare was slightly better represented in the Roman deposits at Exeter and one bone at least had evidence of butchery (Maltby 1979: 61). Vegetius mentions that hares were sometimes eaten by the Roman military forces in Britain (Davies 1971; Jones et al. 1985: 171). It will be interesting to observe whether urban and military sites in general produce a greater proportion of hare bones than rural sites. Further study of the bones from Winchester would also be of value as a direct comparison to the Owslebury hare sample.

FOX, BADGER, HEDGEHOG AND WEASEL

Fox bones can be difficult to distinguish from certain types of dog and hence it was possible to positively identify only three bones of fox. These consisted of a lower canine from F55-5-3, a mandible from F132-2-6 and an ulna from F150-1-23. There were, however, several other contexts where bones the size of fox were recovered. (These were recorded as fox/dog in the tables in Sections 2-3). These contributed 15 fragments - four from Iron Age, eight from 1st Century A.D. and three from 1st-2nd Century A.D. contexts. There is no evidence that foxes were exploited and the few animals present may represent the scattered remains of natural mortalities or the remains of foxes killed as pests. They would have been a menace as scavengers particularly on the sheep flocks of Owslebury. Fox bones were found in contexts at Danebury, including the substantial part of the immature skeleton in an Early Iron Age pit (Grant 1984a: 526).

Badger was represented by five bones from three contexts, all of 3rd-4th Century A.D. date. F664-9 contained a mandible, maxilla and radius, all probably from the same animal; a humerus was recovered from F133-5-10 and a mandible from F133-7-20. These again may be natural casualties or animals killed as pests.

Hedgehog was represented by eight bones from six contexts. Its earliest occurrence was in F55-3-10, in which a mandible was found. Two other Iron Age contexts produced evidence for the presence of hedgehog. F377-4 and F400-7 each produced a radius of the species. The only hedgehog bone dated to the 1st Century A.D. was a maxilla in pit F209. Finally, two 1st-2nd Century A.D. context contributed four hedgehog bones. F133-4-21 contained a femur anu F642-5-16 produced a mandible, radius and metacarpal probably from the same animal. These bones probably represent the remains of natural mortalities. Hedgehogs can be found in virtually all lowland habitats where there is sufficient cover for nesting. They are most abundant on the edges of woods and in hedgerows in meadowland (Corbet and Southern 1977: 33).

No bones of stoat were identified but 23 bones of weasel were recorded. Ten of these formed part of an articulated skeleton of a male in the 3rd-2nd Century B.C. pit F181-1. The mandibles, os coxae, femora, a tibia, two vertebrae, a rib and the baculum were recovered. These and the weasel bones from Other Iron Age pits (a tibia in F376-2, and a humerus and ulna from F409-1), probably represent the remains of pitfall victims. Another weasel humerus was recovered from the 3rd Century B.C. ditch F589-4-2. A mandible from the 1st Century B.C. context F61-1 completed the Iron Age assemblage.

From the 1st Century A.D. deposits, three weasel bones probably from a single animal (two mandibles and a humerus) were recovered from F133-1-13 and a tibia was found in the upper fill of the track F147-5-10. F642-5-2 produced a humerus and another 2nd Century A.D. context, the quarry F61-1 contained a mandible. None of the 3rd-4th Century A.D. contexts produced any evidence of weasel.

Weasels again can be found in very varied habitats, ranging from lowland farming land upto moorland and moutains. They occur whenever their major food supply - voles and mice - are abundant (Corbet and Southern 1977: 340). It is clear from the numerous remains of rodents in some deposits that the area in and around the Owslebury settlement would have provided the weasel with ample prey.

<u>RODENTS AND OTHER SMALL MAMMALS</u>

The majority of the bones from these species were recovered from the lowest layers of the pits, quarries and ditches in which they were found. Most therefore, are the remains of animals that died after they fell into a hole and were unable to escape. They were particularly common in the Iron Age pits and some of the 3rd-4th Century A.D. cess pits. Their recovery from these pits was aided by the good preservation of bones in the lower layers. In contrast, the number of small mammal bones retrieved by hand excavation is likely to be a small proportion of the total numbers of such animals present in the deposits. Counts of small mammals are also complicated by the fact that only the skull and mandibles of certain species can be distinguished from each other. This accounts for the high proportion of unidentified rodent bones (1,840 from phased contexts) in the assemblage.

Voles

The most commonly occurring rodent species represented was the short-tailed vole (358 bones including articulated skeletons). They were also the most frequently occurring species of small mammal recovered at Danebury (Coy 1984: 526). They were also well represented in Iron Age pits at Winnall Down (Maltby 1985b: 98, 102), Old Down Farm (Maltby 1981b) and Balksbury (Maltby AML Report).

Nowadays in Britain, short-tailed vole are found most frequently in rough, ungrazed grassland. They can also be found in open field habitats in regions lacking other Microtus species (Corbet and Southern 1977: 189).

The bones of water voles were recorded much less frequently. The 85 bones included 51 from a skeleton in pit F533 (1st-2nd Century A.D.). Water voles were relatively less common in relation to short-tailed voles than at Winnall Down (Maltby 1985b), but they were similarly relatively poorly represented at Danebury (Coy 1984: 526). The present day distribution of water voles in Britain is restricted to the banks of waterways. However, they can be much more terrestrial in some parts of Europe (Corbet and Southern 1977: 199-200) and there is evidence for the presence of water voles on prehistoric sites that are situated some distance from water, for example at Wigber Low, Derbyshire (Maltby 1983b).

Mice

The most frequently identified species of mouse belonged to the wood mouse (Apodemus sylvaticus) or the yellow-necked mouse (Apodemus flavicollis) between whose skeletons it is difficult to distinguish. Most of the Owslebury specimens are more likely to have belonged to the former species. 245 bones were recorded from the phased deposits including 180 bones from skeletons in F75-1-4, F383 (1st Century A.D. pit), F642-5-13 and F650. The fact that Apodemus bones were recorded less frequently in the deposits than those of short-tailed vole need not necessarily mean that it was less well represented in the local area. Coy (1984: 526) points out that Apodemus would be able to escape from the bottom of pits more easily than voles and they therefore could be under-represented in such features.

Both secies of Apodemus can be found in a wide variety of habitats (Corbet and Southern 1977: 212, 218). They have been identified in most large Iron Age faunal assemblages in Wessex.

Only five of house mouse were identified, all from Romano-British deposits. House mice have now been identified on several Iron Age sites in Southern England, for example, Gussage All Saints (Harcourt 1979: 155), Danebury (Coy 1984: 526), Old Down Farm (Maltby 1981b) and Winnall Down (Maltby 1985b: 102). It is currently thought that the species was introduced into Britain during that period (Corbet and Southern 1977: 229). However, it only appears rarely in later deposits at Owslebury.

Harvest mouse was only represented by two bones in the cess pit F650-4.

Shrews

Three species of shrew were identified. The best represented was the common shrew (71 bones). 34 of these bones came from skeletons in F650 and all but three of the remainder were found in Iron Age pits, where again they are most likely to have been pitfall victims. Two pygmy shrew bones were recovered from Iron Age contexts and a mandible of a water shrew was found in the cess pit F650-3.

Shrews have been identified much less frequently than rodents on contemporary archaeological settlements in England. They have not, as yet, been identified at Danebury. Both common and pygmy shrew were represented in Iron Age pits at Winnall Down (Maltby 1985b: 102) and a pygmy shrew bone was found in an Iron Age context at Balksbury (Maltby AML Report). Common shrew only identified at Old Down Farm (Maltby 1981b), Gussage All Saints (Harcourt 1979: 155) and the Romano-British site of Little Somborne (Maltby 1984b). No other Iron Age or Romano-British site in Wessex has as yet produced evidence for the presence of the water shrew.

The habitat of the water shrew in Britain today is confined mainly to streams and ponds but it does also occur well away from water, often in woodland (Corbet and Southern 1977: 59). Common and pygmy shrew are widespread in all types of habitat (Corbet and Southern 1977: 50, 56).

Rabbits and Moles

There is a strong possibility that the bones of these species in the samples were the remains of intrusive burrowing animals. This is especially the case with the rabbit, which does not appear to have been introduced into Britain until the Norman invasion. Most of the rabbit bones were found in contexts close to the ground surface, which supports this observation. One exception was a rabbit tibia found in F650-3, a layer quite low down in the cess pit. However, although this is less likely to be the bone of a burrowing animal, there remains some doubt about its provenance, since the bone was not marked (unlike the rest of the bones of its context), and it is possible that it was placed in the bag in error at some stage of the finds processing. This bone has been sent for C-14 dating.

AMPHIBIANS

Some contexts produced large numbers of bones of frog and toad. Again they were most abundant in the lower layers of Iron Age pits and the 3rd-4th Century A.D. cess pits. Generally only the bones of the hindlimbs of amphibians were identified to species (frogs have longer hindlimbs than toads). This accounts for the high number of unidentified amphibian bones in the deposits. In the phased contexts, 418 frog and 335 toad bones were identified and a further 643 bones could have belonged to either species.

The majority of the amphibian bones again probably represent animals that fell in the pits (or ditches) and were unable to escape. Most (if not all) of the bones of frog probably belonged to common frog(*Rana temporaria*). These are largely terrestrial animals and are usually found in water during the breeding season or in hibernation (Arnold and Burton 1978: 79). The common toad (*Bufo bufo*) is the only species of toad likely to be represented. This species can also be found in a wide variety of habitats, and is again not restricted to aquatic environments (Arnold and Burton 1978: 72).

BIRDS

1,066 bird bones were identified from the phased deposits. Of these, 717 were incorporated in complete or partial skeletons. The number of bird bones identified for each species is shown in Table Bird.1.

Domestic Fowl

420 bones were recorded of which 279 formed articulated groups. Only 14 of these bones were associated with Iron Age deposits. Only one of these - a tarsometatarsus - was found in a 3rd-2nd Century B.C. context (F574-3-9). 13 were in Late Iron Age contexts, consisting of 10 from the quarry F378, one in the pit F400-8 and two in the gully F83-2-1.

