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THE VERTEBRATE REMAINS FROM SCOLE-DICKLEBURGH, EXCAVATED IN 1993 (NORFOLK AND SUFFOLK), A140 AND A143 ROAD IMPROVEMENT PROJECT

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Summary

The faunal assemblage from the Romano-British "small town" of Scole Dickleburgh, located on the Norfolk-Suffolk border, includes a total of c. 3284 identified vertebrate remains from Early-Mid Roman (1st-late 3rd centuries AD) and Late Roman (4th century AD) contexts. In comparison, few identifications were recorded for prehistoric and post-Roman contexts. Most of the remains are from cattle and sheep while pig, equid and goat are less common. A few dog and cat specimens were identified also. The ratios of the main stock show little variation throughout Roman occupation (cattle c. 56-57%; caprines c. 32-35%; pig c. 9-11%) and intrasite variation is probably due to excavation and recovery strategies rather than socio-economic factors. Kill-off patterns of cattle and pig show little variation but caprine mortality profiles suggest that a shift occurred, from meat production in the Early-Mid Roman period to a broader range of uses in the Late Roman period. Age profiles from north and south of the river also show some variation, in the Early-Mid Roman period, which may be status related, with inhabitants closer to the town centre consuming better quality meat. Element distributions show that live animals or whole carcasses were brought to the settlement. Large scale processing was not evident although heavily butchered scapulae were present in various deposits. The Scole sheep and cattle rivalled the largest of known sizes at other Roman sites, suggesting that stockraising at Scole followed the trend of size increase observed across Roman Britain. The metric analysis reveals an increase in some sheep measurements and a possible change in the shape of cattle from the Early-Mid to Late Roman periods. Hunting, fishing and fowling were not important subsistence activities but antler from hunted animals and shed racks was used. The find of a fallow deer antler, dated by C14 to the 3rd-6th c. AD, is of exceptional interest, given the scarcity of pre-Norman finds in Britain. Unusual deposits include a cattle skeleton in a well fill, the deposition of two horse skulls in a leat and a deposit of cremated domestic waste and owl pellets contents.

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INTRODUCTION

The Romano-British "small town" of Scole-Dickleburgh is located on the River Waveney in East Anglia, on the present-day border of Norfolk and Suffolk. It lies adjacent to the Roman road which originally ran from Colchester (*Camulodunum*) to Caistor St.Edmund (*Venta Icenorum*), known as *Iter V* on the Antonine Itinerary (Suffolk Archaeological Unit 1994; Rogerson 1977) (Fig. 1a). The site has a long history of archaeological investigation starting in the early part of the century; excavations undertaken in 1973 revealed evidence of mainly domestic occupation dating from the 1st to the late third centuries AD (Area 1007) (Rogerson 1977).

In 1993, excavations were undertaken by the Norfolk and Suffolk Archaeological Units, in advance of the A140 and A143 road improvement project. Four main areas were investigated. The largest site covered 1.7ha and was located closest to the original town centre which lies under the modern village of Scole (1007 SCL, Areas 1-4). Three smaller areas of c. 0.3ha each (Stuston, SUS 005, Areas 6 and 7 and Oakley, OKY 005, Area 8) were excavated south of the River Waveney (Fig. 1b) (Flitcroft and Tester 1994; Suffolk Archaeological Unit 1994). The archaeological evidence suggests that the Roman town flourished from the late 1st century to the 4th or 5th centuries AD. Remains of industrial and residential activity, which may correspond to "ribbon development" along the edges of the town centre, were identified on both sides of the river. Evidence of prehistoric, Saxon, medieval and post-medieval occupation is much more limited, providing little information about pre- or post-Roman Scole (Ashwin et al., Synopsis 1997; Flitcroft and Tester 1994).

Two main phases of Roman activity were identified: initial domestic occupation with evidence of industrial and craft activity (including metal, leather, bone, antler and wood working; Early-Mid Roman, Periods 3 and 4) and a period of waste build-up and possible agricultural use (Late Roman, Period 5) (Flitcroft pers. comm. 1995; Flitcroft and Tester 1994; Suffolk Archaeological Unit 1994). The Early-Mid Roman faunal specimens are from a variety of contexts including ditches, pits, wells, postholes and a deposit of cremated animal remains, discovered near a small inhumation and cremation cemetery (Flitcroft and Tester 1994). More than half of the Late Roman assemblage was recovered from the extensive layers of grey soil (Areas 1-4) and dark earth (Areas 7 and 8), as well as from a palaeochannel (Area 8). The grey soil consists of a dark-earth type deposit and subsoil, probably including the build-up of domestic waste (midden and hearth debris) and constructional debris. The dark earth from inside the town boundary (Area 7) may consist of domestic waste also, while outside the town boundary (Areas 7 and 8), it shows a lower content of burned soil (possible hearth debris), cess residues and constructional debris and the chemical makeup is suggestive of manured arable soils (Macphail, Archive reports a, b). The peaty deposit excavated in a palaeochannel is considered "not typical of natural peats" and is characterised, in some samples, by a high frequency of anthropogenic inclusions (Macphail, Archive report b).

During the original analysis, the Early and Mid Roman assemblages were grouped and studied separately from the Late Roman assemblage. The chronological groupings are the following:
Medieval/Post-medieval (Periods 6-7): 5th century-modern
Late Roman (Period 5): 4th century AD
Early-Mid Roman (Periods 3-4): mid 1st-late 3rd centuries AD
Prehistoric (Periods 1-2): pre 1st century BC-1st century AD

The main objectives of the faunal analysis were to identify diet and husbandry practices at Roman Scole, to determine whether these changed through time, to identify, if possible, socio-economic or functional differences within the settlement and to place Scole within the regional and wider context of Roman subsistence and animal management in Britain. In addition, detailed examination of individual assemblages provides information about the formation and nature of particular or unusual contexts, including some possible "ritual" features, such as a cremated deposit (originally identified as a funerary pyre), a cow burial and the contents of a leat.

METHODS

Recording and quantification: The faunal remains were identified and recorded following Davis (1992), with amendments by Albarella and Davis (pers. comm. 1995) and the addition of two vertebral elements (atlas, axis). The recording of the innominate bone was also modified in order to include all fragments with at least one half of the acetabulum. The macrofaunal remains were quantified by bone count (referred to as N in tables and figures) and Minimum Number of Individuals (MNI), following Davis (1992). In the case of the pyre assemblage, (see below) all identifiable fragments were recorded in order to determine whether joints of meat or whole animals were represented in the samples, however only the suite of countable bones (Davis 1992; with amendments noted above) was used for species quantification. Recording of the microfaunal remains was limited, in most cases, to single elements which allow species distinction. Frog and toad were identified on the basis of the ilium (Bohme 1977); house mouse and woodmouse were differentiated on the basis of the upper first molar alveoli while the voles were identified on the basis of the occlusal pattern and size of the lower first molars. The shape and size of the mandibular condyle allowed distinction between species of shrew (Chaline 1974). For moles, the single most common element was included in the bone counts; recording of small bird remains followed Davis (1992) and Albarella and Davis (pers. comm. 1995); and all elements of rare taxa were counted (eg. reptile). The microremains are quantified by bone count and MNI.

Ageing and sexing: Tooth wear and eruption were recorded following the methods of Ewbank et al. (1964), Payne (1973 and 1987 for caprines) and Grant (1982 for cattle and pig) and analysed following Payne (1973, 1988) and O'Connor (1988). Sexual distinction is based on the morphology of the canines and canine alveoli in swine and on the presence/absence of spurs on the tarsometatarsi of domestic fowl.

Osteometric analysis: Measurements were taken as in von den Driesch (1976), Payne and Bull (1988) and Davis (1987a for equid teeth). The breadth of cattle and caprine teeth was measured across both cusps rather than separately at the first and second cusp. Consequently, the measurements may not be directly comparable with data from other sites, however analysis of size change at Scole using this measurement is valid as the measurement was taken in the same way for all ruminant teeth. Measurements recorded for non-countable specimens are included in the metric analysis.

Other aspects: Pathologies, non-metric traits and butchery marks (type and location) were recorded.

RESULTS

Recovery: Most of the faunal remains were recovered by trowelling. Approximately 9% of the grey soil and dark earth layers was sieved using a 1cm mesh, a further proportion was carefully excavated by hand and the remaining soil was machined away (Flitcroft, pers. comm. 1995; Suffolk Archaeological Unit 1994). As the material retrieved by coarse sieving constitutes, in some cases, a large proportion of the Late Roman assemblage, the data are included with the hand-collected remains (Tables 1, 2a, 2c, 2d), however the coarse sieved assemblages are presented in separate tables and graphs also (Table 3). Whole earth samples were taken from particular contexts for flotation and fine sieving through 0.5mm mesh, including almost all of the cremated "pyre" remains (Table 4). The fine sieved remains are discussed separately from the hand-collected and coarse sieved assemblages.

In order to assess recovery bias in the assemblages from different areas and periods, the frequency of isolated incisors relative to all isolated teeth was calculated for the main taxa (Table 5a) (Albarella and Davis 1994a). The low recovery or absence of caprine incisors in hand-collected and coarse-sieved assemblages suggests that a large proportion of small specimens was lost during excavation. Differences were observed in the incisor ratios between context types also. Caprine incisors are relatively more frequent in pits than in ditches, which is supported by the higher ratio of caprine premolars to molars in pits than in ditches (Table 5b). Although the differences are slight, they may indicate that pits were more carefully excavated than ditches.

Preservation: In general, the bones from Scole are hard and well preserved (Table 6a). Approximately 7-9% of remains are weathered; the Late Roman assemblage includes a higher frequency of weathering than the Early-Mid Roman assemblage which is due in part to the poor preservation of the bones recovered from acidic peat layers in the palaeochannel (Table 6b). The remains from ditches and the grey soil show a higher frequency of weathering and abrasion than those from pits and wells, which may indicate that they were exposed for a longer period or were less protected than pit and well refuse. Carnivore gnawing was observed on approximately 7-8% of bones and many specimens were not recorded because the countable parts had been destroyed by chewing. Little evidence of digestion or rodent gnawing was observed. Burning is also infrequent except in the cremated deposit. Butchery marks were observed on many specimens and some worked and semi-worked objects were recovered also.

Prehistoric period (Period 1: Late Neolithic-Bronze Age; Period 2: Iron Age)

The small prehistoric assemblage include mainly cattle and caprine remains and a few bones of pig, equid, dog and cat (Tables 1, 2a, 2c). Measurements of a cattle scapula and humerus compare to those at the lower end of Roman ranges (Appendix 2). The dog remains include elements from different size animals (small-medium size). The presence of a small cat mandible is of interest. The specimen is from an animal at least 5-6 months old (P4 and M1 erupted) (Silver 1969) and the mandible height aboral to M1 places within the range of measurements recorded for the small post-medieval domestic cats from Bene't Court, Cambridge, which were much smaller than modern wild cats (Luff and Moreno-Garcia 1995) (Table 22). Wild cats were present in Britain during the Prehistoric period but the domestic cat is thought to have been introduced sometime during the first centuries of Roman occupation. Finds from Iron-Age contexts have been variably attributed to wild and domestic cats (Davis 1987b; Zeuner 1963) but many more finds are required for a detailed study of the pre-Roman animals.

Roman Period (Periods 3-4: Early-Mid Roman; Period 5: Late Roman)

The Roman assemblage includes a total of c.3284 identified bones and teeth collected by hand and coarse-sieving and an additional 418 identified specimens from fine-sieved whole earth samples. Over 90% of the hand-collected and coarse-sieved specimens are from the domestic livestock, cattle, caprines, pigs and equids (Tables 1-3; Figs. 2, 3). Less than 5% of the assemblage consists of remains of other mammals, including dog, cat and wild mammals; bird remains are infrequent also (c.5%). A few bones of fish and amphibia complete the assemblage. The fine-sieved samples differ from the above with a higher frequency of microfauna (Table 4). These are presented following the main discussion, which focuses on the hand-collected and coarse-sieved remains.

Domestic mammals

Livestock: chronological and spatial variation

Cattle remains make up approximately one half of the Early-Mid and Late Roman bone counts, caprines represent approximately one third and pig and equid remains each make up c. 5-10% of the assemblages (Tables 1, 8a, 8b). Most of the caprine remains are from sheep (174 positive sheep identifications to two positive and one possible goat identifications) (Table 7) (Boessneck et al. 1969; Payne 1969). The relative importance of cattle and caprines, based on MNI, differs from that indicated by bone counts, with an increase in the relative importance of caprines and a decrease in that of cattle, however both bone counts and MNI estimates suggest that there was little or no change in livestock proportions between the Early-Mid and Late Roman periods (Tables 8a, 8b).

The taxonomic distribution in the individual excavation areas (Areas 1-4, 7 and 8) shows some variation, which is probably due in part, to recovery methods, particularly in the case of the Late Roman assemblages (Tables 8a, 8b, 9). For example, the relative frequency of caprines is high in the coarse-sieved assemblages from the grey soil (Areas 1-4) and dark earth (Area 8) (Tables 3, 9; Fig. 3). In Areas 1-4, the coarse-sieved assemblage makes up over 65% of the total number of counted Late Roman specimens while the sieved specimens make up only 4% of the total Late Roman identified assemblage from Area 8. The importance of caprines in Area 8 is masked further by the inclusion of the palaeochannel assemblage, which is dominated by cattle remains (Table 9). This context may consist of redeposited material (Suffolk Archaeological Unit pers. comm. 1995); the specimens are poorly preserved, the context was machine excavated in part and remains were collected from the spoil. Consequently the palaeochannel assemblage is probably biased towards the larger taxa

The relative importance of caprines was probably greater than indicated by bone counts and MNI calculations suggest that they may have been as common as cattle in both periods. Throughout occupation however, cattle would have provided much more meat than caprines or pigs, given their greater size. It is difficult to assess whether intrasite variation is due to differences in recovery methods or to other factors. The greater relative importance of caprines in Areas 1-4 in the Late Roman period may be due to better recovery however it may reflect the status of the area closest to the town centre also. Jones (1977) identified a relatively high proportion of caprines in an area adjacent to Areas 1-4, in both the Early and Late Roman periods, however their relative importance is shown to decrease through time (Table 10).

The taxonomic distribution in pit, well and ditch assemblages was compared in order to determine, if possible, whether these context types were used for different and/or unusual purposes. The results show that the relative frequency of caprines and pigs is higher in pit assemblages than in those from ditches or wells (Fig. 4); this may be due to better recovery (see above) although other factors such as preservation bias and disposal practices may also differ between context types. Similar observations have been made at other sites (see Maltby 1981; Davis 1995; Stallibrass 1985; Wilson 1992). Only one well assemblage is unusual in that it includes an almost complete cattle carcass (80271, see below). Once disused, most of the wells were probably used for the occasional disposal of domestic waste.

Cattle

Age and sex: In both periods, cattle were slaughtered primarily when adult (Table 11; Appendix 1). The data suggest that very young animals were rarely culled; all deciduous fourth premolars had reached an advanced stage of wear at time of death (Table 12a) and few juveniles are represented in the assemblage. A slightly greater proportion of young animals may have been killed in the Late Roman period (30%) in comparison to the Early-Mid Roman period (25%) but the difference is not significant. The postcranial fusion data and relative frequency of very juvenile elements support the dental evidence (Table 13). The distribution of metacarpal measurements suggests that males/castrates may have been relatively more common in the Late Roman period than in the Early-Mid Roman period (Fig. 7a). Other measurements do not allow distinction of sex groups.