Domestic fowl bones have been found very infrequently in Iron Age contexts in Britain (Maltby 1981a: 162). A few have occurred in some Late Iron Age deposits (e.g. Skeleton Green, Hertfordshire - Ashdown 1979) but they are rare in earlier contexts in Hampshire. Excavations at the hillfort at Winklebury produced skeletons of two domestic fowl (Jones 1977: 64) but the report does not make clear precisely to what date these finds belonged. Conversely, domestic fowl bones were not recorded in the large samples from the deposits dated to the early and middle phases at Danebury. A single bone was recorded from the late (a) phase (400-300 B.C.) and six from the late (b) phase (300-100/50 B.C.) (Coy 1984b). Domestic fowl bones were not identified in Early and Middle Iron Age contexts at Old Down Farm (Maltby 1981b), Winnall Down (Maltby 1985b), Balksbury (Maltby AML Report) and the smaller Iron Age samples from Chilbolton Down (Maltby 1984a) and Cowdery's Down (Maltby 1983). Domestic fowl bones were present, however in the Late Iron Age pits at the Micheldever Wood Banjo Enclosure (Griffiths AML Report 2647).

Given the paucity of occurrences of domestic fowl on contemporary sites, the security of dating of the Iron Age deposits in which such bones were recorded at Owslebury must be examined carefully. It has already been noted that F378 produced an unusual faunal assemblage, which included bones of several species (e.g. fish and cat) not usually associated with Iron Age contexts in Hampshire. The bone in F400 was in the top layer of the pit and could conceivably have postdated the 1st Century B.C. origin of the pit.

In any event, it is clear that domestic fowl was at most only rarely exploited at Owslebury in the Iron Age. The reference by Julius Caesar that the Britons had a taboo on eating the flesh of chickens and geese, although they were kept, (Rivet 1958: 125) is indicative that they were not an important source of food amongst the inhabitants the Romans encountered in the middle of the 1st Century B.C. F378-4 at Owslebury produced a sternum with knife cuts, implying that one bird at least was eaten but the species was not of any importance in the pre-Roman economy.

Domestic fowl was the most commonly represented avian species in the Romano-British deposits at Owslebury. Its numbers did, however, include bones from at least seven partial skeletons and not all of the birds represented were necessarily eaten by humans. Indeed the two partial skeletons recovered from the lower fills of F642 both produced evidence of toothmarks made by cats on some of the bones. These birds may possibly have been killed by them. Other groups of articulated domestic fowl bones were found in F133, F632, F634 and F650 (See Section 2 for details).

However, evidence that domestic fowl were eaten is provided by the discovery of butchery marks on two bones of 1st Century A.D. date. A coracoid from F42-1-5 and a tarsometatarsus from F75-1-4 both had knife cuts on them. A greater proportion of the domestic fowl bones were found in isolation than was the case for other species of bird represented, particularly the corvids. This implies that domestic fowl carcases were more often disarticulated than other bird species.

This is not to say that domestic fowl was a significant addition to the meat diet. Excluding articulated bones, domestic fowl fragments contributed less than 0.5% of the fragments of the major domestic mammals throughout the deposits. The figure fell consistently between 0.3-0.4% from the 1st Century B.C. deposits onwards. Even allowing for under-representation due to poor preservation and retrieval bias, this was a low figure. It is, however, typical of most Romano-British assemblages (Maltby 1981a: 162). Although some Romano-British samples have produced over 1% domestic fowl bones, the chicken was still not a common source of food in that period.

Table Bird.2 lists the fragments of the different skeletal elements represented in the domestic fowl assemblage. Variability in representation can best be explained as a combination of differential preservation and recovery bias. The larger and/or sturdier bones were better represented particularly amongst the disarticulated assemblage.

Most of the domestic fowl bones belonged to skeletally mature individuals, although a few specimens in each phase belonged to young birds. It is possible to sex domestic fowl tarsometatarsi since bones of cocks have spurs on the shaft. The majority of mature tarsometatarsi belonged to hens. Including articulated bones, 13 tarsometatarsi (1 Iron Age, 6 1st Century A.D. and 6 3rd-4th Century A.D.) belonged to hens and only two (one each from a 2nd Century A.D. and a 3rd-4th Century A.D. context) to adult cocks. It is possible that this may represent the ratio of male to female birds kept for breeding but the sample is too small to be reliable. Several tarsometatarsi belonged to immature birds. One of these (from F642-8-10) was a large specimen and it is possible that it belonged to a male bird that had been castrated to encourage growth.

Hens in lay produce a layer of medullary bone on the interior surfaces of the shafts of long bones (Driver 1982) and this is particularly easy to detect in the femur (Coy 1983). Seven femora containing medullary bone were recorded including those from F133-1-1, F632-2, F634-1-48, F642-3-3 and F642-7-11. These bones belonged to laying hens. The hen represented by the skeleton in F642-1-21 was not in lay. The two other femora had no medullary bone. These could have belonged either to hens not in lay or to male birds.

Table Bird.3 summarises the metrical data obtained from domestic fowl bones. Most of the specimens were of 3rd-4th Century A.D. date but the table includes a few measurements taken on bones from earlier deposits. The results from the different measurements show a fairly consistant pattern with a coefficient of variation ranging from 6.6 to 9.7. The birds were generally small and had a similar or rather more restricted size range than those from the Roman levels at Exeter (Maltby 1979: 210). The mean size of the measurements tended to be larger in the Exeter sample. This may be a sex related difference since bones of cocks tend to be larger than those of hens within a particular breed. The Owslebury sample may have contained a greater proportion of female birds than the one from Exeter. This is supported by the fact that the mean tended to be closer to the minimum of the size range, supporting the numerical dominance of smaller bones, probably mainly from hens. The sample from Fishbourne also contained a higher percentage of bones in the smaller size group, suggesting that there too hens outnumbered cocks. It would be interesting to examine, when suitable samples become available, whether different types of Romano-British settlements produce different ratios of male:female birds.

Geese, Ducks and Waders

It seems that other poultry were scarcely exploited at all at Owslebury. F642 was the only feature that produced bones identified to greylag/domestic goose. These were found in two sections of the lowest fill of of this ditch, dated to the 1st Century A.D. A carpometacarpus was found in F642-1-6 and a humerus and a wing phalanx in F642-1-15. It is possible that these belonged to wild rather than to domestic birds. However, since Hampshire is beyond the present range of the wild greylag goose (Heinzel et al. 1972: 46), it is more likely that it was a domesticated bird. It was not until the Saxon period, however, that domestic geese appear to have been kept in any numbers (Maltby 1981a: 161).

Bones of the mallard/domestic duck were found slightly more frequently at Owslebury (9 bones) but mainly in 3rd-4th Century A.D. deposits. The only earlier occurrence consisted of an ulna recovered from a 1st Century A.D. gully (F149-2-3). The cess pit F632-4 produced the skull and mandibles of one bird, and isolated bones were found in five other 3rd-4th Century A.D. layers (a radius in F36-5-4; an ulna in F75-6-2; a tibiotarsus in F150-3-22; a furcula in F642-8-10 and a humerus in F650-16). Where they had been found at all, bones of mallard/domestic duck have generally outnumbered those of greylag goose in Romano-British deposits (e.g. at Exeter - Maltby 1979: 202-203, Colchester - Luff 1982: 149, Fishbourne - Eastham 1971: 389 and Portchester Castle - Eastham 1975: 410). However, the numbers involved are tiny and both species seem only to have been occasionally eaten. At Owslebury they may not have been exploited at all in the Iron Age or early Romano-British periods.

Only seven other bones of duck or goose were recovered from the excavations. Only one of these, a tarsometatarsus of a teal in F133-1-9 was identified to species (Table Bird.1). Teal has been identified on a few Romano-British settlements, for example, at Exeter (Maltby 1979: 203), Colchester (Luff 1982: 149), Fishbourne (Eastham 1971: 389), Portchester Castle (Eastham 1975: 410), in the Romano-British levels at Old Down Farm (Maltby 1981b) and in Winchester (Maltby in prep). Teal breeds sporadically in southern England at the present day but breeding pairs have been observed in southern central Hampshire (Sharrock 1976: 61). It is found more commonly in southern England as a non-breeding visitor (Heinzel et al. 1972: 54).

Two species of wading bird, the woodcock and common snipe were represented at Owslebury. Woodcock bones were found in four contexts (a humerus and ulna in F133-1-15; an ulna in F136-1; a carpometacarpus in F642-5-13 and a humerus in F660-3). All these contexts were either 1st or 2nd Century A.D. in date. Woodcock bones have not as yet been identified on any Iron Age site in Hampshire, apart from the banjo enclosure at Micheldever Wood (Griffiths AML Report 2647). They appear to have been exploited occasionally as a game-bird in the Romano-British period. They have been recorded, for example, at Exeter (Maltby 1979: 202-203), Rope Lake Hole, Dorset (Coy AML Report 4070), Colchester (Luff 1982: 149), Chelmsford (Luff 1982: 226) and Brancaster (Jones et al. 1985: 166). Eastham (1975: 410) records a possible occurrence of the species in the sample from Roman levels at Portchester Castle. Woodcock prefer habitats which include deciduous woodland or heathlands with scattered trees. They feed mainly on marshy or swampy ground, and breed nowadays in most parts of Hampshire (Sharrock 1976: 176). The single occurrence of the common snipe consisted of a femur recovered from F370-3-11. Snipe typically breed in marshes and other wet locations. They still occur commonly in many parts of Hampshire (Sharrock 1976: 174).

Raven

Raven was comparatively well represented in all phases of occupation. A high proportion of their bones formed articulated groups. Five partial skeletons were recorded (in F147-1/2-25, F369-2-4, F370-5-6, F642-1-7 and F646-3). These contributed 119 of the 152 raven bones recorded. It is probable that most (if not all) of the remaining bones of raven belonged to other more disturbed articulated carcases, that were eventually incorporated into the deposits. There was no evidence of butchery on any of the bones, although occasional observations of butchery of raven have been recorded elsewhere, for example at Danebury (Coy 1984: 530) and at the Roman fort at Brancaster, Norfolk (Jones et al. 1985: 169).

Ravens have been found on several Iron Age sites in Wessex. They were the most common avian species represented at Danebury, where it was suggested that a substantial breeding colony may have been located nearby (Coy 1984: 530). Raven bones were not found however, in the Iron Age deposits at Winnall Down (Maltby

1985b) and were represented by only two bones at Old Down Farm (Maltby 1981b). Two pits at Balksbury produced partial skeletons but they were not represented elsewhere in the deposits (Maltby AML Report). In Wiltshire, two bones of raven were recovered from the Iron Age site at Groundwell Farm (Coy 1982).

Similarly, raven bones have been recovered in fluctuating numbers on Romano-British sites in Hampshire. At least eight birds were represented in various pits from Portchester Castle (Eastham 1975: 414) and 19th Century excavations at Silchester apparently produced a large number of raven bones (Jones 1892: 288). Two bones were recovered from Early Roman levels in the 1974-80 excavations of the Silchester defences (Maltby 1984b: 200). Raven bones have been found quite commonly in Roman levels at Winchester (Coy pers. comm.) In contrast, only one bone was recovered from Romano-British levels at Winnall Down (Maltby 1985b: 109) and raven was not recorded in several smaller assemblages of that date in Wessex. In Sussex, only one bone was recorded in the Fishbourne excavations (Eastham 1981: 389).

The distribution of ravens in England has become severly restricted during the 20th Century. Formerly they were much more widespread and have been found on prehistoric and Romano-British sites in many areas. They prefer open, hilly country but can often roost and rest in trees (Heinzel et al. 1972: 308). The birds would have been attracted as scavengers to a farming settlement and would have helped dispose of the carcases of animals in particular. It is perhaps significant that in upland districts nowadays ravens are most numerous where sheep carrion is fairly plentiful, especially in the form of placentae at lambing time (Sharrock 1976: 290). The probability that sheep were sometimes folded at Owslebury and the presence of the remains of newborn lambs and other young animals in the deposits indicates that the raven may have had ample opportunity to scavenge.

Although it is documented that ravens were sometimes tamed and kept as pets by the Romans (Toynbee 1973: 273-275), it is likely that the birds represented at Owslebury belonged to a wild population which scavenged for food in and around the settlement.

Rook/Crow

Unfortunately, rooks and crows are skeletally almost identical and it has been therefore impossible to distinguish between the two species in this report. They were the second best represented species in the assemblage, although they became less common in the 3rd-4th Century A.D. deposits. A large proportion of their bones (13 out of 179) formed articulated groups. Partial skeletons were recovered from F370-3-10, F378-1/2 (Iron Age), F574-4-9, F596-2-2 (1st Century A.D.) and F613-1 (2nd Century A.D. quarry). Both rooks and crows can tolerate a wide range of habitats and would again be attracted as scavengers to the area of the farming settlement. No evidence of butchery was observed on any of the bones.

Rook/crow was present in all phases at Danebury (Coy 1984) but again only in the Romano-British phase at Winnall Down (Maltby 1985b: 109). They were not recorded at Old Down Farm (Maltby 1981b) nor at Balksbury (Maltby AML Report). They were represented in small numbers at the banjo enclosure at Micheldever Wood (Griffiths AML Report 2647) and the Iron Age site at Little Somborne (Locker AML Report 2365).

Occurrences of rook/crow from the sites of the Romano-British period in Wessex have been suprisingly rare. Two partial skeletons were recovered from Little Somborne (Maltby 1984b) but they were not recorded at Portchester Castle (Eastham 1975) nor from several other smaller assemblages.

Other Corvids

Jay was represented by two ulnae in F55-4-49 but nowhere else on the site. No bones of jackdaw were identified and the assemblage was completed by four immature bones of unidentified corvids.

Birds of Prey

The most common bird of prey represented was the buzzard. 109 bones were found in nine contexts . Nearly all of them formed articulated groups. The most spectacular finds came from the cess pit F646 in which 85 bones from at least two birds were recovered. The recovery in F646-3 of two scleral rings in the eye sockets of the skull of one of the birds shows that the buzzard was dumped in the pit intact and there were indeed no indications that any of the buzzards had been butchered. Apart from F646 (layers 3-6), one bone of buzzard was recorded in F55-4-1 and 18 articulated bones in F380-2/3-7 (Both 3rd-2nd Century B.C. in date). Five bones were of 1st Century A.D. date, four were found in F147-2-3 (probably from one bird) and one in F370-4-10.

Buzzards were found commonly throughout mainland Britain until the 19th Century (Moore 1957; Sharrock 1976: 455), although their range contracted greatly after that to be restricted to the western half of Britain. The densest concentrations tend to occur where there is a diverse habitat, for example wooded farmland. They would again have been attracted by carrion and may have been killed as pests.

Of the other Iron Age assemblages in Hampshire, buzzards have been recorded only at Danebury (Coy 1984: 530). However they were also identified at Gussage All Saints, Dorset (Harcourt 1979: 155) and at Groundwell Farm, Wiltshire (Coy 1982).

Of the Romano-British sites to date investigated in Wessex, only Rope Lake Hole, Kimmeridge, Dorset has produced evidence for buzzard (Coy AML Report 4070). Buzzard bones have been found on several Romano-British sites elsewhere in England, for example, at Brancaster, Norfolk (Jones et al. 1985: 166).

A peregrine was represented by a tibiotarsus in the ditch F370-4-11 (1st Century A.D.). Apart from Scotland, these birds have a predominantly coastal distribution in the wild at the present day (Sharrock 1976: 127). They will rest, however, on inland crags as well as sea cliffs. Peregrines mainly feed on medium-sized birds. This single occurrence need not apply that falconry was practised by the inhabitants of Owslebury. It is more likely to have been killed as a scavenger. Coy (1984: 530) records the presence of a peregrine at Danebury.

Three bones of an unidentified species of falcon were recovered un the pit F707. Layer 2 produced a radius and ulna and layer 3 a humerus possibly of the same bird. Both layers were dated to the 1st Century A.D.

Other Species

Bones of other identified species of bird are listed in Table Bird.1. Most of these belonged to small species, unlikely to be exploited for food. The exception may have been that of the pigeons, represented by a single bone each in two 3rd-4th Century A.D. contexts (F133-7-5 and F724-5). Pigeon bones have been found on a few Romano-British sites, for example Waddon Hill (Davies 1971: 730), Exeter (Maltby 1979: 202-203), Portchester Castle (Eastham 1975: 410) and at Winchester (Pfeiffer pers. comm.). Pigeons therefore may have been occasionally exploited. Significantly, however, they were absent in the large Iron Age assemblages from Danebury (Coy 1984) and other smaller assemblages from Wessex. It seems likely that pigeon (either the wild rock dove or the domesticated variety) only began to be exploited in the area in the Romano-British period.

Bones of species of the thrush family were found quite commonly. These were mainly the size of thrush, blackbird or fieldfare but the morphological similarities of their skeletons meant that the bones could not be assigned to a single species. One humerus in F133-2-4 did, however provide a good match for the slightly smaller redwing. This is now a common winter migrant to England. The other species of birds identified are all still commonly found in Hampshire in habitats as diverse as dense and open woodland, meadows, open farming land and moors.

Table Bird.1 excludes the relatively large number of unidentified bird bones recorded in the deposits (see Sections 2-3). Many of these belonged to small species of passerines which it was not possible to identify further.

Birds were never important in the economy at Owslebury. Apart from a few domestic fowl, that were probably kept for their eggs, feathers and meat from the late Iron Age onwards, the large numbers of potential food birds resident in the area were seldom exploited. Admittedly, the small size and fragility of bird bones probably means that they are under-represented in the assemblages but birds provided very little of the diet.

This pattern is similar to the observations made on other Iron Age and rural Romano-British sites in Hampshire, notably at Danebury (Coy 1984: 531), where as at Owslebury, most of the birds represented (apart from domestic fowl) were probably scavengers (raven, rook/crow and buzzard) which may have been killed as pests but not eaten.

The lack of exploitation of wild birds for food is also consistent with the low numbers of deer, hare and other potential food species amongst the mammals represented at Owslebury.

FISH

A few fish bones were recovered from the excavations. From the 1st Century B.C. deposits, F400 produced one bone of a fish in each of layers 4, 6 and 7 and F132-1-1 produced two fin rays. None of these bones were identifiable to species. The quarry F378-1, however, did produce three caudal vertebrae of a flounder from a fish about 300g in weight.

Another bone of a flounder - a cleithrum was found in F642-3-17 and thus datable to the 1st Century A.D. It belonged to a fish of similar size to the one from F378. A vomer of a common eel was found in F133-4-18 and a bone of an unidentified fish was recovered from F642-5-18.

Two fish bones were identified from the 3rd-4th Century A.D. cess pits. F646-3 contained a skull fragment of a common eel together with a bone of an unidentified species and F650-3 produced a vertebra of a herring from a fish that was c.25 cm long.

Flounders have been identified from Romano-British Winchester (Coy AML Report 2329) and they may have been fished in the river Itchen. They are commonly caught nowadays at the mouth of the Itchen (Bourdillon and Coy 1980: 110). The eels also could have been caught locally in the river Itchen. The herring is the only marine species represented. This fish could have been caught in the Solent but it is also possible that the fish could have been caught further away and salted or preserved before being brought to Owslebury. No evidence of herring has been recorded from Romano-British sites elsewhere in Wessex.

Although both preservation conditions and retrieval methods would have hindered the recovery of small, fragile fish bones, the apparent lack of interest in the exploitation of fish is typical of Iron Age and rural Romano-British sites in Southern England. Only six fragments of fish were recovered at Danebury, and only one of these was identifiable (a vertebra of <u>Salmo</u> sp. - trout or salmon - Grant 1984a: 531). One identifiable fish bone was found in a Middle Iron Age hut gully at Winnall Down and a conger eel was represented in the early Romano-British deposits from the same site (Maltby 1985b: 102, 108-109). Similarly, just one unidentifiable fragment of fish was recovered from a Middle Iron Age pit at Balksbury (Maltby AML Report). In Dorset, two dace bones were represented in the early phase at Gussage All Saints (Harcourt 1979: 155)

Fish bones are scarce even from sites near the coast in Wessex. In Dorset, The Iron Age and Romano-British site at Rope Lake Hole produced just two fish bones, one of which belonged to a ballan wrasse (Coy AML Report 4070). No fish bones were recovered from Romano-British levels at Portchester Castle. At Cleavel Point, Ower, which is virtually on the coast, fish bones were still comparatively rare from the Romano-British deposits, although common eel and gilthead sea bream were identified (Coy AML Report 3592).

It is possible that some urban deposits may produce evidence for exploitation of fish in the Romano-British period. At Exeter, although fish bones were relatively rare, ten species of fish were represented (Wilkinson 1979: 79). Fish have also been recorded in samples from the excavations of the Forum and Basilica at Silchester (Grant 1985: 30) and in two Early Romano-British pits at Dorchester (Maltby in prep) although further analysis of deposits in Winchester should help clarify the situation. They were not recovered from the relatively small samples from Iron Age and Romano-British layers from the Western Suburb sites (Coy and Bradfield AML Report) despite a systematic sieving and sampling programme, but have been found on other sites in the Roman town (Coy AML Report 2329).