Element distribution and butchery: The most common elements are teeth which are particularly resistant to destruction and are often well represented, particularly in assemblages which are poorly preserved and possibly redeposited (eg. ditches, palaeochannel) (Table 15a; Fig. 5). The dense structure of distal limbbones (tibia, metacarpals, metatarsals) also ensures good preservation (Brain 1981). The low recovery of incisors relative to the cheek teeth is probably due to recovery bias (see above).

Most of the limbbones and crania are heavily fragmented and butchery marks were observed on many remains (17%, Tables 16a, 16b). The relative frequency of cattle butchery is low compared to some other urban sites but higher than at rural sites, as indicated in Maltby's (1989) study of Roman butchery. The most common butchery marks consist of chop marks, probably produced by cleaver-like tools; finer marks are common also and were probably produced by lighter implements (eg. knives) when defleshing and skinning (Table 16b). Butchery of the scapulae is particularly distinctive. Typically, the edges of the glenoid and the acromion were "trimmed" and the scapular blades were perforated in the centre or at the proximal end (Plates 1, 2). Explanations for trimming at the distal end include preparation of the joints for curing in brine or cold-smoking (O'Connor 1988; Dobney et al. 1995: 27) while the holes at the proximal end probably served for hanging the joints. Heavy butchery along the spine of the scapula, fine cuts and the removal of splinters of bone along the blade edges probably occurred during filleting. Large concentrations of scapulae were not observed but a few deposits contained from three to eight butchered specimens, suggesting that shoulders of beef may have been prepared and/or distributed in various areas of the site.

Similar modification was observed in 1973 assemblage from Scole and in many Roman assemblages from Britain and the Continent, some of which have a military connection (Luff 1982; Dobney et al. 1995; Grant 1975; Jones 1977; Lauwerier 1988; O'Connor 1982; Schmid 1976). Grant (1987, see also Maltby 1989) has suggested that the establishment of standard butchery practices may have originated in response to military food requirements. The presence of processed scapulae in non-military contexts into the 4th century, as at Scole, suggests persistence of such a tradition.

Other butchery evidence is limited. Chop marks at the base of the cattle horncores suggest that horns were recovered for working. Heads were separated from the main carcass by chopping through the cervical vertebrae. Disarticulation of the cattle limbbones was accomplished by cutting or chopping through or near the articulations and longitudinal chops may indicate marrow extraction. A few phalanges show fine cuts and incisions which may be due to skinning.

One particular deposit from a ditch (81336) includes many metapodial, radius and tibia fragments which are heavily chopped in a longitudinal direction. This breakage seems excessive for marrow extraction; instead, the bones may have been intensively fractured for glue production or grease extraction. The bones may also consist of craft waste as the shafts of the lower limbbones of large mammals are straight and have a thick cortex which makes them ideal for bone working.

<u>Measurements</u>: The cattle measurements are presented in Appendix 2 and summarised in Table 17a. The largest samples of single measurements have been plotted in histograms (Figs. 7a-c). The breadth of the third molar and height of the trochlear constriction of the humerus (HTC), show a significant decrease in size from the Early-Mid to the Late Roman period (at the 1% confidence level) (Table 18). In contrast, the distal breadth of the metacarpal (BFd) shows a significant increase (at the 5% confidence level), which may reflect the greater proportion of males in the later period (Fig. 7a). A possible change in sex ratios, however, does not explain the decrease in the other measurements. Also, bone breadth may not reflect bone length (Davis 1996) and it is interesting to note that the Early-Mid Roman metapodial lengths compare to the larger of the Late Roman values. Significance tests were not performed on bone length as the samples are very small. The data suggest a change in shape, rather than one of overall size. As yet, it is difficult to discuss or explain shape variability in cattle, given the lack of a large corpus of data and our ignorance of how bone measurements behave in cattle.

The Scole data are unusual in that evidence from many Roman sites suggest that cattle increased in size from the Early to Late Roman periods. The results from sites within Colchester (metapodial length) reveal a size increase from the 1st to the 4th centuries AD (Luff 1993: 122). Data from the nearby settlements of West Stow and Icklingham and from further afield, including Lincoln and Exeter, also show a size increase in astragalus and metapodial length (Table 19) (summary data in Crabtree 1989, 1994; Dobney et al. 1994; Maltby 1979). It is interesting to note that at Lincoln, these measurements decrease from the 3rd-4th centuries (Dobney et al. 1995) and a similar change was observed in the Netherlands (Lauwerier 1988). Lauwerier (1988) suggests that large breeds may have been imported in the 3rd century and subsequently interbred with smaller native stock, resulting in a size decrease. The scarcity of data from pre-3rd century contexts, at Scole does not allow testing of this hypothesis (see also Dobney et al. 1995).

Despite the conflicting evidence for size change at Scole, most measurements compare to or exceed the range of Roman data from local sites such as Colchester and from more distant sites such as Lincoln, Exeter and York (Table 19). The distal tibia breadth from Early-Mid Roman Scole is significantly larger than Early Roman measurements from Colchester (at the 1% confidence level) (Luff 1993). The astragali lengths from Early-Mid Roman Scole are significantly larger than contemporary data from Lincoln (Dobney et al. 1995) (at the 0.1% confidence level) while the Late Roman astragalus and metacarpal lengths are significantly larger than Late Roman values from Lincoln also (< 0.01% confidence level). Withers heights calculations for the Scole animals range between 1m-1.3 m.

Non-metrical traits and Pathology: The hypoconulid is missing or reduced in approximately 6% of Early-Mid Roman third molars (2 out of 32 M3s) and 5% of Late Roman specimens (5 out of 99 M3s). The second premolar is missing in five jaws (out of 77 mandibles with anterior portion intact/6.5%). Both abnormalities are considered to be genetic in origin but their significance is uncertain and there appears to be considerable variability in the incidence of both in Roman sites (O'Connor 1988; Dobney et al. 1995; Maltby 1979). Pronounced wear and polishing was observed on the third cusp of a few third molars; this may have been caused by misalignment of the upper and lower jaws. Malocclusion was observed between the molar teeth in two mandibles. Marked differences observed in the breadth of the medial and lateral condyles of one metacarpal and one metatarsal (indicated in metric appendix), may be related to age or the use of cattle for heavy work although the link to traction has not been securely proven (Bartosiewicz et al. 1993). Evidence of arthritis, including eburnation and grooving of articulation surfaces was observed in two specimens. Other changes include lipping of articular surfaces in longbones and phalanges and the growth of extra bone (osteophytes) at articular ends. The significance of depressions observed on the mid-anterior surface of three calcanea is uncertain.

Well skeleton (Late Roman period): An almost complete immature cattle skeleton was deposited in well 81261 (Group 80271). According to the excavators, the skeleton was found partially articulated which suggested that originally the carcass had been cut up in order to fit it into the well shaft (Suffolk Archaeological Unit pers. comm. 1995). No butchery marks were observed on the bones. A number of the small bones and teeth were missing from the skeleton, suggesting that the carcass may have been disturbed prior to disposal or that some elements were lost during excavation. The sequence of dental eruption and epiphysial fusion correspond closely to data recorded for modern animals (eg. Silver 1969) and indicate an animal approximately 24-30 months old (mandibular M3 half erupted, metacarpals and metatarsals fusing). Sex determination was not possible. Preservation of the remains is generally good. Some elements exhibit cracking which may be due to drying of waterlogged bone.

It has been suggested that the animal was deposited in the well as part of a water rite, however it is difficult if not impossible to determine whether the well contents include a sacrificial victim or an animal which died from natural causes. Luff (1982) identified a possible votive well deposit from Chelmsford and various pit and well fills have been identified as ritual deposits on the basis of the unusual number of carcasses and diversity of taxa deposited in them (eg. Grant 1975), however disused wells and pits would have been ideal spaces within which to dump carcasses of animals which died of disease or injuries (Lentacker et al. 1993; Wilson 1992). Once deposited, the articulated or semi-articulated remains would have been better protected from dispersal, weathering and other taphonomic processes than bone refuse discarded in more open contexts (Wilson 1992).

The presence of miscellaneous specimens (including equids, caprines, cattle and deer) including one gnawed bone, in the same context as the Scole skeleton or in associated contexts, suggests that the well may have been used at least briefly for the disposal of local refuse before being sealed.

Caprines

Age and sex: The patterns of caprine tooth wear (Payne 1973, 1988) suggest that at least 50% of animals were slaughtered before the age of two years in the Early-Mid Roman period, while in the Late Roman period, only one third of animals were killed when immature (Tables 11, 12b, 14,; Fig. 8; Appendix 1). The age distribution based on mandible wear stages shows a highly significant difference between periods (chi-square 15.96, P=0.007). When the age groups are considered by area, the data also show a significant decrease in the relative proportion of young animals south of the river (chi-square 14.14, P 0.01) but not north of the river, from the Early-Mid Roman to the Late Roman period. The assemblage recovered from the earlier excavation on the north side of the river also shows that a high proportion of young sheep was killed throughout Roman occupation (Jones 1977).

The data may indicate that a shift occurred in sheep raising strategies, from an emphasis on meat production in the Early-Mid Roman period to a broader range of uses including wool and/or milk production in the Late Roman period. Alternatively, the pattern may indicate a general fall in the status of the inhabitants, possibly more marked south of the river, and a concomitant decrease in the demand for, or access to, good quality meat. Explanations based on socio-economic differences, however, are difficult to reconcile with the image of low status reflected in the archaeological features and material remains, from areas north and south of the Waveney, throughout occupation.

During both periods, most animals (c. 80%) were slaughtered by their fifth year, probably before meat quality had declined substantially (eg. Albarella and Davis 1996). The epiphysial fusion data and the relative frequency of very juvenile specimens support the dental evidence (Table 13).

Element distribution and butchery: The distribution of caprine elements is strongly influenced by preservation and recovery bias and particular discard patterns were not observed (Table 15b; Fig. 6). Cheek teeth dominate the assemblages from the three main areas and the more durable postcranial bones are well represented. The distal tibia is particularly common relative to other longbones, which is probably due to its dense structure (Brain 1981). Incisors and phalanges are very rare, probably due to recovery bias.

Butchery of caprines appears to have been less intensive than for cattle, probably due to carcass size (Tables 16a, 16b). Only c. 5% of caprine bones show butchery marks and chop marks are less common than cuts. The preparation of small joints of mutton or lamb would not have required intensive butchery or breakage and disarticulation and defleshing of the smaller carcasses with knives may have left fewer traces than would cleaver-like implements. The cranium was removed by chopping through the axis or by cutting the surrounding tendons as suggested by the presence of numerous fine cut marks on the atlas and axis. The most common cut marks on the main limbbones consist of fine cuts which were probably produced during defleshing. Chop marks were observed most frequently on the distal shafts and articulations but a few longbones were butchered through the midshaft. The mechanisms of meat preparation and distribution are not easily defined. Live animals may have been brought to individual households. Alternatively, sides of carcasses or smaller joints may have been sold, with some secondary butchery occurring at the place of consumption.

Measurements: One goat metacarpal was identified and was excluded from the metrical analysis (Fig. 9). All other elements are assumed to come from sheep (Appendix 2; Table 17b). The log-ratio distribution of sheep measurements (Davis 1996), indicates that the Scole sheep were, on average, slightly taller and more slender than modern unimproved Shetland ewes (Fig. 10). Few complete longbones were recovered; lengths of the Early-Mid Roman metacarpals and Late Roman metatarsals compare to ranges known from other Roman sites (eg. Colchester, Luff 1982, 1993; Lincoln, Dobney et al. 1995; West Stow, Crabtree 1989; York, O'Connor 1988) and do not show a significant size increase between the Early-Mid and Late Roman periods, while the distal breadth of the tibia does show a significant increase (at the 5% confidence level) from the Early-Mid to the Late Roman periods (Table 18). An increase in the distal breadth of the tibia was identified at Colchester and other East Anglian sites (Luff 1993; Crabtree 1994) (Table 20) while an increase in bone length is known from Colchester, Lincoln and Exeter (Luff 1993; Dobney et al. 1995; Maltby 1979).

Non-metrical traits and Pathology: Pathologies were most commonly observed in the mandibles and teeth. These include mandibular swelling, severe interocclusal wear of teeth, bone recession, tooth loss and bone resorption, some of which may have been caused by infection or gum disease (Baker and Brothwell 1980). Two associated molars show possible growth arrest, which may have been caused by a period of stress during the animals' life. Extra bone growth was observed on the anterior shaft of a metacarpal, possibly due to sub-periosteal haematoma caused by trauma or stress (Baker and Brothwell 1980; Dobney et al. 1995). A few postcranial remains exhibit the growth of osteophytes which may be age-related. The absence of the second premolar, which may be a congenital trait, was observed in only a few specimens (3 out of 118 mandibles).

Pigs

Age and sex: The age distribution of pigs based on mandibular tooth wear is similar in the Early-Mid and Late Roman periods, reflecting the unchanging pattern of slaughter of immature and subadult animals throughout occupation (Table 11; Appendix 1). The tooth wear data show that most second molars were lightly to moderately worn and some were in the process of erupting, while most third molars were unerupted or only lightly worn (Table 12c). The fusion data also indicate that most animals were culled before reaching maturity (Table 13). Very juvenile pig specimens include five postcranial elements and one mandible; two foetal/perinatal elements of medium size artiodactyla may include pig specimens also. The scarcity of very juvenile and perinatal remains suggests that pigs were not raised within the settlement on a large scale.

The sex ratio is based on mandibular canine alveoli which are morphologically distinct in male and female animals. Boars (6 mandibles) and sows (6 mandibles) are equally represented but the sample is very small and may represent no more than six animals, consequently it is not possible to discuss procurement or husbandry strategies.

Element distribution and butchery: The total number of pig specimens is much lower than that of cattle and caprines and the pattern of element distribution is less clear (Table 15c). In addition, the young age at which pigs were frequently slaughtered probably influenced the preservation of postcranial elements. All elements are represented but teeth dominate the assemblage and dense elements, such as the distal scapula and tibia, are relatively well represented.

The small sample of pig bones reveals little about pig butchery, pork preparation and meat distribution (Tables 16a, 16b). The cranium and mandible were split in two for extraction of the brain. The cheeks were further subdivided by chopping transversally through the mandible; the jaws may have been chopped open for marrow retrieval also (eg. van Wijngaarden-Bakker 1990). Fine cut marks on the mandible were probably produced when defleshing. The scapulae were cut and chopped in the neck area below the spina and at the proximal end of the blade, indicating separation and subdivision of the shoulder joint. A few chop marks were observed on other longbones including the tibia and innominate.

Measurements: There are few pig measurement and these are mainly from teeth as most postcranial remains were unfused at time of slaughter (Table 17c; Appendix 2). Tooth breadth measurements do not show any change from the Early-Mid to the Late Roman period (Table 17c). The log-ratio analysis of tooth measurements shows that the data overlap with measurements from neolithic domestic pigs from Durrington Walls (Fig. 11; unpublished data provided by U. Albarella 1997) (after Payne and Bull 1988). This and the low variance of the measurements suggests that the Scole pigs are from a homogeneous population of domestic animals. A very large third metatarsal (GL 111.6mm; Appendix 2), in which fusion was just completed, is most probably from a wild animal.