TABLE DEER.1

Fragments of Red and Roe Deer Recovered from Owslebury

a) Red Deer

Date	Antler	Bone	Total	%
3-2BC	3	11	14	.3
1BC	-	2	2	.06
1AD	3	5	8	.05
1-2AD	1	4	5	.08
3-4AD	5	14	19	.1
TOTAL	12	36	48	

b) Roe Deer

Date	Antler	Bone	Total	%
3-2BC	2	9	11	.2
1BC	-	-	-	-
1AD	-	-	-	-
1-2AD	-	5	5	.08
3-4AD	2	8	10	.08
TOTAL	4	22	26	

% = percentage of bone fragments of major identified species.

TABLE DEER.2

Metrical Analysis of Deer Bones

a) Red Deer

Bone	Meas.	Date	Size(mm)
Humerus	Bd	3BC	58.9
	BT	3BC	51.0
Radius	Bp	1AD	58.9
Metacarpus	Bp	3-4AD	37.0
Tibia	Bd	1BC	50.1
Astragalus	GLl	3BC	55.3
	GLl	3-4AD	50.7

b) Roe Deer

Bone	Meas.	Date	Size(mm)
Scapula	GLP	1-2AD	28.3
Radius	GL	3BC	166.8
	Bp	3BC	26.3
	Bd	3BC	25.0
Metacarpus	Bp	3BC	21.4
Tibia	Bd	3-4AD	24.5
Calcaneus	GL	3-4AD	58.9
Astragalus	GLl	3-4AD	29.0

Bd = maximum distal breadth.
BT = breadth trochlea.
Bp = maximum proximal breadth.
GLl = maximum length lateral.
GLP = greatest length glenoid.
GL = greatest length.

All measurements after von den Driesch (1976).

TABLE HARE.1

Elements Represented in Hare Assemblages at Owslebury

	Iron Age	1st A.D.	1-2 A.D.	Cess pits 3-4 A.D.	Other 3-4 A.D.	Total
Skull frags.	-	-	-	2	1	3
Mandible	-	2	-	3	2	7
Loose teeth	-	-	-	1	1	2
Scapula	-	-	-	3	-	3
Humerus	-	1	-	2	2	5
Radius	-	-	-	4	1	5
Ulna	-	1	-	4	-	5
Os Coxae	1	1	1	8	1	12
Femur	-	1	-	5	-	6
Tibia	3	2	2	9	2	18
Calcaneus	-	1	-	1	-	2
Astragalus	-	-	-	1	-	1
Metacarpal	-	2	-	-	-	2
Metatarsal	-	-	-	1	1	2
Metapodial	-	1	-	1	-	2
Ribs	-	-	-	14	-	14
Cervical verts.	-	1	-	-	-	1
Lumbar verts.	-	1	-	-	-	1
TOTAL	4	14	3	59	11	91

TABLE BIRD.1

Bird Species represented at Owslebury (Fragments)

Species	3-2BC	1BC	1AD	1-2AD	Cess 3-4AD	Other 3-4AD	Total
Domestic Fowl	1	13	83	25	193	105	420
			(44)		(183)	(52)	(279)
Greylag/Dom. Goose	-	-	3	-	-	-	3
Mallard/Dom. Duck	-	-	1	-	4	4	9
Teal	-	-	1	-	-	-	1
Goose sp.	-	-	-	1	-	1	2
Duck sp.	-	-	-	-	-	3	3
Goose/Duck sp.	-	-	-	1	-	-	1
Woodcock	-	-	3	2	-	-	5
Snipe	-	-	1	-	-	-	1
Buzzard	19	-	5	-	85	-	109
	(18)	-	-	-	(85)	-	(103)
Peregrine	-	-	1	-	-	-	1
Falcon sp.	-	-	3	-	-	-	3
Raven	2	6	121	5	14	4	152
			(105)		(14)		(119)
Rook/Crow	14	29	59	68	-	9	179
	(9)	(22)	(27)	(55)			(113)
Jay	2	-	-	-	-	-	2
Unid. Corvid	1	-	2	-	-	1	4
Redwing	-	-	1	-	-	-	1
Thrush sp.	47	-	9	7	3	7	73
	(47)						(47)
Starling	-	2	2	-	2	1	7
Pigeon sp.	-	-	-	-	1	1	2
Meadow Pipit	-	-	-	-	1	-	1
Dunnock	-	-	-	-	1	-	1
House Sparrow	16	-	1	2	14	30	63
	(16)					(26)	(42)
Skylark	1	-	-	-	1	-	2
Lark sp.	(14)	-	-	-	-	-	(14)
Robin	-	-	-	-	3	-	3
Warbler sp.	1	-	-	-	-	-	1
Finch/Bunting	-	-	2	-	1	-	3
TOTAL	118	50	298	111	323	166	1066
	(104)	(22)	(176)	(55)	(282)	(78)	(717)

( ) = number of articulated bones.

TABLE BIRD.2

Fragments of Domestic Fowl Represented at Owslebury

Domestic Fowl	3-1BC	Art. 1AD	Oth. 1AD	1-2AD	Cess 3-4AD	Art. 3-4AD	Other 3-4AD	Total
Skull frags.	-	-	-	-	3	1	1	5
Mandible	-	-	1	-	4	-	-	5
Coracoid	1	2	4	1	7	2	10	27
Furcula	-	1	1	2	3	1	3	11
Scapula	1	2	2	1	6	2	2	16
Humerus	-	4	3	-	8	2	6	23
Radius	2	3	2	4	6	2	1	20
Ulna	-	3	3	3	6	2	3	20
Os Coxae	1	2	2	1	3	1	-	10
Femur	-	5	4	2	7	2	5	25
Tibiotarsus	2	5	7	6	7	2	4	33
Fibula	1	-	-	-	5	-	2	8
Carpals	-	-	-	-	2	1	-	3
Carpometacarpus	2	4	5	2	5	2	6	26
Tarsometatarsus	1	3	6	2	10	2	8	32
Wing Phalanx	-	2	-	-	9	1	-	12
Foot Phalanx	-	7	-	-	24	12	-	43
Ribs	-	-	-	-	36	7	-	43
Sternum	3	1	1	1	3	1	2	12
Vertebrae	-	-	-	-	37	9	-	46
Pygostyle	-	-	-	-	3	-	-	3
TOTAL	14	44	39	25	193	52	53	420

TABLE BIRD.3

Metrical Analysis of Domestic Fowl Bones

Bone	Meas.	N	Range	Mean	S.D.	C.V.
Coracoid	GL	10	45.4-58.0	50.1	3.7	7.4
Scapula	Dic	12	10.7-14.2	11.9	1.1	8.8
Humerus	GL	7	61.8-73.6	66.8	4.7	7.1
	Bp	10	16.5-20.7	18.3	1.7	9.3
	Bd	11	12.9-16.5	14.7	1.3	8.7
Ulna	GL	6	58.1-74.6	65.0	5.4	8.3
	Bp	10	7.8-10.0	8.4	0.6	7.4
Carpometacarpus	GL	9	32.8-40.4	35.6	2.8	7.7
	Bp	10	9.7-12.7	10.6	0.9	8.1
Femur	GL	5	67.6-83.3	72.6	6.3	8.5
	Bp	10	12.2-16.0	14.2	1.3	9.1
	Bd	11	12.3-15.9	13.6	0.9	6.6
Tibiotarsus	GL	7	98.4-118.0	102.8	6.8	6.6
	Dip	8	16.2-21.6	18.4	1.8	9.6
	Bd	9	9.3-12.5	10.4	1.0	9.1
Tarsometatarsus	GL	6	59.7-80.2	68.6	6.6	9.7
	Bd	9	10.0-13.8	11.4	1.1	9.5

S.D. = Standard Deviation
C.V. = Coefficient of Variation
GL = Greatest length
Dic = Greatest cranial diagonal
Bp = Greatest breadth proximal
Bd = Greatest breadth distal
Dip = Greatest diagonal proximal

SECTION 10

DISCUSSION AND CONCLUSIONS

The analysis of the animal bones from Owslebury was designed to follow two major lines of inquiry. The first aim was to investigate the variability of the faunal assemblages both chronologically and spatially, in order to gain a better understanding of how the bones were affected by different processes. The second aim was to trace the developments in animal exploitation at Owslebury from the 3rd Century B.C. to the 4th Century A.D. These topics will now be considered in turn.

CONCLUSIONS FROM THE ANALYSIS OF INTRA-SITE VARIABILITY

The methods of analysis (see Section 2) were derived mainly to investigate the specific conditions encountered at Owslebury. Most of the results of this study were discussed in detail in Section 4. However, many of the results have wider implications and it is these which will be considered here.

Vertical Variability in Faunal Assemblages

The detailed examination of the variability in the animal bone assemblages at Owslebury showed that the depth of burial was a significant factor in the survival of the bones. Layers closest to the modern ground surface produced assemblages dominated by severely eroded fragments and loose teeth. More fragile elements such as parts of the skull and many of the upper limb bones, vertebrae and ribs were less well represented in such layers. As a result there were significant differences between samples obtained from layers situated at different depths within the same features. Consequently, layers close to the ground surface produced relatively fewer gnawing and butchery observations, a higher proportion of unidentifiable fragments, changes in the relative number of fragments of the major species represented, fewer measurable bones and fewer bones of immature animals of all species. The causes of such poor preservation in the layers nearest to the ground surface probably lie in a combination of factors, including root disturbance, weathering, trampling and leaching.

Obviously such differential preservation had a significant bearing on attempts to interpret developments and changes in all aspects of animal exploitation at Owslebury. The situation was made worse by the fact that most of the layers nearest the ground surface were dated to the 3rd-4th Century A.D. and this made comparisons of samples of this date with the generally better preserved samples of earlier date more difficult. However, with care, such comparisons can still be made, although many of the conclusions are unfortunately less clear cut.