Pathology: Pigs were probably slaughtered before abnormalities had developed or became visible on the bones. The only pathological specimen consists of a very large metacarpal of a subadult animal with porous bony growth along the diaphysis.

Equids

Most of the mandibular teeth are typically caballine (*Equus caballus*) with a wide internal (u shape) fold and partial penetration of the external fold between the meta- and entoflexids (Davis 1987). Although it is possible to differentiate between the postcranial remains of horses/ponies, donkeys and mules, this was problematic for the small samples from Scole (see below, Measurements) (Clutton-Brock 1992: 49; Davis 1987: 192).

Age and sex: Almost all equid remains are from adult animals but deciduous teeth and unfused or fusing postcranial elements are present in the assemblages of both periods, indicating ages at death of less than 13-15 months (unfused phalanges) and of c. 18 months (metapodials), two years (tibia) and 42 months (radius) (Silver 1969) (Table 13). Young animals (under 12-18 months) may have been raised in the vicinity of the settlement. Six male canines were recovered (Early-Mid Roman: 2; Late Roman: 4) and the crania of one male and one female were found in a leat (see below).

Element distribution and butchery: The assemblage of equid remains is dominated by teeth and the more durable postcranial remains (Table 15d). Butchery marks are infrequent. Two metapodials are chopped and sawn respectively, above the distal articulation. A central tarsal shows chop marks on the anterior proximal surface and anterior and medial sides. Possible chop marks were observed on a humerus and two femora. Cut marks suggestive of defleshing or skinning were noted on a distal humerus (Tables 16a, 16b). Horseflesh may have been consumed occasionally but the scarcity of butchered equid elements in comparison to those of other livestock indicates that this was uncommon at Scole (see also O'Connor 1988; Maltby 1979; Dobney 1995). Hides may have been valued and some limbbones may have been used for bone working.

Measurements: Equids of varying sizes were present at Scole but most were probably similar in height to medium-size ponies (Appendix 2). Slenderness indices of the Scole metapodials do not show clear distinction between species; only one metacarpal falls outside the range of ponies, donkeys or mules and within that of horses (data in Eisenmann and Bekouche 1986).

Pathology: The most common changes in equid bones consist of the growth of osteophytes near articular ends, which may be age-related. One case of spavin was observed on a metatarsal which shows considerable development of osteophytes at the proximal articulation. The cause of the disease is uncertain but one contributing factor may be the use of animals for heavy work which may aggravate the function and articulation of bones which are misaligned or in some other way abnormal. The changes may cause varying degrees of lameness but animals may still be suitable for work (Baker and Brothwell 1980). Growth arrest was tentatively identified on one premolar, possibly indicating a period of stress, perhaps due to poor nutrition or illness.

Bit wear: One unusually worn lower second premolar of an equid, recovered from a Late Roman context, shows bevelling, unusual wear and spalling of the enamel at the front of the tooth. The metaconid was too worn to provide a horizontal baseline from which to measure the bevel (method in Anthony and Brown 1991). The bevel measured from a baseline established across the highest points of the enamel on the lingual side of the metastylid, to the dentine at the prow of the tooth, is c. 7mm. The bevel measured from a non-horizontal baseline, established across the enamel of the metastylid and worn enamel of the metaconid, is only c. 2.5mm. In the bevelled area, the enamel folds are worn to the same height as the dentine while on part of the metaconid and all of the metastylid, the enamel stands clear of the dentine. Preservation of the enamel varies across the occlusal surface. It is relatively intact at the rear of the tooth where it appears transparent and the surface is convex and smooth (with some breakage) while at the front of the tooth, in the bevelled area, the enamel surface is concave, uneven and chipped and there are tiny cracks within the enamel, especially on the lingual side of the tooth.

The cause of the differential wear is uncertain. According to criteria in Anthony and Brown (1991), the above evidence may suggest bitting, however there is considerable debate over the identification of bit wear as some changes in equid teeth may be caused by abnormal wear or filing (Payne 1995). A few specimens from Scole (mandibular and maxillary premolars), including one of the horse crania from a leat (see below), exhibit some bevelling and overhang but uniform wear of the dentine and enamel and spalling of the enamel are not evident. The presence of bevelling on some third molars suggests that wear rather than bitting may be responsible for some of the modifications.

Independent evidence for the use of bits at Scole comes in the form of a small iron bit recovered from a Roman context (Jones 1977). The item may have been suitable for a small pony (c. 1m at the withers) and may have fit the smaller animals identified in the 1993 assemblage.

<u>Leat skulls</u>: Two horse skulls were discovered in a Roman leat (measurements in Appendix 2). The wear on the incisors of one of these indicates that the animal was probably 6-8 years old at time of death and the size of the canines suggests the animal was male. The wear on the premolars and molars is dissimilar on the right and left sides and the right second premolar exhibits pronounced "hook" shaped wear. The wear is less pronounced on the left tooth. The unusual wear may be due to malocclusion. The second skull is incomplete. A vestigial canine is present on the right side and the alveolus is resorbed on the left side, indicating that the animal was female. Additional finds from layers in the leat include miscellaneous equid, cattle and medium size mammal remains.

The significance of this deposit is uncertain. The deposition of equid bodyparts or burial of whole animals is documented for many British and Continental sites and horse skulls, some of which may represent offerings, have been found in bogs, wells and pits at a number of Roman sites (Luff 1982). Finds from Iron-Age and Saxon contexts may hold special significance also (Grant 1984; Luff 1982; Crabtree 1996). While the deposition of whole animals may not necessarily represent ritual offerings (as in the case of the cattle carcass above), unusual deposits such as this one suggest deliberate preparation and deposition rather than discard activity.

<u>Other domestic mammals</u>

<u>Dog</u>: remains were recovered from a variety of Roman contexts but they represent only 3% of finds from the Early-Mid Roman period and 1.5% from the Late Roman assemblage (Table 1. Most of the remains are from the layers of grey soil and dark earth, ditches and pits. The remains include isolated cranial and postcranial remains and possibly three partial skeletons (Table 15e). The dental and fusion sequences indicate that most of the

animals were adult at time of death. The range of dog sizes resembles that known from many Romano-British assemblages (Appendix 2; Figs. 12a, 12b) (Harcourt 1974; Jones et al. 1985; Luff 1993; Clark 1995). Shoulder height calculations, based on a few complete bones, range from c. 34 cm to 74 cm (Table 21) but most of the cranial and postcranial elements are from medium size animals (beagle to labrador size). Some specimens may be from smaller dogs (c. 25-30cm at the shoulder) but the remains of very small lapdogs and bow-legged animals were not observed. A few specimens are exceptionally large, exceeding the size of published Romano-British and Anglo-Saxon dog/wolf finds and some modern wolf specimens (Harcourt 1974; O'Connor 1988; Ancient Monuments Laboratory Canadian Timber wolf reference skeleton). Medium and large size animals may have been used as guard dogs or for hunting (eg. Columella in Forster and Heffner 1968). The few pathologies include tooth loss and alveolar resorption in two mandibles, the growth of osteophytes at the distal end of a femur and malformation in an ulna. Fine cut marks were observed on one tibia only, suggesting that the use of skins or consumption of dogs was uncommon (Tables 16a, 16b).

Cat: specimens are rare, representing less than 1% of finds in all periods (Tables 1, 15e). The isolated finds were recovered mainly from wells (see also Jones 1977). One of these, a maxilla, is from a juvenile animal approximately five months old (P4 erupting, M1 unerupted). Measurements of a tibia are similar to those recorded for domestic cats from Anglo-Saxon sites (Albarella and Davis 1994a; Crabtree 1994) (Table 22). The status of cats in the Roman period is uncertain and their disposal in wells and other dumping spots at Scole may reflect a utilitarian role rather than one of companionship (Lentacker and De Cupere 1994).

Wild mammals

Wild mammals are poorly represented in all periods suggesting that hunting was not an important subsistence activity (less than 3% of countable specimens) (Tables 1, 15f; Fig. 2) (see also Jones 1977). The diversity of wild taxa increased slightly in the Late Roman period but this is probably due to differences in sample size rather than to any change in taxonomic richness in the site area or in subsistence choices. The presence of a fallow deer antler in a Roman context is of exceptional interest and is discussed in detail below.

Fox: Five fox specimens were recovered from Late Roman contexts. One of these shows abnormal bone growth on the innominate; the ischium flares out and extra bone growth is present. Foxes are non-specific predators and as such may occupy a wide variety of habitats (Lloyd 1975). They may have been attracted to food waste at Scole or to live animals raised within or near the settlement.

Hare: A small number of hare remains are present in the Early-Mid and Late Roman assemblages. Secure identification to brown hare (*Lepus capensis*) was possible for one distal humerus only (criteria from S. Davis, pers. comm. 1995). The brown hare is found mainly in lowland areas and commonly inhabits agricultural land and rough pasture. The mountain hare is uncommon in lowlands and it is absent from East Anglia today, however, it may spread into flat country where the brown hare is absent or uncommon and its distribution in the past may have differed from the present day range (Van den Brink 1967; Corbet and Southern 1977). Hare may have been hunted, purchased at market or perhaps raised in special enclosed *leporaria* (André 1981).

Badger: Badger remains are occasionally identified in Roman assemblages but probably did not constitute a food item (André 1981). Two specimens were identified at Scole (femur; ulna, not counted). Badgers occupy a variety of habitats including deciduous woodland and copses, open fields and hedgerows, preferably in undisturbed areas (Corbet and Southern 1977). They may attack poultry and some agricultural crops although this is considered to occur rarely and cause insubstantial damage today. Occasional pests may have been eliminated or alternatively badgers may have been hunted for their pelts (Dobney et al. 1995).

Squirrel: The presence of a femur of red squirrel (*Sciuris vulgaris*) represents an unusual find. This species was widely distributed throughout Britain prior to the introduction of the North American grey squirrel and was common in East Anglia up to twenty years ago (Corbet and Southern 1977). The scarcity of this animal in Roman archaeological assemblages may indicate that it was not valued for food or fur in the past (although it may be due to recovery bias also). Finds from post-Roman contexts have been interpreted as waste from the working of skins (O'Connor 1988, 1989).

Rat: A rat tibia recovered from a Late Roman context may be from Black rat (*Rattus rattus*). An increasing number of finds from Late Roman and pre-Norman contexts suggests that the Black rat was introduced during the Roman period (Davis 1987; Dobney et al. 1995; O'Connor 1992; Rackham 1979) while the Common rat (*Rattus norvegicus*) was introduced much later, probably in the early eighteenth century (Corbet and Southern 1977).

Deer: Three species of deer are represented at Scole, including the indigenous species, red and roe deer, as well as the reintroduced fallow deer. Both red and roe deer are represented by cranial and postcranial remains as well as antler fragments while fallow deer is represented by a single shed antler. Of 43 antler and cranial remains, only 11 were identified to species. The remaining antler specimens are almost exclusively from large cervids which may include fragments of fallow deer antler.

All cervid longbones were fused at death. The measurements of the red deer postcranial elements are similar to those obtained for postglacial, including modern red deer specimens in Britain and they are larger than Pleistocene and postglacial fallow deer specimens (Lister, unpublished data) (Appendix 2). Most of the postcranial remains and many antler fragments exhibit butchery marks (Tables 16a, 16b). Chop marks were observed on the distal articulation and distal shaft of the humeri and a tibia was chopped at the proximal articulation and shaft. A femur exhibits fine cut marks on the lateral side of the distal articulation, which may result from defleshing or disarticulation. The pedicles on both red deer crania had been chopped through, indicating removal of the antlers (see also

Luff 1993 for similar Roman finds) while one antler was shed (Plate 3a). One of the roe deer antlers was also removed from the cranium by chopping around the pedicle (Plate 3b).

The presence at Scole of shed and unshed antler in addition to crania of red deer with chopped pedicles suggests that both collecting of antler and hunting of deer were practised, although shed antler, skins and whole carcasses may also have been imported (Krzyszkowska 1990). The environment surrounding Scole during the Roman period would probably have included attractive habitats for fallow, roe and red deer with the presence of pasture and meadows, cultivated fields and some deciduous and mixed woodland.

Fallow deer antler

The presence of a shed fallow deer antler in a Roman context is of exceptional interest (Plates 4a, 4b). The specimen was recovered from the basal layer (30786) of well 38024, which also included bones of a buzzard (*Buteo buteo*), butchered cattle remains and other bones and teeth of the main domestic livestock. Pottery from layer 30786 dates to the third-fourth centuries AD. while the assemblages from the overlying layers include materials ranging in date from the first to fourth centuries AD. The antler specimen itself has been dated, by ^{14}C, to the third to sixth centuries AD (2σ cal AD 267-545 (AA-26221, 1620 +/- 45 BP)).

The shape of the antler is of the triangular form and the specimen does not display any abnormal variations in shape (Chapman and Chapman 1975). The brow and trez tines are present and the first speller of the palm is developed also. The shape of the antler compares roughly to the third heads (corresponding to the third year) of deer from Richmond Park (Chapman and Chapman 1975: 113) but the specimen could have come from an older animal. The measurements place within the range of those recorded for fallow deer older than four years of age from Epping Forest (Chapman and Chapman 1975) but the measurements overlap with the modern data for younger age groups from Italy (Perco 1988). The antler exhibits butchery marks and fine cut marks on the palmate area. The posterior side of the palm was removed by chopping longitudinally probably from a cranio-medial direction (Plate 4b). The antler was almost complete when discarded and much material could still have been obtained from the specimen hence it is difficult to understand why it was discarded.

Fallow deer were part of the indigenous British Pleistocene fauna but disappeared with the Last Glaciation (Lister 1984). During the postglacial period, they were probably reintroduced to Central and Western Europe by the Romans (Zeuner 1963) but opinion is divided concerning their introduction to Britain. The initiative has been credited most widely to the Romans (Clutton-Brock 1987; Grant 1975) or the Normans (Chapman and Chapman 1975; Fletcher 1984). The uncertainty surrounding the introduction of fallow deer to Britain is due in large part to the scarcity of finds which predate the medieval period as well as to the questionable stratigraphic reliability of the archaeological contexts. Only a few finds have been reported from Iron Age, Roman or Anglo-Saxon contexts, some of which might be intrusive (Chapman and Chapman 1975; Grant 1975; Rahtz

1979). Literary evidence for fallow deer in Britain prior to the medieval period is equally tenuous due to the difficulty of interpreting historic references. In contrast, medieval and post-medieval finds are much more common, indicating that by this time fallow deer were well-established in Britain (Grant 1981; Maltby 1979). This is supported by many references to deer parks and fallow deer in contemporary documents (Chapman and Chapman 1975; Stamper 1988).

The origin of the Scole specimen is uncertain. As the antler was shed, it could have been imported to the site from other regions of Britain or from the Continent. The importation of venison (from fallow deer) to England has been postulated on the basis of finds from other sites (West 1983).

Birds

Avian remains represent 4% of the Early-Mid Roman assemblage but only 1% of Late Roman remains, despite the use of sieves for the excavation of some layers (Tables 1, 15g; Fig. 2). More than half of the bird remains are from Galliformes but a variety of other taxa was identified, some of which were present in the 1973 assemblage also. Birds probably did not rival the larger domestic mammals in terms of meat yield; some may have been raised locally for egg production and occasionally meat.

Domestic fowl: More than half of the bird bones from Scole are from medium-size Galliformes (Table 1). Distinction between most elements of domestic fowl (*Gallus gallus*), guinea fowl (*Numida meleagris*) and pheasant (*Phasianus colchicus*) is problematic due to the morphometric similarity of these taxa. In this assemblage, a large proportion of the Galliformes remains could not be attributed to species, however all bones that were identifiable are from domestic fowl (Erbersdopler 1968; MacDonald 1992). Domestic fowl may have been introduced to Britain prior to the arrival of the Romans while guinea fowl and pheasant were probably imported during the Roman period (Zeuner 1963; Blank 1984).

All elements of domestic fowl are represented in the collection, indicating the presence of whole birds at the site (Table 15g). Most of the bones are from mature individuals but the fragile and more porous elements of immature birds may not have survived as well as the harder elements of adult birds. Three males and one female were identified on the basis of the presence or absence of spurs on the tarsometatarsi. A few butchery marks were observed on the femora of domestic fowl, indicating disarticulation and defleshing (Tables 16a, 16b). Most measurements place at the lower end of contemporaneous size ranges known from other Roman sites including Colchester, Exeter and Lincoln (Dobney et al. 1995; Luff 1982; Maltby 1979) and probably compare in size to the smaller of Old English game birds (Dobney et al. 1995). Two humeri of domestic fowl exhibit advanced stages of osteopetrosis, a viral condition which causes the bone to thicken (Baker and Brothwell 1980). This disease has been identified at Wicken Bonhunt (Baker and Brothwell 1980) and at Colchester, where numerous cases were identified in Roman assemblages (Luff 1993).

Other birds: In addition to domestic fowl, other birds may have been raised at Scole or hunted. Possible domesticates include geese, ducks and pigeon (Table 1) (André 1981). One of the goose elements is similar in size to the Greylag goose (*Anser anser*) but distinction between the domestic and wild forms of this species was not possible (Appendix 2). The wild Greylag is a permanent resident of East Anglia while the other wild geese are mainly winter residents and today are uncommon or absent in East Anglia. One goose element may be from one of the smaller wild species. The duck remains are similar in size to mallard and domestic ducks (*Anas platyrhynchos*) and some of the larger wild species (Appendix 2). The Romans are known to have hunted and raised pigeons (André 1981). One specimen in the assemblage may be from rock dove (*Columba livia*) or woodpigeon (*Columba palumbus*) but it was not possible to distinguish between the two species, as they may overlap in size (Fick 1974). Both may be found in towns as well as in rural areas. One specimen of woodcock (*Scolopax rusticola*) was identified in a Late Roman context. This species is a common resident in England and today is found mainly in woodland habitats (Perrins 1987). It appears to have been common fare in the past (Parker 1988).

A number of specimens are from commensal birds and common urban scavengers, including corvids, buzzard and white-tailed eagle (Tables 1, 15g). The corvid remains are the size of rook (*Corvus frugilegus*) and crow (*Corvus corone*); one tibiotarsus was slightly larger than these taxa but smaller than raven (*Corvus corax*) (Appendix 2). A group of corvid bones recovered from a pit probably belong to a single bird. A few buzzard (*Buteo buteo*) remains were recovered from a well and probably come from a single individual. The femur of a white-tailed eagle (*Haliaeetus albicilla*) was recovered from a pit dug into the top of a well (Group 80271) which contained a cow skeleton; the significance of the eagle bone is uncertain but it may be from a carcass of a predator/scavenger rather than from something more symbolic. White-tailed eagles, like other birds of prey were common scavengers in Roman urban environments (Parker 1988; O'Connor 1993). The remains of small birds are rare in the main assemblage. One passerine element is thrush size but was not identified to species. Other specimens were recovered in the bulk samples and cremated assemblage (see below).

Amphibia

Amphibian remains (Common frog, *Rana temporaria* and Common toad, *Bufo bufo*) represent less than 1% of hand-collected remains (Table 1). Both species are found in a wide variety of habitats, the frog preferring moist environments and the toad, drier ones (Arnold et al. 1992).

Fish

One fish specimen, a pike vertebra, is present in the hand-collected assemblage. A few additional specimens were recovered by fine-sieving (see Bulk samples below).

Bulk samples from miscellaneous contexts

Only a few of the fine sieved whole earth samples yielded identifiable specimens (Table 4). The samples include remains of pig (including a foetal/neonatal bone), common shrew (*Sorex araneus*), birds, amphibians and fish. Most of the avian remains are from passerine size birds. Although limited, the fish data are interesting in that only freshwater fish and eel are represented. The fish specimens include vertebrae of common eel (*Anguilla anguilla*), trout (*cf. Salmo trutta*) as well as one scale of a perch (*Perca fluviatilis*). Two scales of perch were identified in the 1973 assemblage. All of these taxa may have been found in the River Waveney or in nearby lakes or ponds. Few Roman sites have yielded sizeable assemblages of fish remains and the study of fish in Roman subsistence is problematic due to poor recovery on some sites (Grant 1989). Fish data from sieved and hand-collected Roman assemblages from York (O'Connor 1991), Lincoln (Dobney et al. 1995) and Colchester (Luff 1993), suggest that eel or marine taxa were probably of greater economic importance than fresh-water fish, while at Exeter (Maltby 1979) only marine taxa are represented in the Roman period.

Deposit of cremated remains

A deposit of partially cremated remains of macro and microfauna was discovered in the vicinity of an inhumation and cremation cemetery in Areas 1-4. The deposit was initially interpreted as a "series of funerary pyres" (Flitcroft and Tester 1994). The assemblage includes a large number of cranial and postcranial remains of microfauna in addition to the macroremains of domestic and wild taxa represented in the main assemblages (Table 4). The frequency of burnt remains varies between samples from c. 10-90% of the total assemblage contents. The degree of burning also varies from c. 5-100% calcination.

The macroremains include mainly bones and teeth of caprines but cattle, pig, dog, cat, hare, domestic fowl, duck and fish (Cyprinidae, possibly bream) are represented also (Table 4). Many of the calcined elements were deformed by the heat and in some cases it was difficult to differentiate between the bones of animals similar in size and skeletal morphology (*eg.* caprine and roe deer). The element distribution is dominated by the more durable and resistant elements, including teeth and carpals, tarsals and sesamoids (many of these were recorded but not counted), however even the teeth and more resistant parts of the limbbones are highly fragmented. All bodyparts rather than select joints appear to be represented in the samples.

The remains of microfauna include many bones, teeth or tooth rows of mice, voles and shrews, some bones of small birds including swallow and passerines, amphibian remains and a possible reptile cranial element (Table 4; Fig. 13). As the diagnostic elements chosen for quantification differ between Classes and Orders, the taxonomic representation may be biased towards those animals and element types which are least susceptible to destruction by digestion or other agents (*eg.* soils) (Chaline 1974: 21-22; Stahl 1996). The taxonomic distribution resembles owl pellet contents, with a high frequency of rodent remains and fewer of shrews, amphibians and small birds (Chaline 1974). Many of the small mammal longbones (not counted) are abraded and rounded at the articular ends which may support the idea of digestion and regurgitation by owls. Most of the small mammal remains are dark brown in colour but some of the amphibian remains are of a lighter shade. Fresh looking bones were not observed in the samples, suggesting that recent intrusives are not included. A few remains are charred or calcined.

The contents as well as the modifications observed on the bones suggests that the deposit may consist of midden refuse mixed with the contents of owl pellets. Site waste may have been dumped in a structure where owls roosted. The accumulation of refuse and pellet contents may have been periodically burnt as new material was added, which would explain the presence of burnt remains of small animals. Alternatively, the remains of microfauna may come from material cleaned out of one or more structures and added to other site refuse. This material may have been subsequently dumped and burnt in the location of the "pyre". The presence of fine inundation layers within the deposit suggests that more than one episode of deposition occurred (Macphail, Archive report a).

The environmental information provided by the microremains must be viewed with caution as the origin of the sample is uncertain. If the specimens are from pellet contents, the taxonomic and element representation may be biased due to differential preservation (partial or complete digestion and/or subsequent burning). Most of the small mammals represented in the sample occupy a wide range of habitats. The predominance of field vole indicates predation in open fields and ungrazed grassland. The habitats of the other taxa include deciduous woodland, banks and hedgerows and aquatic environments. Some taxa may also have inhabited gardens and buildings (Corbet and Southern 1977).

Medieval and post-medieval periods (Periods 6 and 7)

The medieval and post-medieval assemblages are very small and provide little information about subsistence or husbandry practices during the Post-Roman period. The assemblages are dominated by the remains of cattle and caprine and the few fine-sieved remains are exclusively from caprines; pig and dog remains are relatively common but most of these are from single skeletons (Tables 1, 2a, 2c). Rarer taxa include cat, red deer and domestic fowl. The dog skeleton is from an animal similar in height to a labrador (c.53-58cm at the shoulder) but slightly more slender in build. The cat specimens are similar in size to those of domestic cats from Anglo-Saxon and post-medieval sites (Albarella and Davis 1994a, 1996; Crabtree 1994) (Table 22).

DISCUSSION

The 1993 excavations in the area of Scole-Dickleburgh yielded a large assemblage of faunal remains, of which approximately 4000 specimens were identified. Most of these were recovered from Roman contexts while only a few date to the prehistoric and medieval/post-medieval periods. Mammal remains constitute over 90% of the assemblages from all periods and almost all of these are from the domestic livestock, cattle, caprines, pigs and equids. The remains of other domestic mammals, dog and cat, wild mammals, birds, fish and amphibians are much more rare.

The main livestock raised at Scole were cattle and sheep; pigs, equids and goats were much less common. Results based on MNI calculations and data from the fine sieve samples from Scole suggest that the relative abundance of caprines may have been greater than indicated by bone counts, however cattle would have provided the bulk of the meat supply, given their greater size. Pigs do not appear to have been important meat providers however it is not possible to determine if additional pork was imported to the site in deboned form. Horses and dogs were probably rarely consumed but hides, skins and some bones may have been used. Domestic fowl would also have provided meat and a regular supply of eggs. Ducks, geese and pigeons may have been raised within the settlement also.

The proportions in which the main domestic species were consumed appears to have remained stable throughout occupation. The taxonomic distribution varies between areas of the site but this is attributed primarily to differences in sampling strategies and recovery methods. The frequencies of the main taxa identified at Scole correspond to patterns observed in assemblages from Romanised civilian settlements in Britain, in which cattle tend to predominate (Grant 1989; King 1978). With its low pig frequencies, Scole differs somewhat from Roman towns or military sites which include a relatively high proportion of pig remains (>20%) and fewer sheep (<30%) (King 1978, 1984; Luff 1993) and is most similar to patterns known from the smaller Roman "vici" (King 1984) (Fig. 14). The location of Scole on heavy clay soils in the Waveney Valley may explain in part the high frequencies of cattle, which are more suited to such environments than sheep (Grant 1989; King 1978; Peglar 1993).

It is difficult to determine to what extent the inhabitants of Scole were directly involved in stockraising. Some animals, such as caprines, pigs and domestic fowl, may have been raised on a small scale within the settlement, however the scarcity of remains of perinatal animals and very young animals suggests that livestock were raised mainly outside the settlement and brought to town for slaughter at a marketable age or at the end of their productive lives. Throughout occupation, most cattle were slaughtered when adult or elderly, suggesting that they were used mainly for traction and possibly dairy production. In contrast, most pigs were killed when immature or subadult, reflecting their primary role as food animals. The cull pattern of caprines shows a distinct change from the Early-Mid to Late Roman periods. The data may indicate a change in the local livestock economy, with a shift from meat production in the Early-Mid Roman periods to a broader range of uses including wool and/or milk production in the Late Roman period. Differences related to status are less probable given the low status of the area in general.

The presence of elements from all bodyparts indicates that whole animals were slaughtered within the settlement. Few assemblages with distinctive butchery waste were observed and most contexts include a range of elements, many of which exhibit cut and chop marks. The presence of many cattle scapulae with heavily butchered articulations and holes pierced at the proximal end, in both the 1973 and 1993 assemblages, suggest that joints may have been imported to or prepared at Scole, however distinction between organised versus domestic butchery is problematic. Secondary butchery of joints could have been undertaken at the household level and some of the smaller livestock may have been raised in backyards and slaughtered by non-specialists.

Some of the cattle and sheep sizes from Scole rival the largest of known animal sizes in the surrounding area and in different parts of Roman Britain. The "improvement" of native stock by the Romans may have been accomplished by importing large breeds and cross-breeding these with the small native Iron-Age animals. Alternatively, the size increase may have been obtained by careful selection and management of the native livestock. The distal tibia breadth in sheep shows a significant increase from the Early-Mid to Late Roman periods at Scole while the cattle measurements provide conflicting evidence of size change, which may reflect a change in bone proportions and body shape rather than overall size. The dog remains from Scole include specimens of small, medium-size, very large dogs and possibly wolves, resembling the variability known from other Roman sites

Hunting, fowling and fishing do not appear to have been important subsistence activities. Grant (1989) suggests that the scarcity of non-domestic animal remains at most Roman sites indicates the main food supply was adequately ensured by stock raising and agricultural activities; the data from hand-collected and sieved assemblages from Scole support Grant's conclusions.

Antler was probably an important raw material for craft work and was obtained from hunted game as well as by collecting shed antler. The shed antler of a fallow deer is of especial interest and is one of a growing corpus of pre-Norman fallow deer finds in Britain. It is the first specimen to be dated by C14 and the result confirms it's Roman origin, however it does not help to resolve the question of whether live fallow deer were present in Britain at that time. Antler was the subject of active trade and the specimen may have been imported from the Continent. Dating of a wider range of finds, in particular of postcranial bones, would be helpful in assessing the presence and distribution of this species in pre-Norman Britain.

The range of wild mammals and birds represented at Scole suggest that a variety of habitats was present in the surrounding territory including stands of deciduous and mixed woodland, scrub and ungrazed grasslands as well as fields and meadows. Some of the wild taxa would have required forested areas for shelter but could have been hunted in more open areas and along field edges.

A few unusual assemblages were observed. A cremated assemblage includes many remains of microfauna and highly fragmented bones and teeth of domestic livestock. The macro remains include elements from all bodyparts rather than select joints while the taxonomic distribution of the microfaunal remains resembles the makeup of owl pellets. The contents and preservation of the assemblage suggest that it consists of a deposit of occupation refuse mixed with owl pellets, which was burnt, probably in multiple episodes. A cattle skeleton from a well is from an immature animal but it is not possible to say whether it consists of a ritual offering or whether the animal simply died of natural causes and was discarded in the well. The presence of other remains, including one gnawed specimen, suggests that the well may have been used, at least briefly, for waste disposal. The deposition of two horse skulls in a leat are more suggestive of ritual activity.