The effects of vertical variability upon faunal samples have been discussed in relation to other Iron Age samples. Maltby (AML Report) showed how the upper layers of pits at

Balksbury produced much more poorly preserved assemblages than the lower layers, producing significant variations in species representation. Wilson (1985) did a similar study of vertical variability at Mingie's Ditch, Oxfordshire. He concluded that although bone degradation differentially destroyed skeletal elements, the overall effect on comparative species representation was relatively small since greater fragmentation of the more robust elements tended to replace the loss of the fragile elements in fragment counts. At Owslebury it has been demonstrated that sheep and pig bones generally suffered more severely from the effects of erosion and gnawing than those of cattle and horse. However, it has also been shown that this does not necessarily mean that the teeth and bones of the former will be less well represented in poorly preserved deposits. Conversely, the percentage of sheep/goat fragments tended to increase in relation to cattle in layers where preservation of bones was particularly poor, simply because the greater destruction of sheep/goat jaws released so many more loose teeth into the archaeological record, while at the same time increased fragmentation reduced the number of large mammal bones that could be positively identified as cattle or horse (Figure Section4.6).

Although differential preservation accounted for the majority of observed vertical variabilty, other factors did play a part. The results from Owslebury supported the observations made at Balksbury that articulated bones of animals tended to be located towards the bottom of pits rather than in the upper layers. In general, the evidence for the primary dumping of bones in the deposits was restricted mainly to lower layers of pits or ditches. It was from the lower layers of pits that most of the small mammal and amphibian bones were collected. This may partially reflect better preservation conditions but many of these animals probably fell in and were unable to escape.

Such results are to be expected from archaeological deposits. Because of slumping the upper layers of many features will contain material that accumulated in a depression rather than was thrown away deliberately into a convenient hole. Consequently, not only will upper layers tend to produce more poorly preserved assemblages, they will also be less likely to contain large amounts of primary waste.

Horizontal Variability in Faunal Assemblages

Studies of horizontal variability are more complex in settlements whose features contain relatively few primary dumps of rubbish. Whereas the majority of vertical variability can be accounted for by differential preservation, many more factors can result in horizontal variability.

In the first place, it is more likely that retrieval bias will be encountered. Deposits excavated by different workers, by different techniques and in a variety of weather conditions may produce differential recovery standards. At Owslebury it has been suggested that material recovered from the early seasons of excavation were less reliable than those obtained from the later seasons. In one instance such biases led to variations between the samples recovered from different sections of the same ditch (F75).

Once again, it is inevitable that differential preservation will result in horizontal variability. Features of different depths will often produce samples of a different nature. However, these variations can be monitored, if sample sizes permit, using the same techniques of analysis employed in the analysis of vertical variability. Although such problems hinder the interpretations of other more interesting causes of intra-site variability discussed below, they are not insuperable. Provided that the degree of attrition of animal bones can be quantified, it is still possible to draw conclusions about disposal strategies.

For example, Wilson (1985) was able to demonstrate convincingly that sheep bones were more abundant in the central area of the settlement at Mingie's Ditch (despite poorer preservation due to shallow burial) than in the peripheral areas, where cattle and horse were more important. At Owslebury, it was found that pits in general produced higher percentages of sheep and pig fragments. In the 3rd-2nd Century deposits, where it was possible to compare the contents of the pits with the assemblages in the enclosure ditch, it was concluded that the observed variations could not be accounted for by factors of differential preservation alone. Analysis showed not only that the bones of the larger mammals (cattle and horse) tended to be better represented in the enclosure ditch, but also that animals of different ages were represented in varying numbers in the two types of deposit.

Although other Iron Age samples have not been analysed as closely for possible variations due to differential preservation, the contrast between samples from central and peripheral parts of a settlement (where they can be defined) has tended to show similar patterns, with the bones of larger mammals found more frequently in the peripheral areas (usually in ditches). Examples of this have been documented at Winnall Down (Maltby 1985b: 97-101) and the Micheldever Wood banjo enclosure (Coy AML Report 3288). At both sites cattle (and horse) bones were better represented in the ditch deposits than in the pits. The same dichotomy has also been recorded on some Iron Age sites outside Hampshire, for example at Farningham Hill, Kent (Locker 1984) and at Ashville (Wilson 1978: 112). Explanations for this variability could lie in the fact that the carcases of large mammals tended to be processed more frequently in peripheral areas. Consequently more of their butchered waste was dumped in those areas. Pits tend to be more centrally located and these might contain a higher proportion of cooking waste. It is conceivable that since more lamb and pork may have been cooked on the bone, more of the bones of sheep and pigs would become incorporated into the pits. In addition animals of smaller carcase size may more often have been butchered in these central locations. Such distinctions in the location of butchery, table and kitchen waste were postulated originally by Halstead et al. (1978).

Although these contrasts are important and are informative about the activity areas of a settlement and the behaviour of its occupants, they obviously cause problems when attempts are made to determine the relative importance of the different species and the mortality patterns of the domestic stock. At Owslebury, it is fortunate that so much of the settlement was excavated and the extent of the variability could be examined. The problems become more acute when only a small, restricted portion of a settlement can be investigated. Certainly the experience from Owslebury, Mingie's Ditch and Winnall Down would lead to the recommendation that features in peripheral areas should be examined quite extensively, since the faunal data may produce an assemblage quite different from those obtained from contexts closer to the centre of the settlement.

The faunal assemblage from Owslebury was also notable for the number of articulated or associated bones of skeletons which were recovered from various parts of the settlement in all periods. These groups ranged from litters of newborn puppies, complete skeletons and various groups of associated bones from different parts of the body. Grant (1984a: 533-43) paid detailed consideration to animal burials and other associated groups of bones. She regarded these as special deposits and certainly in some instances the careful placement of these burials at the bottom of pits, or their association with chalk blocks or groups of slingstones would lead to the conclusion that some sort of ritual was involved. Other examples of such behaviour have been encountered on various Iron Age sites (Grant 1984c), including Winnall Down (Maltby 1985b: 25). However, there is the problem of defining what might be regarded as a "special" deposit. The fact that so little of the bone originally deposited was buried means that any feature that contained any significant amount of animal bones could be regarded as unusual. Secondly it is difficult to believe that the occurrence of every group of articulated bones at Owslebury signifies some special event. Complete and partial dog skeletons were present in large numbers mainly because they were rarely considered to be providers of meat. Indeed it may be more informative to regard the butchered dog bones as indicative of some unusual activity. Similarly, it appears that horse carcases generally were not as intensively or as frequently butchered as those of cattle. Consequently it is of no surprise that articulated groups of horse bones occur quite commonly. Neonatal or juvenile mortalities would not have provided much meat and, if food was plentiful, they may not have been butchered for meat. Animals that died of disease may not have been eaten. Other groups of articulated bones, particularly strings of vertebrae or bones of the limb extremities can be regarded as primary butchery waste. Consequently, although the slaughter of animals may often have been associated with ritual or ceremonial events at Owslebury, it is not thought that the large proportion of articulated bones were of any particular significance that cannot be explained by events normally associated with pastoral farming.

ANIMAL EXPLOITATION AT OWSLEBURY

This section will examine the evidence for the exploitation of the major species represented at Owslebury. Although interpretations were often made difficult by both intra- and inter-site variability, it has been possible to demonstrate the major developments and changes that took place in the exploitation of animals at Owslebury during the 700 years of its occupation.

Cattle

Cattle were the principal providers of meat for the inhabitants of Owslebury throughout the period of occupation. Although it seems likely that three times as many sheep were eaten (Section 4), the fact that cattle probably provided over eight times as much meat from each adult carcase would mean that at least twice as much beef was consumed than lamb or mutton. This may be an underestimate since a greater proportion of the sheep represented were immature animals that were culled before they had reached full body weight.

Cattle, therefore, were extremely valuable animals. In addition to their meat and hides, they could also have provided milk and traction power. Their value would mean that their efficient management would always have been an important consideration for their owners. It may also have made them cautious about culling or trading too many of their cattle for fear of depleting their herd's breeding potential and to guard against unforseen disasters such as disease or raiding. If there was individual ownership of cattle, the numbers kept may also have been a visible reminder to other members of the community of wealth and status. This also would have encouraged the keeping of as many cattle in the herd as possible.

Alternatively it can be argued that the importance of cattle was so great that their management would have been controlled on a regional scale. Grant (1984b: 110) has suggested that strips of land on the Wessex chalklands may have been exploited as a unit. Each strip would encompass a narrow section of land running from the down pastures to the valley bottoms. Within each block of land there would be a group of inter-related settlements, perhaps controlled from a hilltop site which would have managed the whole landuse system.

In support of such a theory, Grant (1984b: 108) has contrasted the mortality profiles presented by cattle mandibles in the samples from the hill forts at Danebury and Balksbury with those from the lowland settlements in the Thames Valley at Ashville, Barton Court Farm and Odell. She argued that the high proportion of neonatal and older calves at Danebury in particular suggested that calving was taking place within or near the hill fort. In contrast, the almost complete lack of neonatal mortalities from the Thames Valley sites would suggest that calving was infrequent at those settlements. She also contrasted the low proportions of older but still immature cattle from the chalkland sites in Wessex with the lowland sites in the Thames Valley, where - at Odell and Barton Court Farm at least - a large proportion of the mandibles belonged to immature animals with only the first two molars in wear (Stage 4 of the tooth eruption sequence employed at Owslebury).

Grant suggested that such variations in cattle mortalities may result from a management system in which cattle calved in the protected environments of enclosed upland settlements like Danebury but were then grazed on the lusher pastures of the valleys until they were at an age when they could be used as draught or breeding animals. The hypothesis would expect lowland settlements to have a higher proportion of immature animals representing cattle that died or were culled as surplus to breeding and working requirements. Unfortunately there have been no adequate comparable samples from settlements in river valleys in Hampshire but she argued that the sites in the Upper Thames Valley with their high proportions of immature cattle may represent the lowland picture.

Such a theory has attractions and would find a parallel in the interpretation of the plant remain evidence in the two areas. Jones (1985) has argued that there would have been links in the management of crop production, processing and distribution between hill forts, arable and pastoral farmsteads. However, although there are undoubtedly significant variations in the cattle mortality data, other interpretations could fit the data as they currently stand.

For example, there may have been regional variations in the management and exploitation of cattle between the Thames Valley and Hampshire. In addition, the Iron Age samples from Barton Court Farm and Odell were of later date that those from Danebury and Balksbury and the changes could partially be explained by chronological factors which saw a greater emphasis upon the culling of immature cattle for meat in the Late Iron Age.