CONCLUSIONS

The faunal assemblage from Scole has provided important information regarding subsistence and economy in a Romano-British small town. The assemblages from the Early-Mid and Late Roman periods include mainly the remains of domestic animals, mainly cattle and sheep while pigs, equids, goats, domestic fowl and dog are much less common. The proportions of the main stock resemble data from Romanised civilian settlements in Britain and show little variation throughout occupation. Differences in the proportion of caprines north and south of the river are probably due to differences in recovery and excavation strategies rather than other factors such as social status. Kill-off patterns show that cattle and caprines were raised for a variety of purposes including meat, traction in the case of cattle, and wool in the case of sheep however production strategies appear to have shifted, for caprines, from meat production in the Early-Mid Roman periods to a broader range of uses in the Late Roman period. There is also a difference in caprine age profiles between areas north and south of the River Waveney, in the Early-Mid Roman period, possibly reflecting differences in status with inhabitants closer to the town centre consuming better quality meat. Most animals were probably raised outside the settlement as suggested by the scarcity of foetal, perinatal and very juvenile specimens in the assemblages.

The metrical analysis shows that the cattle and sheep raised at Scole were as large or larger than animals from other Roman sites in East Anglia and further afield, suggesting that stockraising at Scole followed the trend of size increase observed across Roman Britain. Some sheep measurements show an increase from the Early-Mid to Late Roman periods while the cattle data provide intriguing evidence for a possible change in body shape.

A variety of non-domestic bird and mammal species are present in the assemblages in addition to fish but these were of little dietary importance. Antler may have been a valued material and was obtained from shed racks and hunted animals. The unusual find of a shed antler of fallow deer, dated by ^{14}C to the 3rd-6th c. AD, is of exceptional interest, given the scarcity of pre-Norman fallow deer remains and the debate surrounding the introduction of this species to Britain. Other unusual finds include a deposit of cremated domestic waste mixed with owl pellet contents, a cattle skeleton from a well and two horse skulls from a leat. The significance of the deposits is uncertain however only the latter is suggestive of ritual activity.

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Figs. 1a and 1b
1a - Location of Scole-Dickleborough (from Flitcroft and Tester 1994)
1b - Location of excavation areas (from Suffolk Archaeological Unit 1994)

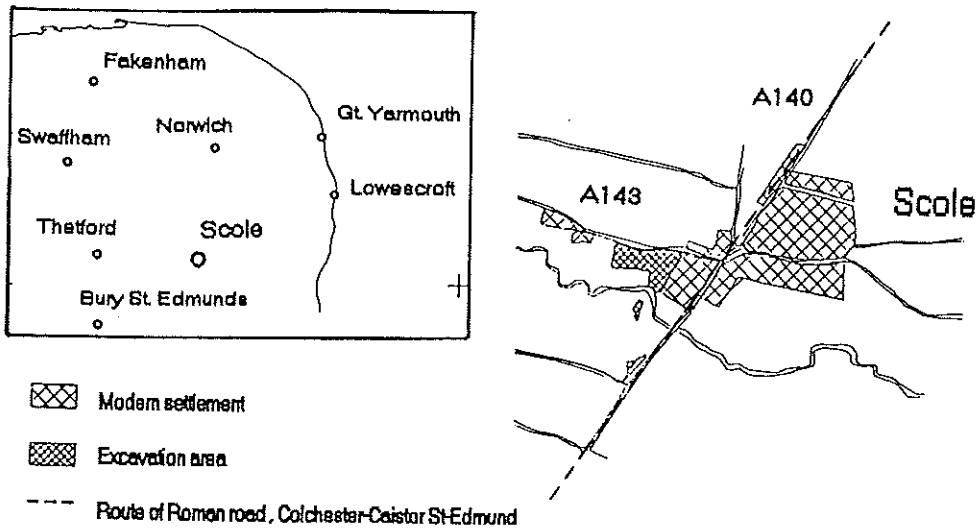


Fig. 1a

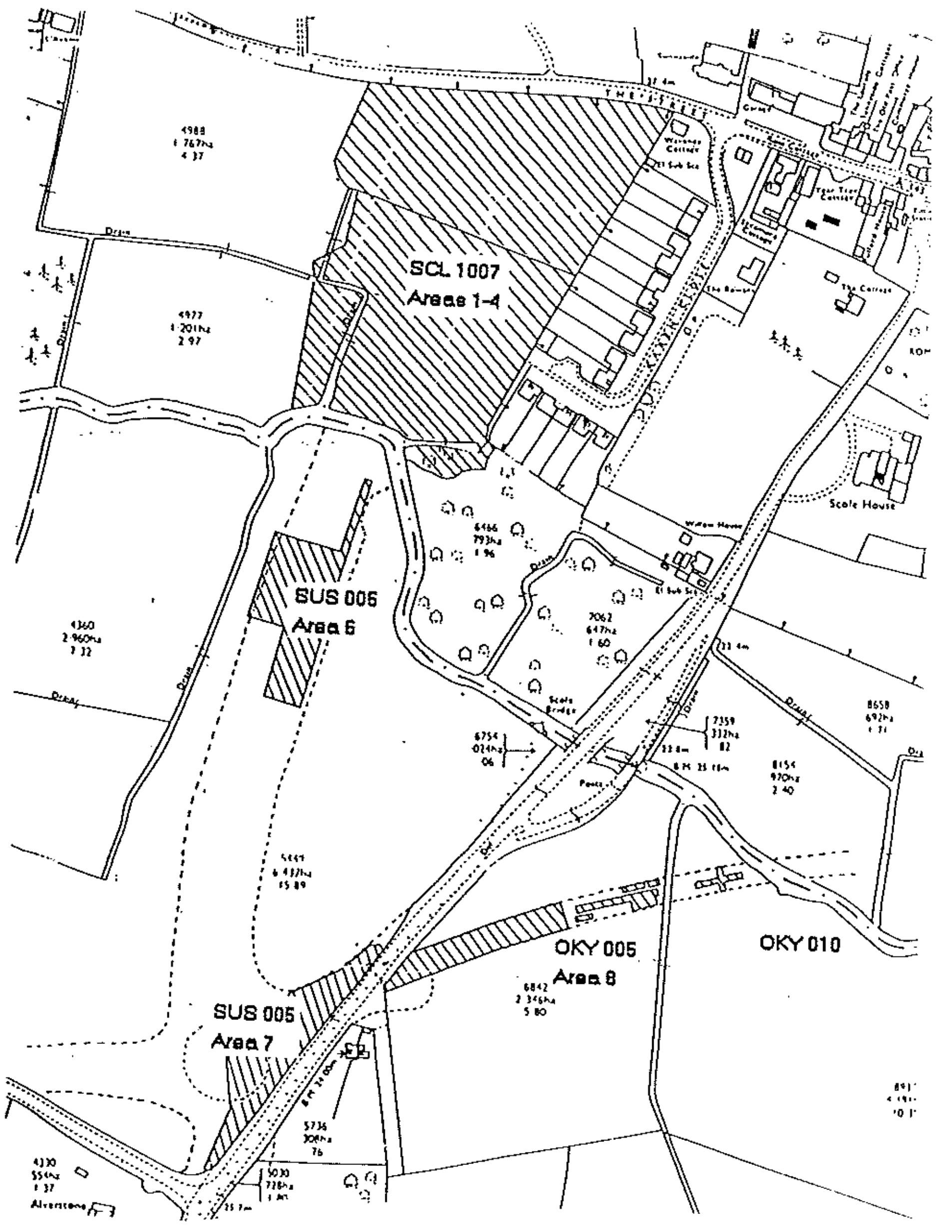


Fig. 1b

Fig. 2
Taxonomic distribution of the faunal remains from the Early-Late Roman Periods (bone counts (N), hand collected and coarse-sieved remains (1cm))

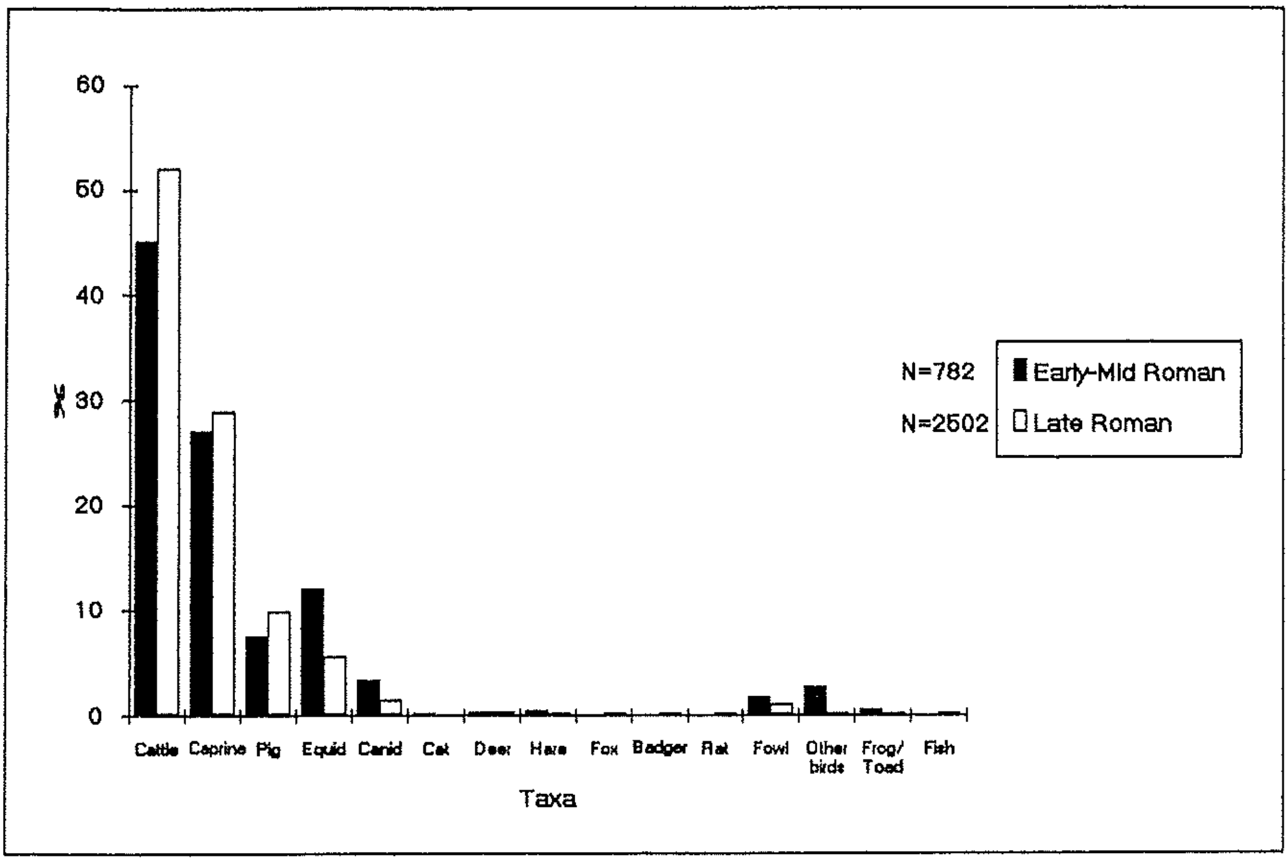


Fig. 3
Taxonomic distribution: grey soil and dark earth assemblages (bone counts (N), hand-collected and coarse-sieved remains(1cm))

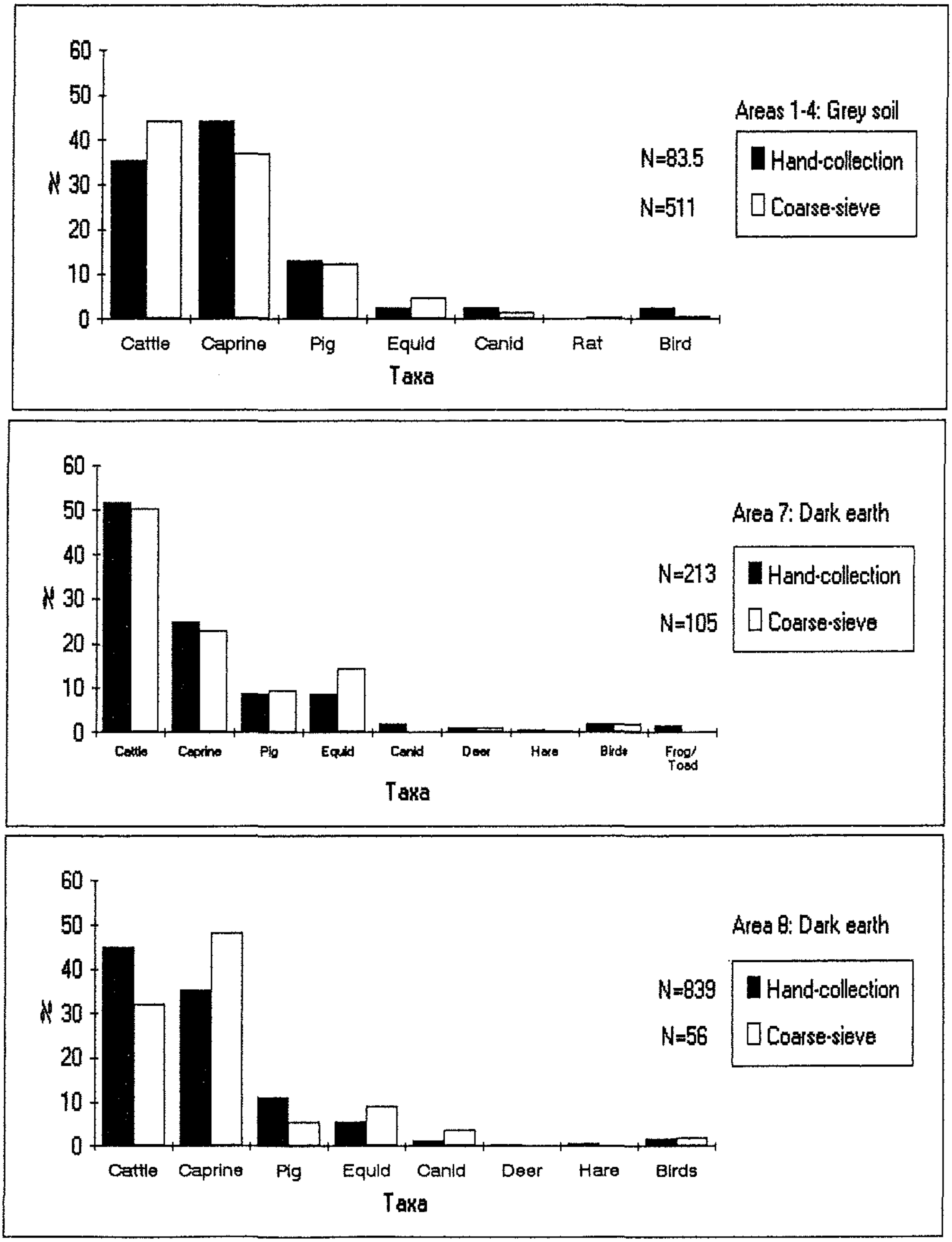


Fig. 4
Taxonomic distribution of the faunal remains from ditches, pits and wells, Early-Late Roman Periods (bone counts (N), hand-collected remains)

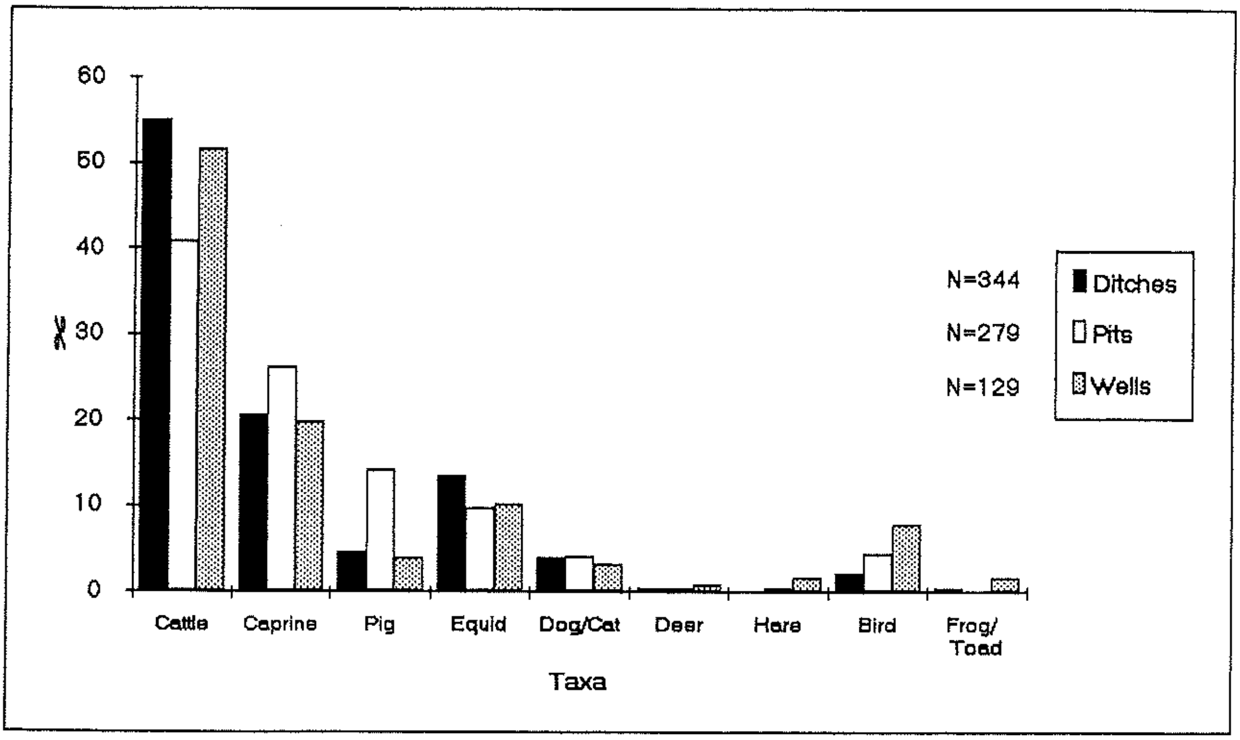


Fig. 5
Cattle: MNI by anatomical element (data in Table 16a)

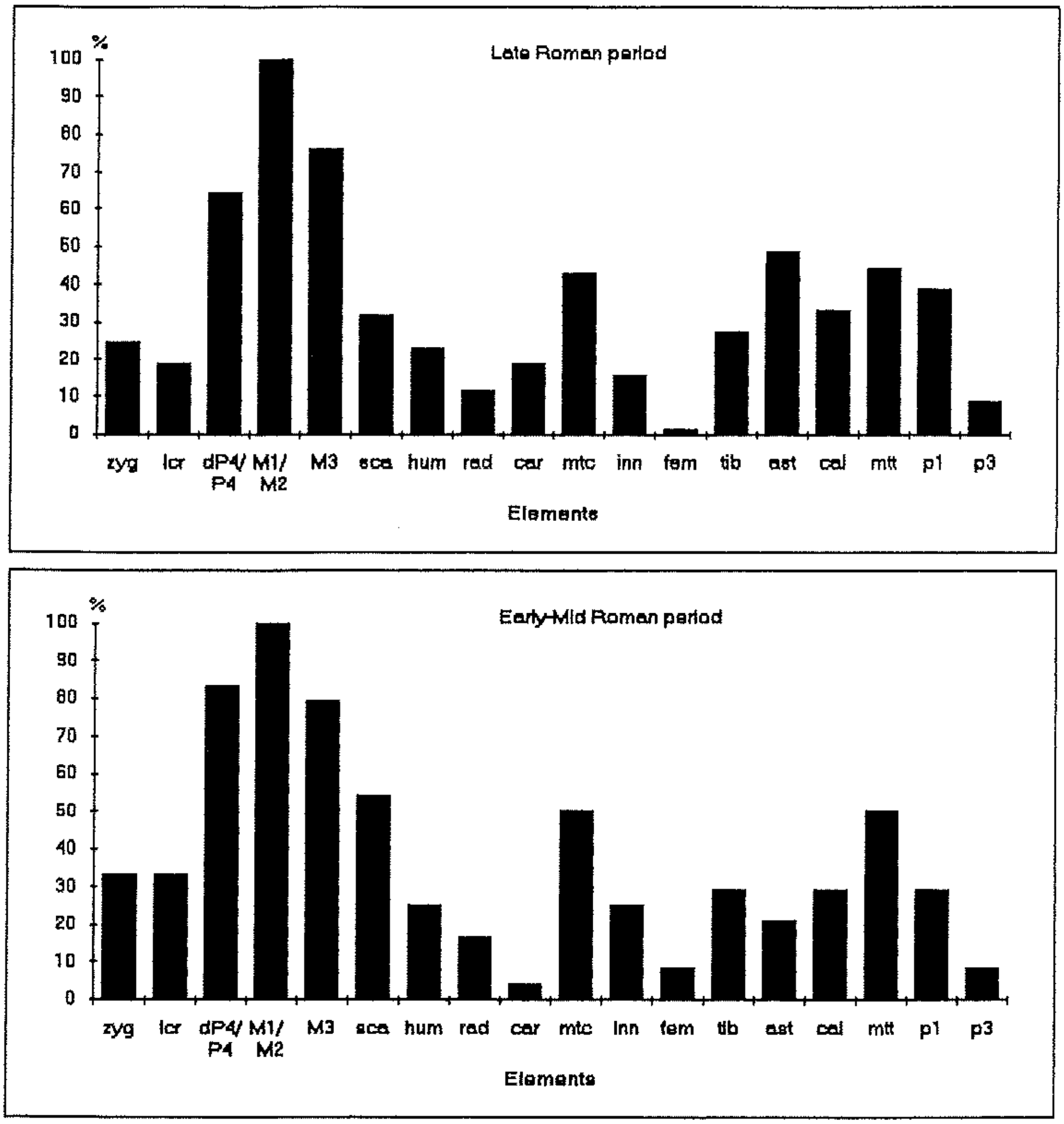
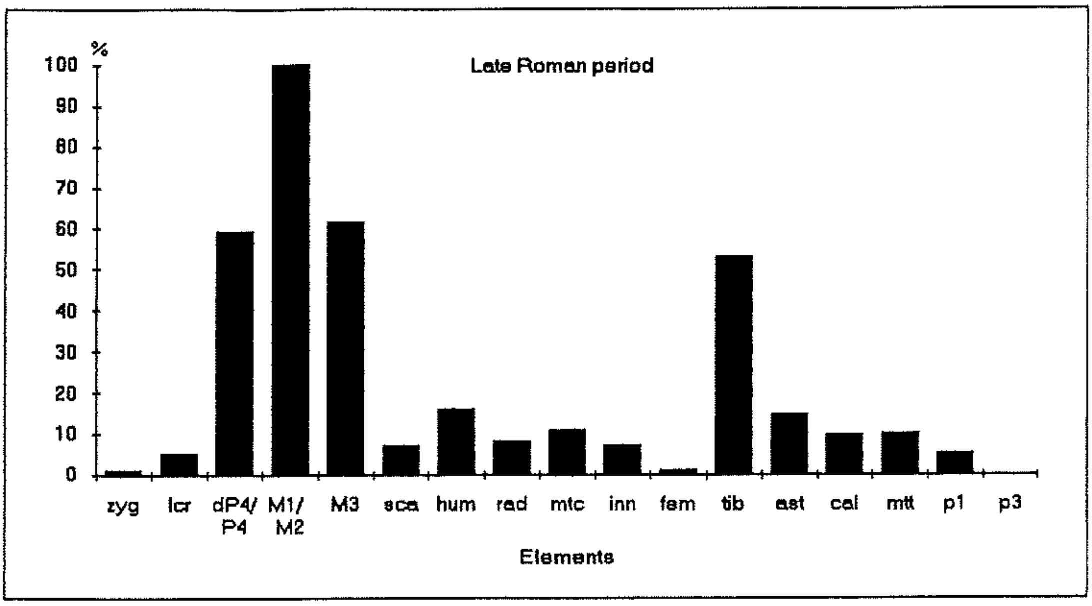


Fig. 6
Caprine: MNI by anatomical element (data in Table 15b)



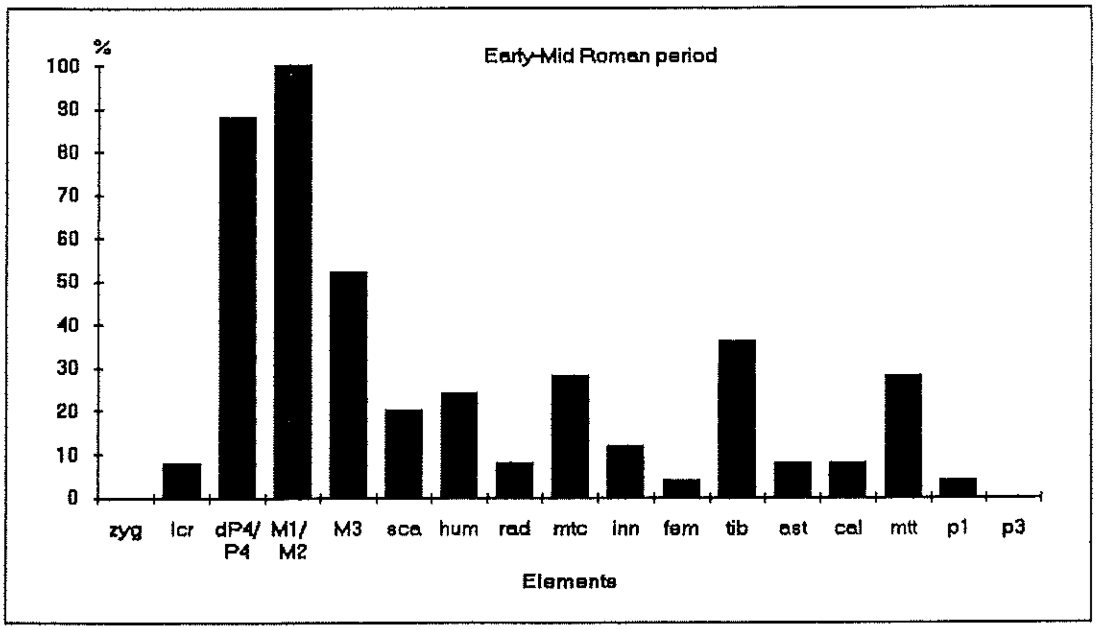


Fig. 7a: Cattle metacarpal BFd (mean indicated by inverted triangle)

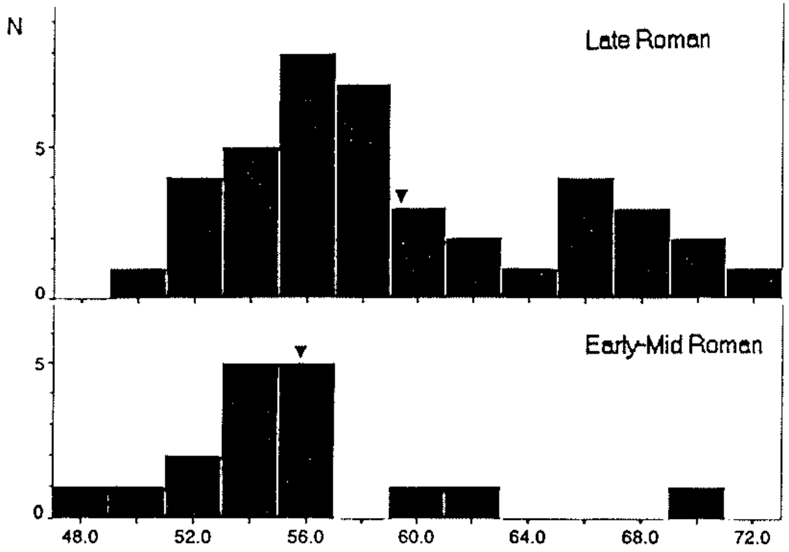


Fig. 7c: Cattle mandibular M3 breadth (mean indicated by inverted triangle)

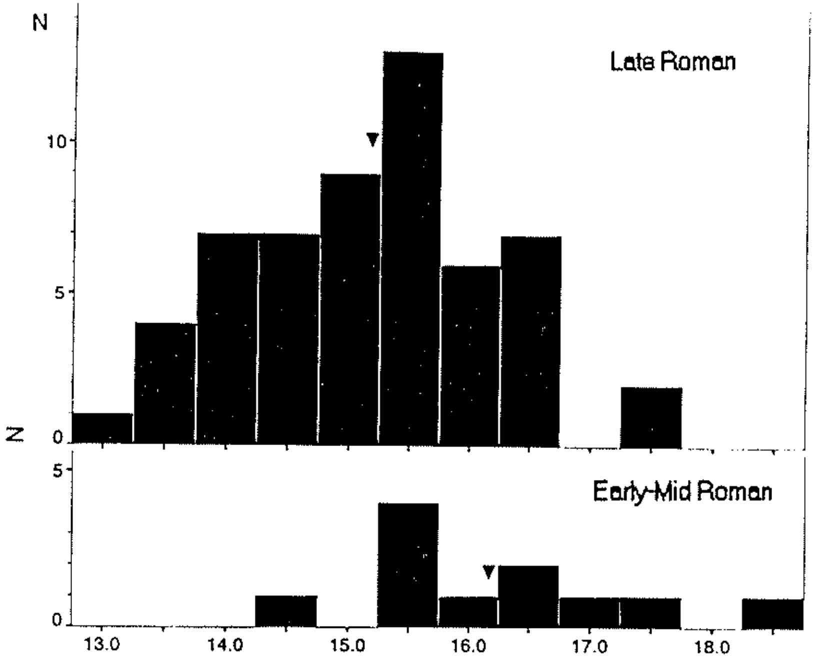


Fig. 7b: Cattle humerus HTC (mean indicated by inverted triangle)