The hypothesis also does not satisfactorily explain the significant differences in the cattle mortality data between Danebury and other chalkland sites. At Balksbury, Winnall Down and Old Down Farm there were much higher proportions of mandibles of adult cattle than at Danebury which is to date unique in having such a high proportion of young calves. This may indeed imply that Danebury was special and was associated more intensively with the rearing of cattle that the other settlements. This would also suggest that Balksbury did not serve the same role as the other hill fort. Unfortunately, as Grant (1985b: 109) has pointed out, there are as yet no substantial contemporary faunal samples from lowland settlements in the area around Danebury for comparison.

It is with this background that the analysis of the ageing data of cattle from the Iron Age deposits at Owslebury should be considered. The results showed that fewer young calves were represented there than at Winnall Down, Balksbury and Danebury and a correspondingly higher proportion of mandibles were at Stage 4 of the tooth eruption sequence (Section 5 - Table CowJaw.1). The proportion of such animals was, however, not as great as that encountered at Barton Court Farm or at Odell, since the largest group of mandibles still belonged to adult animals. The situation is complicated by the fact that there was considerable contextual variability in the location of mandibles between Owslebury and other settlements in Hampshire. At Owslebury, most of the ageable mandibles were obtained from ditches and quarries, whereas most of the samples from the other sites in Wessex have been obtained from pits.

Interpretation of the Iron Age cattle mortality data at Owslebury depends on whether its inhabitants were in control of the management of the cattle herds and whether the cattle represented in the samples were a typical cross-section of the animals kept and slaughtered. If they were, the mortality data may reflect a culling policy which saw those animals not required for breeding or work being slaughtered for meat at 2-4 years of age. The majority of the cattle were then allowed to reach maturity. This would assume that cattle management at Owslebury was largely independant of other settlements and that most of the cattle represented had been bred and kept by its inhabitants. It may be significant that the original layout of the enclosure was sited with the entrance facing the lower pastures, implying that cattle grazing was an important consideration in the siting of the settlement (Collis 1970: 254-6).

If such an interpretation is correct, it would imply that cattle exploitation varied between settlements within the same region. At Winnall Down, for example, situated less than 10 miles distant from Owslebury, the Middle Iron Age assemblage contained fewer immature cattle culled for meat (Maltby 1985b: 106). It is perhaps significant that the settlement at Owslebury was not established until the Middle Iron Age, whereas the comparable samples from Hampshire are all from sites that had existed in the Early Iron Age. It is possible that the established system of cattle exploitation on those sites remained largely unchanged during the Middle Iron Age, whereas the people who established the banjo enclosure at Owslebury developed a different husbandry strategy better adapted to its local environment.

Alternatively, if we follow Grant's model of an integrated cattle management system in this area, we could suggest that cattle exploitation at Owslebury was closely linked to the economy of a neighbouring hill fort - presumably St Catherine's Hill, near Winchester. The higher proportion of immature cattle represented at Owslebury could be used in support of the theory that immature cattle were grazed on lower and lusher pastures than those available in the immediate vicinity of the hill fort. The animals not required for breeding or working purposes were culled at the settlement. However this theory can only be tested by the excavation and analysis of a substantial sample of animal bones from the hill fort itself.

The early Romano-British period saw important developments in cattle husbandry at Owslebury. The ageing data indicated that although about 10% of the cattle mandibles continued to belong to young calves, fewer immature cattle were culled for meat. The sexing data suggested that the metacarpi of "male" cattle outnumbered those of "cows". This suprising result may lead to suspicions that the criteria used to sex these bones are unreliable. What is more remarkable, however, is that the pattern observed at Owslebury is significantly different from the picture that has emerged from several Romano-British urban and military establishments, where the metapodia of "cows" are dominant. Obviously much depends upon the examination of contemporary material from Winchester. If the metapodia from those urban deposits produce a high proportion of "female" specimens, it would provide solid support for the suggestion that cattle of a particular sex or type were often selected or sent to the urban market. It is also likely that immature cattle, particularly young calves, will be less well represented in Winchester than at Owslebury, since other urban assemblages have to date tended to be dominated by the bones of adult cattle (Maltby 1981a: 179-82).

The early Romano-British period also saw an increase in the range of size of cattle at Owslebury, particularly with the appearance of some larger animals. This corresponds to similar observations at Winnall Down (Maltby 1985b: 110). It was not until the late Romano-British period, however, that the cattle were in general larger than the Iron Age stock. Once again comparisons with contemporary samples from Winchester will prove valuable, in order to establish whether the town attracted a higher proportion of the larger animals.

The cattle mortality data for the 3rd-4th Century A.D. deposits at Owslebury was affected by the poorer preservation conditions which appear to have destroyed a greater proportion of the mandibles of young cattle. The layers which preserved animal bones the best still contained evidence for immature cattle but their bones were rarely encountered in the heavily eroded samples which were more typical of these deposits. Sexing data indicated that the imbalance towards "male" specimens had disappeared and the metapodia of "cows" were now found in roughly equal numbers.

In addition to providing the most meat throughout Owslebury's history, cattle would also have been important for the traction power they provided for its inhabitants. There does not appear to have been a high kill-off of immature animals for meat, even in the Iron Age. Both steers and cows could have been used as plough animals and as beasts of burden. Whether cows were often exploited for their milk is less clear. If the proportion of young calves represented in the samples in any way accurately reflect the kill-off pattern, it would appear that dairying was not a high priority in cattle husbandry, since we would expect a much higher kill-off of veal calves in a system that concentrated on milk production.

It is already apparent that the techniques of butchery and carcase processing employed at Owslebury during the Romano-British period were different in many respects to those introduced to Winchester and other urban and military centres by the Romans. In those places new methods of butchery relying heavily on the chopping and sawing of bones were prevalent. These were introduced to cope with the large scale of carcase processing that was necessitated by the demands of the large populations at these centres. At Owslebury, where the slaughter of cattle was comparatively a rare event, these new methods of butchery were rarely encountered and the techniques of carcase processing appear to have remained largely unchanged from the Iron Age.

Sheep

Sheep were the animal most commonly eaten at Owslebury and they appear to have been the species kept in the greatest numbers by the inhabitants of the settlement. Previous analyses of Early and Middle Iron Age chalkland faunal assemblages in Hampshire have consistently shown that a high proportion of neonatal animals and lambs under a year old were represented in the samples. Relatively few mandibles belonging to sheep killed at the optimum age for culling for meat were recovered from such sites. Most of the remaining bones and jaws belonged to adult animals. These samples were derived mainly from pit deposits from settlements such as Danebury, Winnall Down, Balksbury and Old Down Farm (Table SheJaw.6). Similar mortality profiles have been observed from the Thames Valley sites at Ashville and Barton

Court Farm (Hamilton 1978: 129), although fewer neonatal mortalities were recovered.

Interpretation of these mortality profiles have varied. Grant (1984a: 507-8) suggested that the high numbers of neonatal animals represented at Danebury showed that lambing took place in the protection of the hill fort enclosure. She suggested that the rate of juvenile mortality was so great that the majority of the ewes that survived would be required to be kept for breeding purposes. She added that in addition to natural mortalities, some male lambs may have been slaughtered to allow exploitation of ewe's milk to be made. Other males may have been castrated and kept to old age as providers of wool.

Others have suggested that wool production was of greater importance in this period. Cribb (1985: 91) using simulation studies, concluded that the mortality profiles obtained from the mandibles from Winnall Down and Balksbury were compatible with those one could expect to find in flocks exploitated principally for their fleeces. However, Cribb admits that this assumes that Iron Age sheep were efficient wool producers and O'Connor (1982) has argued that the small Soay-type of Iron Age sheep represented on all British Iron Age settlements would not have produced a good or heavy fleece. In addition, Grant (1984b: 107) and Wilson (1978: 134) have suggested that the majority of adult sheep in the samples at Danebury and Ashville belonged to ewes, which produce lighter fleeces than wethers. O'Connor has argued that the high proportion of juvenile mortalities together with the dominance of female animals amongst the older sheep may be indicative of exploitation for milk. Maltby (1981a: 172-4) has argued that if such samples are typical, it could represent a management system which was easy to maintain with little need for the provision of winter fodder with most animals surplus to breeding requirements culled in their first year. Such a system would have provided the farmers with all the sheep's commodities but with no particular concentration on any single one. It could be added that by culling the proportion of the flock not required for breeding or wool production during the autumn of their first year, it would lessen the pressure on providing the flocks with sufficient pasture during the winter months.

Although there are some differences in these interpretations of sheep husbandry, all the authors cited above agreed that meat production was not a priority in the exploitation of these flocks. The low representation of sheep of an age and size suitable for efficient meat production was a consistent feature of these assemblages. The chalk downlands of Wessex are of course ideal for sheep grazing, since they require less water than cattle. Consequently the high proportion of sheep on these sites is to be expected.

The results of the ageing analysis of mandibles from Owslebury have therefore complicated a picture that had appeared to be clear. In the first place, the mortality profiles of the 3rd-2nd Century B.C. showed marked variability between different contexts. Whereas the pits produced a high proportion of lambs, the ditch sections contained a much higher proportion of older animals including a marked peak of mortalities of immature sheep culled at an age ideal for meat production. Consequently, the proportion of immature sheep was higher at Owslebury than at any of the Early or Middle Iron Age samples hitherto examined from Hampshire. Several possible explanations for such variability have been discussed in detail in Section 5. They cannot fully be resolved until further samples are compared.

If the sample from Owslebury contains a cross-section of the sheep exploited by its inhabitants, it can be argued that meat production was considered to be a more important aspect of sheep husbandry there than on the other sites in Hampshire. The system would, however, have been more expensive to maintain because more pasture or fodder would have been required to keep more of the flocks alive through the first winter. Once again, such an interpretation assumes that most of the sheep represented belonged to the inhabitants of Owslebury. It does not preclude the possibility that a more expansive regional system of sheep husbandry was in operation.

The 1st Century B.C. deposits witnessed a further increase in the proportion of mandibles of immature sheep slaughtered for their meat (Stage 4 of the tooth eruption sequence), although once again the results are complicated by contextual variation. There are some indications from southern England that the late Iron Age witnessed a change in sheep husbandry with a greater emphasis on meat production.

Meat production became even more important in the Romano-British period (Maltby 1981a: 175). The change is well documented at Owslebury, although it should be emphasised that few of the mandibles from the early Romano-British deposits were obtained from pits, which produced a much high proportion of young lambs throughout the Iron Age deposits. Consequently the results may be biased towards older sheep. Once again comparisons with the urban deposits at Winchester may reveal that sheep of certain ages were preferentially selected for the urban market.