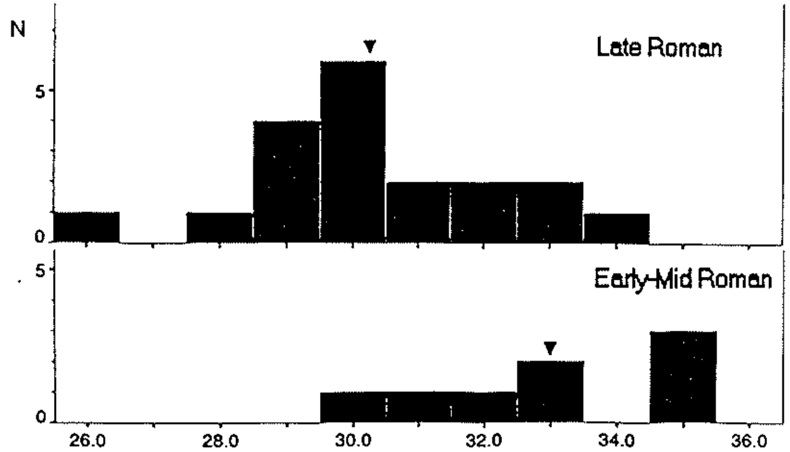
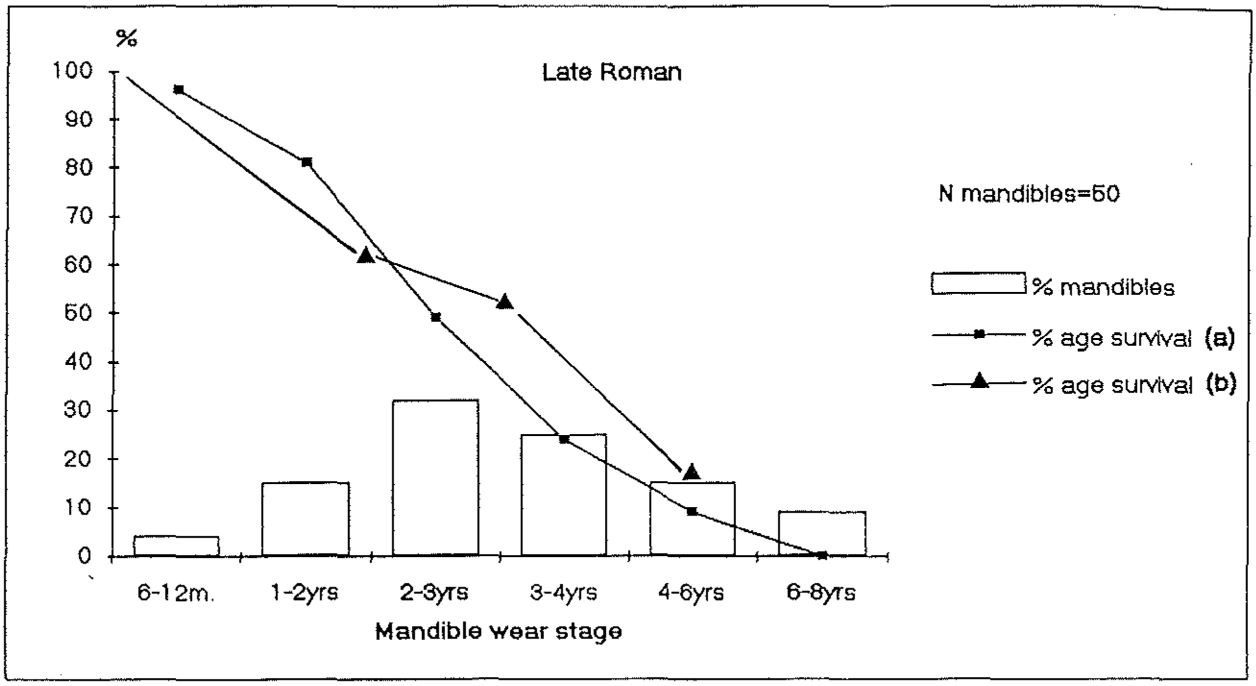


Fig. 8
Mortality curves of caprines based on mandibular tooth wear ((a) after Payne 1973, data in Table 11; (b) after Payne 1988, data in Table 14)



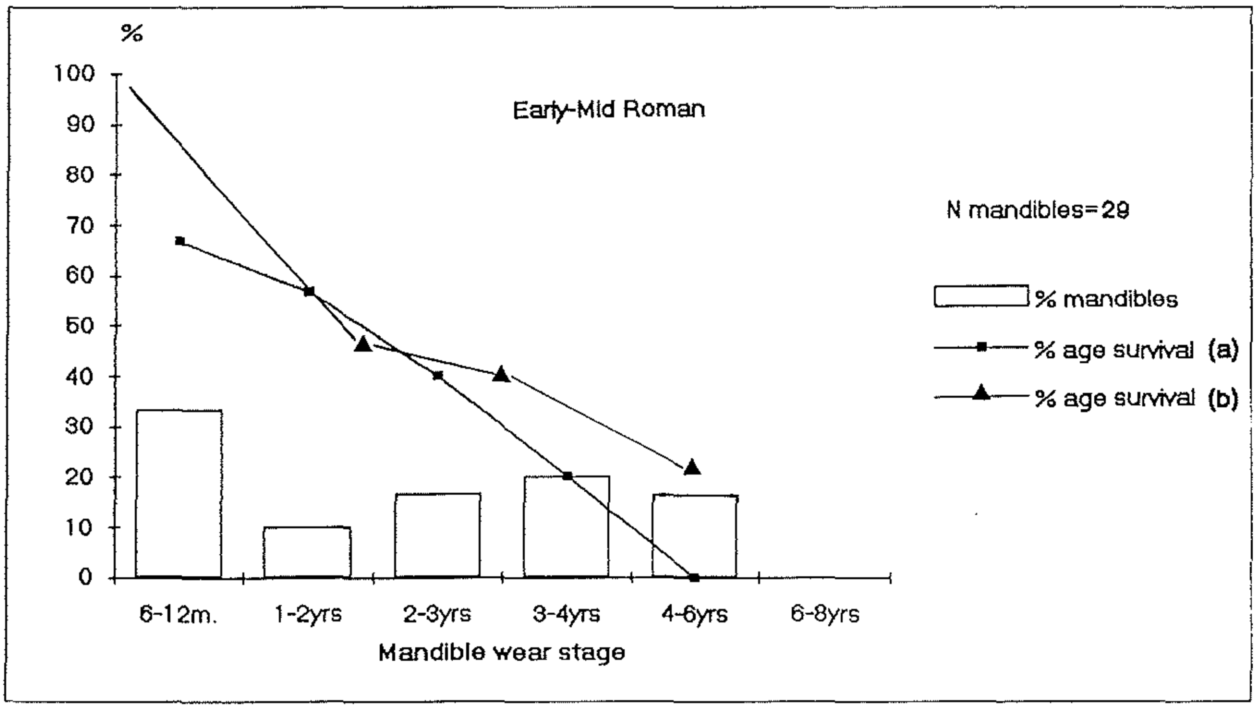


Fig. 9
Sheep and goat metacarpals: medial condyle

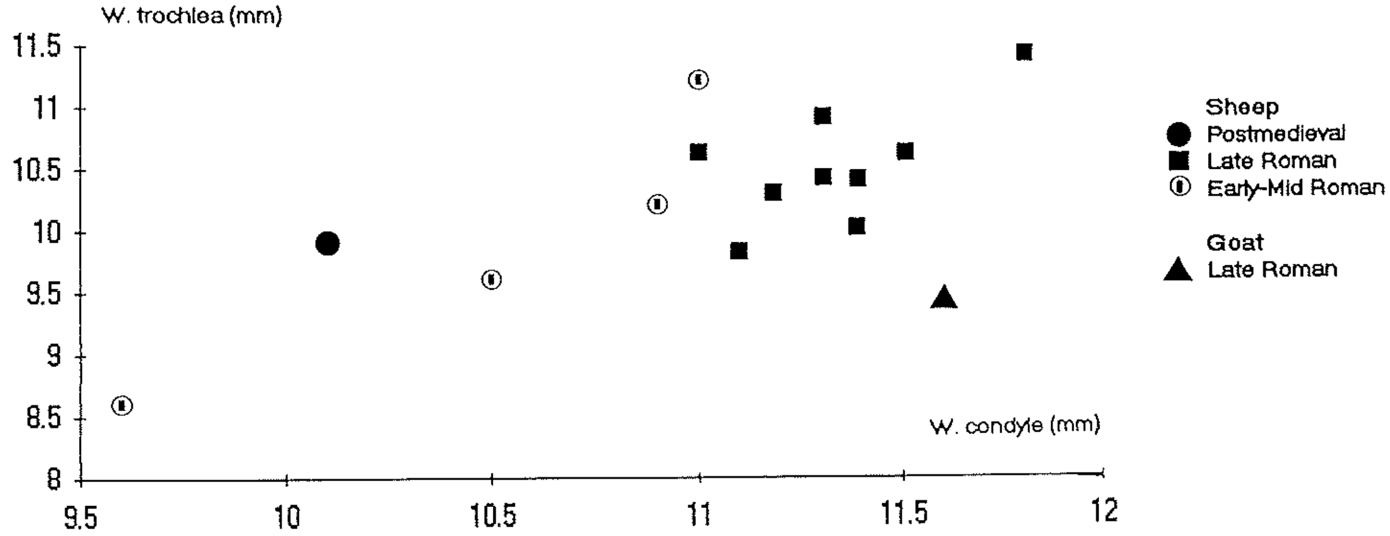


Fig. 10
Log-ratio diagram of Roman sheep from Scole-Dickleborough (1st-4th centuries AD) compared with Shetland ewes (Shetland data from Davis 1996): mean indicated by inverted triangle, for tibia Bd
∇ refers to Early-Mid Roman mean, ▼ refers to Late Roman mean; metacarpal and metatarsal GL pooled

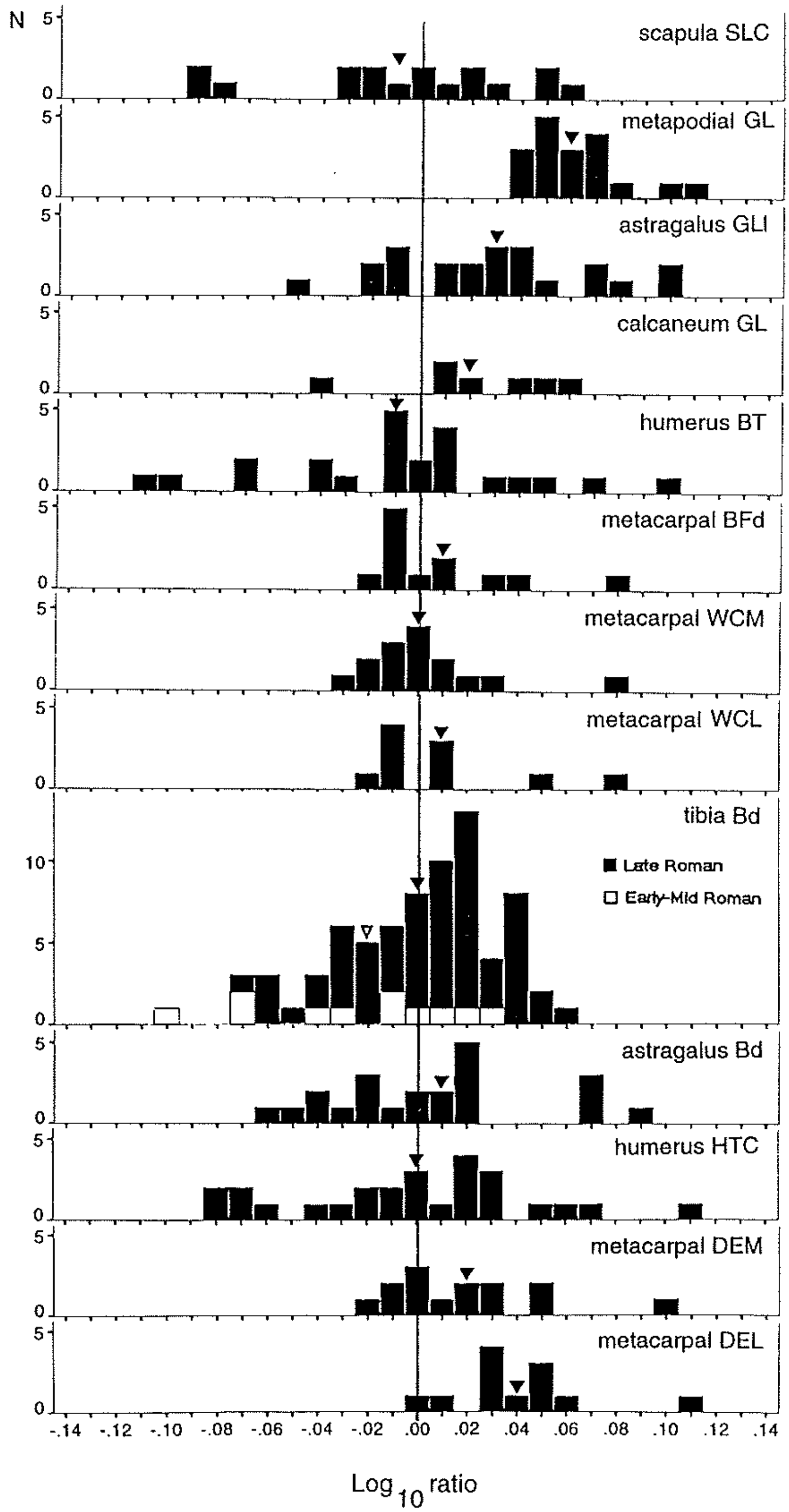


Fig. 11
Log-ratio diagram of Roman pigs from Scole-Dickleborough (1st-4th centuries) compared with neolithic pigs from Durrington Walls (unpublished neolithic data from U. Albarella, 1997): mandibular tooth measurements only (means indicated by inverted triangle).