The 3rd-4th Century samples (apart from the articulated bones from the cess pits) were poorly preserved and the increase in the proportion of adult sheep may simply be a reflection of the fact that a greater number of mandibles of immature sheep did not survive. There is the possibility, however, that wool production may have become more important in sheep exploitation in the late Romano-British period. During the same period, sheep with polled skulls appeared at Owslebury for the first time. These belonged to larger animals that the small Soay-type of sheep that was present in the earlier periods. The introduction of new stock may reflect a growing interest in the production of wool.

There is, however, some evidence to suggest that the introduction of new stock (or the improvement of the existing flocks through better management and nuitrition) did not occur as quickly at Owslebury as on some other Romano-British sites. Recent excavations in Winchester have shown that larger sheep were represented in the early Romano-British deposits there than were ever found at Owslebury. Obviously such variations require further analysis.

Pig

The various analyses made to investigate relative species abundance showed that pork was probably most commonly consumed at Owslebury during the 1st Century A.D. Pigs were also reasonably well represented in the Iron Age samples compared to several contemporary sites in Hampshire. This may reflect the local environment around the settlement, which may have included more woodland suitable for pannage for pigs than some of the more exposed hilltop sites. However the proportion of pigs fell weel short of the levels observed on some other Iron Age and Romano-British sites in Wessex (Tables Section4.18; Section4.22). It has been claimed that pigs were more important on "Romanized" settlements in England than "native" ones (King 1978; 1982). This may be reflected in the Winchester area where Romano-British levels at the rural sites of Winnall Down and Owslebury produced fewer pig bones than the urban deposits at Staple Gardens in Winchester (Maltby in prep.).

Pig bones became less common in relation to all the other major species in the 3rd-4th Century A.D. deposits at Owslebury. This may be partially due to the fact that the poorer preservation conditions destroyed a greater proportion of the pig bones in those layers. However, the decrease is of an order which may well reflect a genuine reduction in the importance of pigs in the diet at that time. This may be related to changes in dietary preferences, or perhaps to the fact that there was less woodland available in the area, which would have restricted the numbers of pigs that could be kept. Again it should be stressed, however, that the pig bones recovered at Owslebury mainly represent the waste from the butchery of these animals and reflect the diet of the inhabitants rather than the relative number of the different species kept at the settlement.

The ageing data revealed significant intra-site variability in the ages of pig represented. In the Middle Iron Age deposits the pattern of this variability was similar to that encountered in the sheep/goat assemblage, with the pits producing a much higher proportion of neonatal and other young piglets, whereas the enclosure ditch contained an unusually high number of adult pig jaws. It again seems likely that the carcases of pigs of different ages tended to be processed and dumped in different parts of the settlement. Overall interpretation of the kill-off pattern, however, is made purely conjectural when faced with variations of this sort.

In the 1st Century B.C. deposits there was a distinct peak in the number of mandibles of pigs killed between 18-24 months of age. This is an age at which slowly maturing breeds of pigs are commonly culled, since they will have by then obtained a reasonable carcase weight. Pigs can endure high levels of immature mortalities because of their high reproduction rates. This makes them ideal animals for meat production.

Most of the pigs represented in the Romano-British levels appear to have been culled between 18-36 months old. Similar mortality profiles have been encountered on other contemporary sites in southern England. There is a slight indication that more younger pigs were culled in the 3rd-4th Century A.D. at Owslebury but the sample of ageable mandibles was probably too small to be reliable.

Metrical analysis revealed that only a very small proportion of the pig bones were comparable in size to wild boar. Although there was increased variability in the size of pigs encountered at Owslebury in the early Romano-British period, there is no real evidence for any significant improvement in the size of the stock: This contrasts with the evidence from Winchester, where the limited sample of measurable pig bones from the Staple Garden excavations belonged mainly to animals larger than those represented at Owslebury. It is possible that the pigs brought to Winchester were derived from stock bred especially for the urban market. If that was the case, it would appear that Owslebury did not supply the town with pigs.

Horse

Horse bones were found in consistent numbers throughout the deposits at Owslebury. Their fragments formed between 10-20% of the total number of cattle and horse fragments in all the major periods. There was therefore no evidence for any decrease in their numbers during the Romano-British period and their abundance at Owslebury is typical of rural (as opposed to urban) Romano-British samples (Figure Section4.7). This contrast between urban and rural samples indicates that horses were only occasionally regarded as sources of meat in Roman towns. This may partially reflect dietary preferences. However, a more important reason may have lain in the horse's principal use - that of a transport animal.

At Owslebury, the carcases of horses were not butchered for meat as frequently or as intensively as those of cattle. Butchery marks were recorded less frequently on horse bones, a much greater proportion of horse limb bones had not been broken open for marrow and a much greater proportion of their assemblage consisted of partial skeletons or groups of articulated bones. This pattern continued throughout the settlement's history. A similar contrast has been noted on several other Iron Age sites, for example at Gussage All Saints (Harcourt 1979: 160) and Danebury (Grant 1984a: 521).

There is no evidence for the culling of immature horses for meat on a large scale. Most of the horse limb bones belonged to adult animals and ageing data from the jaws indicated that a relatively large number of horses were over 10 years old. In addition, the presence of several horse bones with pathological conditions usually associated with older animals also suggests that horses were often kept until old age. Horses cannot be fattened up for slaughter as efficiently as cattle and therefore their value as meat producers is more limited. They would have been valuable, however, for riding and as pack animals. This role may have become even more important in the Romano-British period, when improved road communications and the influence of the urban market would have encouraged the keeping of horses as a means of transport of goods and people.

The Owslebury data could not resolve the question of whether horses were bred at the settlement in the Iron Age. The lack of neonatal mortalities (in contrast to sheep, cattle, pig and dog) would suggest that they were not reared at the settlement. They may have been captured and trained from wild populations as Harcourt (1979) has suggested. Alternatively they may have been acquired from horse traders. Unfortunately the ageing and sexing evidence from Owslebury was too limited to determine whether there was a bias towards adult male animals as observed at Danebury (Grant 1984a: 520). In the early Romano-British samples 32% of the jaws belonged to immature horses. This figure dropped to 12% in the 3rd-4th Century A.D. deposits, in which at least one neonatal mortality was represented. Whether these changes in mortality profiles represent a significant change in the exploitation of horses is unclear. The increase in the number of immature horses represented in the early Romano-British layers may imply that horses were now bred at Owslebury and the sample included immature animals surplus to breeding or transport requirements that were culled for meat. The higher proportion of adult horses in the late Romano-British period may reflect the declining importance of the exploitation of horses for their meat even on this rural settlement. Horses not required further by the inhabitants may have been sold rather than slaughtered.

Horses showed similar developments in their size ranges as was witnessed with the other domestic species. Only in the late Romano-British period were the horses represented consistently larger than the small ponies encountered in the Iron Age deposits. The early Romano-British deposits did produce a wider range in the size of horse bones. Increasing diversity in size may have been associated with a new interest in horse breeding at that time.

Dogs

Cut marks were occasionally recorded on dog bones throughout the deposits. However, the fact that the majority of these bones formed part of articulated skeletons showed that they were rarely eaten. It is possible that the few animals that were eaten were consumed during times of food shortage, since the high proportion of articulated bones suggests that there was generally a taboo upon the eating of dog flesh. At least one articulated skeleton of early Romano-British date, however, had been skinned but not eaten, showing that dog skins were sometimes utilised.

Dogs were kept throughout Owslebury's occupation and their main uses were probably as herding and guard dogs. They would have found ample food amongst the discarded food waste of the inhabitants and dogs seem to have been responsible for the destruction of a very large proportion of the bones originally deposited. Indeed the number of immature dog bones, particularly those of neonatal mortalities in several of the 3rd-4th Century cess pits, suggests that the dog population had to be strictly controlled.

The variability in the size of Romano-British dogs (Harcourt 1974: 164-6) is also reflected at Owslebury. This heterogeneity seems to have been the result of importation of new breeds from the late Iron Age onwards in some parts of England. At Owslebury, by the late Romano-British periods, dogs ranged from very large hounds to quite small stocky individuals.

Other Species

No other species was exploited in large numbers at Owslebury. In the Middle Iron Age phase goat bones were recovered in numbers greater than those encountered to date at any contemporary settlement in Hampshire. Butchery marks showed that they were sometimes eaten but it is perhaps significant that their bones were mainly restricted to the enclosure ditch and they were rarely identified in other features. Once again, relative species abundance in archaeozoological samples appears to have been partially dependent upon the part of the site that was excavated. Thereafter there is scarcely any evidence for the exploitation of goats until the late Romano-British period, and even then only in small numbers.

Poultry also do not seem to have formed an important source of food. Domestic fowl bones have been found only rarely in Iron Age contexts in Hampshire and their presence seems to be restricted mainly to the latter part of the period. At Owslebury nearly all of the small number of domestic fowl bones in Iron Age contexts were dated to the 1st Century B.C. Even in the Romano-British deposits, where domestic fowl bones were more frequently encountered, the presence of articulated skeletons suggests that they were not always eaten. They may of course have been kept mainly for their eggs, as several bones belonging to hens in lay were identified. Metrical analysis also indicated that hens outnumbered males in the assemblage. Cut marks on some bones did show that some of the domestic fowl were eaten but they never formed a significant part of the diet and it is possible that they were consumed more rarely on rural than on urban settlements in this period.

Bones of domestic goose and duck were encountered even more rarely than those of domestic fowl. Indeed it is not clear whether all (or indeed any) of these bones belonged to domestic as opposed to their wild counterparts, the greylag goose and the mallard.

Very few other species contributed to the diet. Fish and wild bird bones were scarce and although their numbers may be underrepresented due to retrieval bias and their poor survival, they seem not to have been exploited to any extent. The same can be said for wild mammals. Red deer, roe deer and hare were probably the only species represented whose flesh was eaten occasionally. Red deer may have been more highly regarded for their antlers as a source of raw material for the manufacture of tools and other objects. The lack of interest in the exploitation of wild fauna is typical of Iron Age deposits in southern England (Grant 1981; Coy 1982b).

OWSLEBURY'S ROLE IN ANIMAL HUSBANDRY

Obviously, as the inhabitants that occupied Owslebury did not live in complete isolation, it is likely that aspects of their dealings with animals involved contact with other people and settlements. These may have been concerned with the acquisition and disposal of stock through trade, redistribution and reciprocity. It is also possible that in some periods some of the flocks or herds may have been managed communually. In addition to livestock, redistribution of meat of animals slaughtered at Owslebury amongst inhabitants from other settlements is likely to have occurred frequently. The slaughter of an adult steer, cow or horse would have provided a large amount of meat for immediate consumption. Although much of this may have been preserved by salting for future consumption, the slaughter of such an animal may have been accompanied by a celebratory meal or feast for a number of people. Indeed animals may often have been slaughtered on special occasions to celebrate a particular event which may sometimes have been associated with ritual or ceremonial activities.

Consequently the development of animal husbandry at Owslebury has to be seen in relation to developments elsewhere in the region and in the Iron Age and Romano-British periods in general. In particular how was the pastoral economy at Owslebury linked with the settlements of the hill fort at St Catherine's Hill and with the development of urban life at Winchester? It is of course impossible to answer this question fully without comparative examination of faunal remains from those settlements and from others in the area. Consequently, although Owslebury has produced an extremely important faunal assemblage, its place in the regional system of animal exploitation will only become fully appreciated after more samples from key sites have been examined.

The Iron Age

The analysis of the samples from Owslebury has again shown graphically how much variability in faunal remains can be encountered when samples from different areas of a settlement can be compared. In particular, the 3rd-2nd Century B.C. samples revealed much variability between features of different types, particularly those from the pits and the banjo enclosure ditch. The variations in species representation and in the ages of the animals recovered must lead to suspicions that excavations of more limited areas of Iron Age settlements may give a restricted and possibly misleading picture of animal exploitation.

The original siting of the settlement appears to have been laid out with particular emphasis on the exploitation of the lower pastures, suggesting that cattle herding was an important element in its early life. The presence of neonatal mortalities of cattle, sheep, pig and dog suggest that they may all have been kept at that time, while goats and horses were also exploited. Perhaps these too were kept by the inhabitants but, as there is no evidence of neonatal mortalities of these species, it is possible that these were acquired by trade or redistribution.

Tentatively it seems possible to suggest that the two principal species eaten (cattle and sheep) were exploited rather more heavily for the production of meat than at some other settlements in the area of that date. This assumes that the mortality profiles of the species in the archaeological records of these sites directly reflect the ages at which the stock were slaughtered and that there was not a significant importation of animals for slaughter from elsewhere. The possibility of a more extensive system of cattle and sheep management incorporating several settlements and involving extensive redistribution of livestock between them cannot be ruled out entirely. Obviously such a theory can only be tested by comparisons with several other sites of varying types in the neighbouring area.

Alternatively, it can be argued that the production of meat may have been more important for the inhabitants at Owslebury, who may have relied more heavily on pastoral farming than those from some of the other settlements excavated in Hampshire. There were comparatively few storage pits for grain at Owslebury in comparison with Winnall Down, for example. This may imply that arable production formed a smaller component of the farming system at Owslebury. Whereas other settlements may have relied on the production of surpluses of grain for exchange, it is possible that, if any surpluses were desired or obtained at Owslebury, these were more likely to have been achieved from the pastoral rather than arable sector of the farm.

This is not to say that the emphasis on meat production was very intensive at this time, even when compared with later phases of the settlement. This would perhaps suggest that the inhabitants were raising their herds independently and that it was important to maintain adequate breeding stock. This would have led to a conservative culling strategy in which only those animals not considered to be of future value were slaughtered for meat.

The 1st Century B.C. deposits produced some evidence to suggest that there was some intensification in meat production in the exploitation of sheep and pigs. At the same time, cattle may have declined in relative importance. There is now no evidence for the exploitation of goat but a few domestic fowl may have been kept. Horses continued to be exploited mainly as transport animals but also for meat. Greater emphasis on meat production may have been a phenomenon that was quite widespread in the later Iron Age. However, a much wider selection of samples needs to be examined before this can be established.

The Romano-British Period

Although the exact relationship between Owslebury and other Iron Age settlements is uncertain, the emergence of Winchester as a major Roman town in the 1st Century A.D. must have had a profound effect on the production and distribution of food in the area. Its inhabitants probably included relatively fewer people directly concerned with food production than any Iron Age hill fort. Consequently, the imposition of Roman rule would have necessitated major changes in the redistribution of food surpluses and possibly in production strategies.

At Owslebury, the early Romano-British faunal assemblage represents an interesting mix of traditional and innovative elements, which reflect the dramatic changes in the economy of that period. In the first place there was further evidence that meat production had become more important. The proportion of cattle, the principal meat source, seems to have increased. So too did the number of pigs, animals whose sole importance was their meat value. Although sheep may have declined slightly in importance, they were still kept in the greatest numbers and the ageing data suggested that a higher proportion of the flocks were culled at an immature age ideal for meat production. Even some horses, although their main use was still as transport animals, were now slaughtered at a comparatively young age for their meat.

It is possible that some cattle may have been exported from the settlement. The measurements of the metapodia at Owslebury were biased towards "male" animals, whereas all the urban samples that can be directly compared have been dominated by specimens which have fallen into the "female" group. It is possible that such animals were taken to Winchester for slaughter. Obviously, the results from excavations at Winchester are required to test this theory further.

On the other hand, there is no clear evidence that the inhabitants of Owslebury traded many of their sheep or pigs to Winchester. Preliminary metrical analysis (Maltby in prep) has indicated that generally larger sheep and pigs were eaten at Winchester and it seems possible that Owslebury did not play an important role in that trade. If that was the case, the proportion of cattle bones represented at Owslebury may underestimate the number of cattle kept, since a considerable proportion of the herds may have been taken away for slaughter. It can be further argued that the need to supply Winchester with beef not only led the inhabitants of Owslebury to keep more cattle, but also to concentrate more upon the exploitation of their other domestic animals for meat production to supply their own needs. It may also be significant that the butchery and fragmentation evidence indicated that the early Romano-British carcases of cattle in particular tended to have been exploited for meat and marrow more intensively than previously.

Generally, however, the inhabitants of Owslebury seemed to have continued with many of the husbandry practices that had been established during the Iron Age. Some larger animals were present in the 1st Century A.D. samples and there was greater variability in the size ranges of all the domestic species, indicating either the introduction of some new stock, or perhaps more likely, some improvement in existing stock size through better nuitrition and management. However, overall, there were only slight improvements in the overall size of the animals. Butchery practices remained largely unchanged despite new techniques in vogue at Winchester. Horses continued to be eaten, whereas as they were not often consumed in Roman towns. The early Romano-British period may have been a time when any major improvements in animal husbandry practices were restricted to those settlements which bwere more directly involved in the provision of urban and military centres with an adequate meat supply. Others may have retained many of the elements of their traditional farming practices.

By the late Romano-British period further changes in the exploitation of animals can be postulated for Owslebury. There was in general an improvement in the average size of the stock. A new type of larger, hornless sheep was introduced at this time (although similar types of sheep have been identified from the 1st Century A.D. onwards in Winchester). At the same time it is possible that wool production may have become more important. The proportion of pigs declined whereas cattle appear to have become more important at Owslebury. These developments may indicate that there was an improvement in the standards of animal husbandry at this time. Extra pasture or fodder would have been required to overwinter a higher proportion of the flocks and possibly to keep more cattle and to improve the general carcase weights of their stock.

However, even now traditional butchery practices still remained and some animals were still no larger than their Iron Age counterparts. Once again the full understanding of the Owslebury faunal data in this period requires comparable data to be analysed from other sites.

Conclusions

It is hoped that the exceptional faunal assemblage from Owslebury will act as a reference point when other faunal analyses are carried out in the area. The results have shown that the history of animal exploitation, carcase useage and redistribution of meat and stock can be traced by careful analysis of animal bone fragments. Of course many of the inferences and conclusions need to be tested against other data. It cannot be stressed too strongly that sensible comparisons of faunal data from different archaeological sites have first to take into account intra-site variability, retrieval standards and preservation conditions. Failure to do so leads to misleading results. It is hoped that the methods of analysis devised for the investigation of these factors at Owslebury can be used at other sites.

Inevitably in a project of this nature there is a tendency to view the faunal data too much in isolation from other archaeological evidence. This is of course one of the disadvantages of specialisation. There is a natural inclination to view changes in animal exploitation as of vital importance in the economy as a whole, whereas these changes may only have been peripheral consequences of much more important developments in other sectors of the economy or society. For example, since archaeological excavations often produce better evidence for pastoral than arable farming, it is easy to place too much importance on changes in animal husbandry when it is conceivable that arable farming may have been much more important to the community both in terms of labour input and food output. The relative importance of the two sectors of farming are inevitably difficult to gauge, although as argued above, it is possible that animal husbandry played a more important role at Owslebury than at some contemporary settlements in the area. It should also not be forgotten how important pastoral and arable husbandry can be to each other in a mixed farming system. Animal dung could have played an important role in crop production, whereas the herds may have relied upon fodder from the crops and fallow fields for a lot of their food.

Conversely, it can be claimed that many of the trends and developments observed in the faunal data from Owslebury reflect changes in the society and economy that other sectors of archaeological research can also investigate. It is important that such studies should be integrated.

For example, the analysis of intra-site variability of the animals bones was designed to provide information on site useage and it complements the detailed analysis of the pottery from the settlement (Pierpoint n.d.). The disposal of carcases of different ages and sizes in different parts of the settlement, the density of bones in various features and the burial of animals in certain deposits all provide information about how the settlement may have operated during its various phases.

On a wider scale, since archaeological studies of trade have usually been restricted to the analysis of the distribution of artefacts, it is easy to forget that stock and food redistribution and trade may have played an important role in everyday life. Although such studies are difficult from archaeozoological evidence, there were several instances where it can be postulated that trading of particular animals may have taken place. Similarly, the concept of a regional system of animal husbandry has been discussed both for the Iron Age and Romano-British periods. There is some optimism from these results that further studies will provide exciting insights into this aspect of the economy.

Perhaps the final comment should be that the last decade has been a time when archaeozoologists have realised that they need to get a better understanding of how their samples were created, since it is clear that interpretations of animal exploitation cannot be made without due consideration of intra- and inter-site variability. However, it is hoped that the next decade will see them becoming more ambitious in the scope of their studies. It is becoming clear that faunal syudies need not be restricted to the analysis of the meat diet and animal exploitation of a single community studied in isolation. If managed properly, the data are available to extend such studies into the realms of social science by investigations of topics such as trade, regional management, ritual activities and cultural attitudes to animals in general.

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