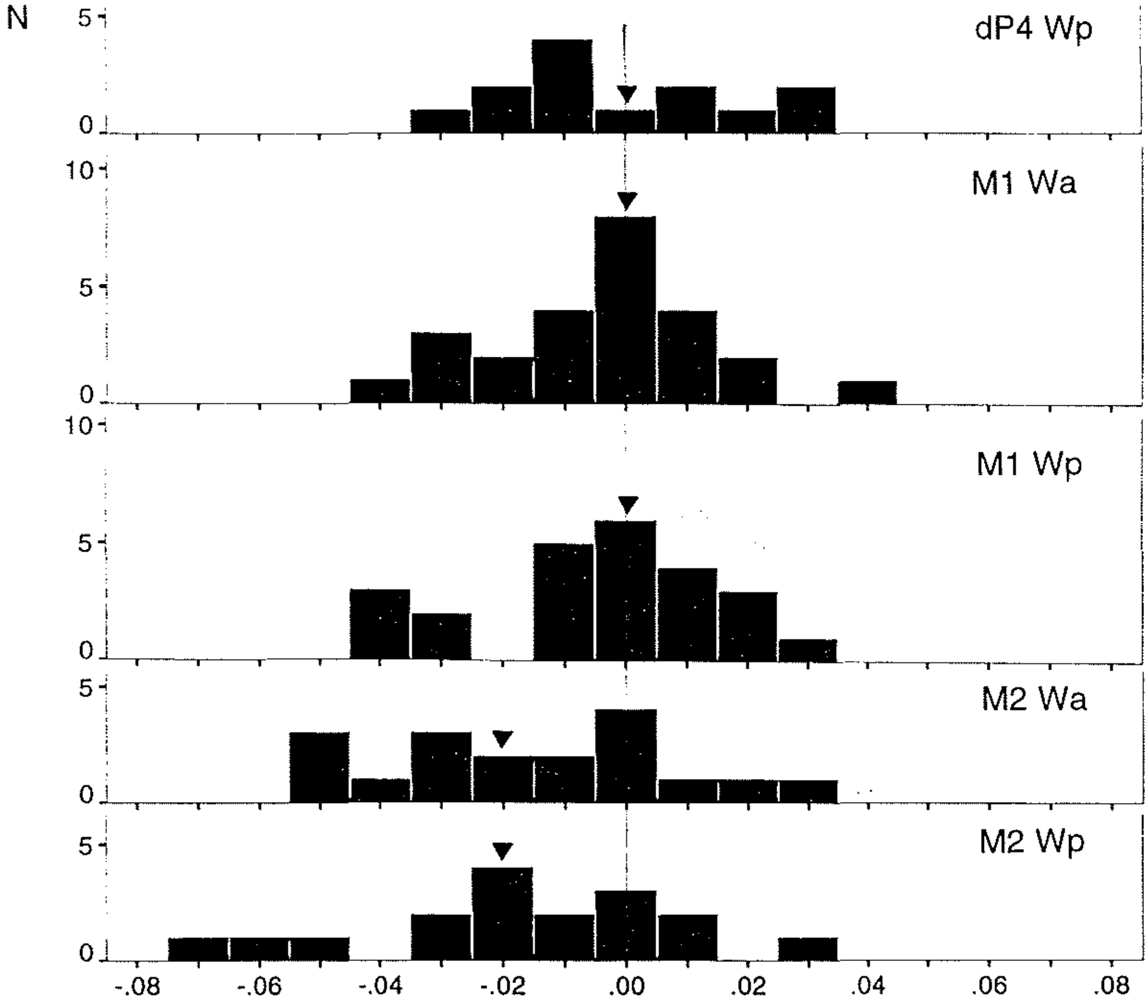


Fig. 12a
Distribution of length of M1-M3 in dog mandibles: Early-Late Roman period

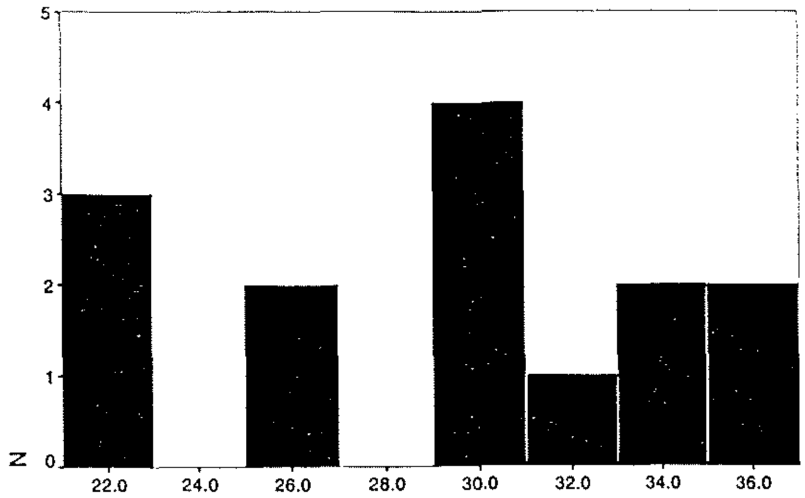


Fig. 12b
Distribution of mandibular M1 length in dogs: Early-Late Roman period

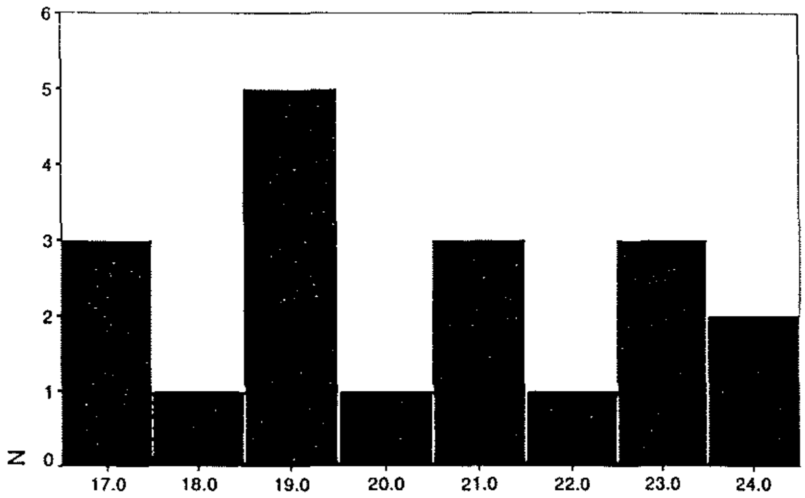


Fig. 13
Taxonomic distribution of microfauna in the cremated assemblage (MNI%; data in Table 4)

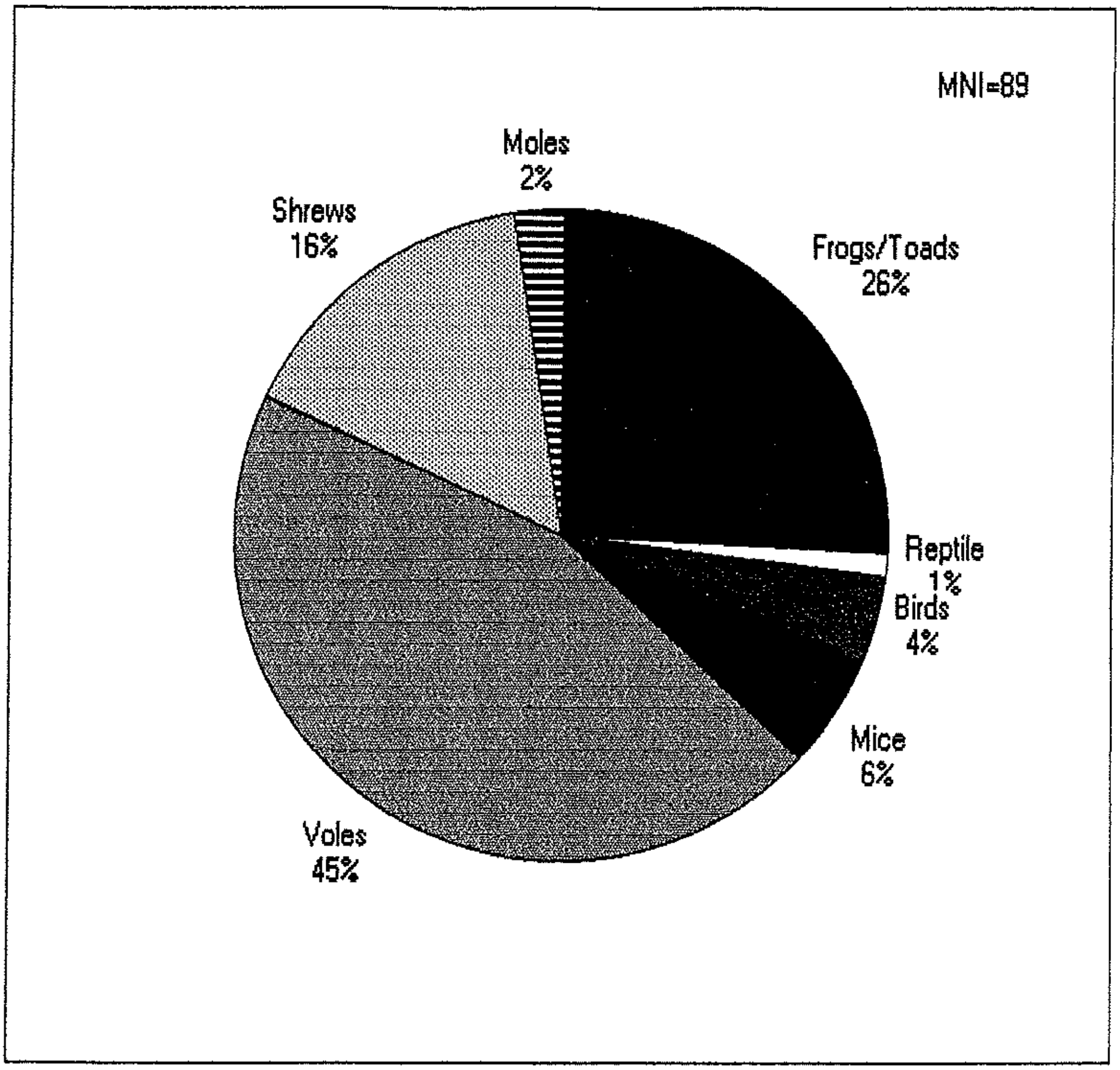


Fig. 14
Relative frequency of cattle, caprine and pig remains from British civilian sites (from King 1984, data in Table 2). O Romanized town; • Romanized settlement/Vicus; ▲ villa; I unromanised settlement; — late pre-Roman Iron Age settlement/oppidum.

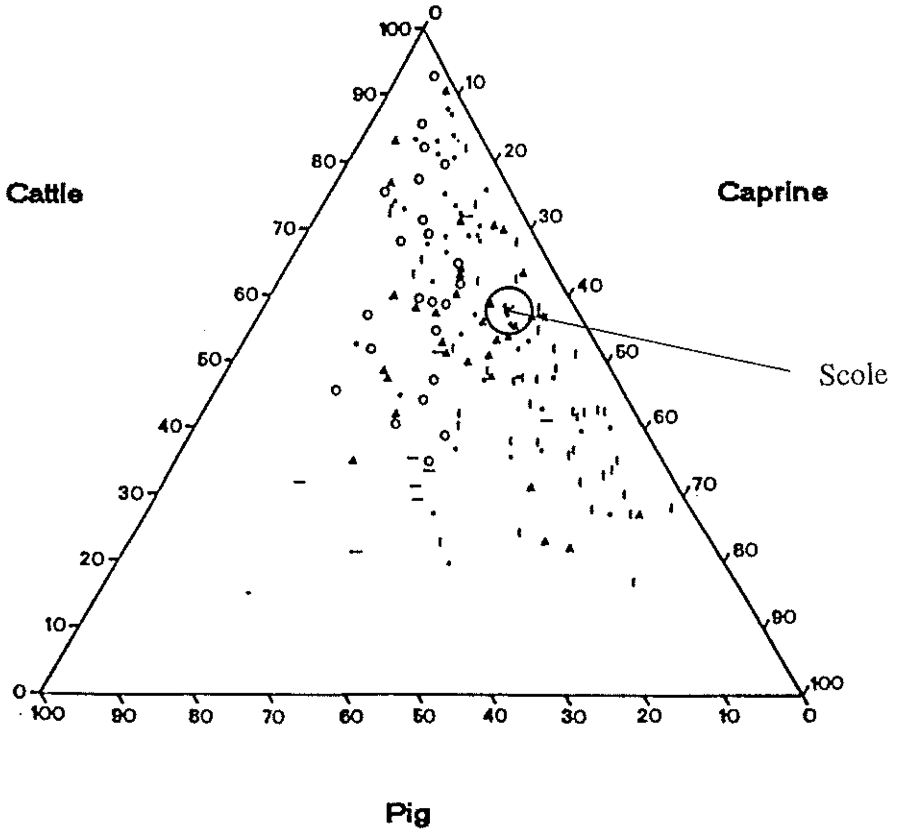


Table 1

Taxonomic distribution of the faunal remains in hand-collected and coarse-sieved assemblages (bone counts (N), after Davis 1992). Cattle/caprine half distal metapodials and pig metapodials divided by 2; equid phalanges multiplied by 2; canid and leporid metapodials divided by 5 and phalanges multiplied by 2/5; cf. domestic fowl included in total Domestic fowl count; sheep and goat included in total Caprine count; presence of non-countable specimens only, indicated by '+'.

	Prehistoric	Early-Mid Roman		Late Roman		Medieval/Postmedieval
Taxa	N	N	%	N	%	N
Mammals						
Cattle	14.5	351	45	1294.5	52	72
Caprine	15	213	27	717.5	29	50
(Sheep	6	52		122		13)
(Goat				3		)
Pig	1	58	7.4	244.5	9.8	20.5
Equid	2	91	12	155	6.2	18
Dog/Canid	2	25.8	3.3	35.2	1.4	32.8
Cat	1	1	0.1	+		1
Red deer		+		6	0.2	1
Fallow deer		+				
Roe deer		2	0.3	1	0.04	
Fox				5	0.2	
Hare		3	0.4	6.2	0.2	
Badger				1	0.04	
Squirrel		+				
cf. Black rat				1	0.04	
Birds						
Domestic fowl		13	1.7	25	1	1
(cf. Domestic fowl		10		20		1)
Goose		1	0.1			
Duck		2	0.3	3	0.1	
Buzzard		6	0.8			
White-tailed eagle				+		
Woodcock				1	0.04	
Rockdove/Wood pigeon				+		
Rook/crow		10	1.3	2	0.1	
Passerine		1	0.1			
Amphibia						
Frog/Toad		4	0.5	3	0.12	
Fish						
Pike				1	0.04	
Total	35.5	781.8		2501.9		196.3

Table 2a

Taxonomic distribution of the faunal remains in hand-collected and coarse-sieved assemblages (Areas 1-4, SCL 1007) (bone counts (N), after Davis 1992). Cattle/caprine half distal metapodials and pig metapodials divided by 2; equid phalanges multiplied by 2; canid and leporid metapodials divided by 5 and phalanges multiplied by 2/5; cf. domestic fowl included in total Domestic fowl count; sheep and goat included in total Caprine count; presence of non-countable specimens only, indicated by '+'.

Taxa	Prehistoric N	Early-Mid Roman N	Early-Mid Roman %	Late Roman N	Late Roman %	Medieval N	Postmedieval N
Mammals							
Cattle	10.5	161.5	48	358.5	46	45.5	23.5
Caprine	12	94.5	28	268	34	23	20
(Sheep	6	27		49		5	6)
(Goat				1			)
Pig	1	26	7.7	87	11	4.5	15
Equid	2	32	9.5	42	5.4	9	6
Dog	2	6.2	1.8	16	2	2	29.8
Dog/fox		2	0.6	1	0.1		
Cat	1	1	0.3	+			
Red deer				+			
Fallow deer		+					
Large cervid		+					
Roe deer		1	0.3				
Badger				1	0.1		
Black/Brown Rat				1	0.1		
Birds							
Domestic fowl		8	2.4	5	0.6	1	
(cf. Domestic fowl		5		4		1	)
Duck				1	0.1		
Buzzard		5	1.5				
Fish							
Pike				1	0.1		
Total	28.5	337.2		781.5		85	94.3

Table 2b

Taxonomic distribution of the faunal remains in hand-collected assemblage (Area 6, SUS 005) (bone counts (N), after Davis 1992). Cattle/caprine half distal metapodials and pig metapodials divided by 2; canid metapodials divided by 5 and phalanges multiplied by 2/5 ; sheep included in total Caprine count

Taxa	Early-Mid Roman N	Late Roman N
Mammals		
Cattle	16	4
Caprine	11	
(Sheep	1	)
Equid	2	
Dog	2.4	
Total	31.4	4

Table 2c

Taxonomic distribution of the faunal remains in hand-collected and coarse-sieved assemblages (Area 7, SUS 005) (bone counts (N), after Davis 1992). Cattle/caprine half distal metapodials and pig metapodials divided by 2; equid phalanges multiplied by 2; canid and leporid metapodials divided by 5 and phalanges multiplied by 2/5; cf. domestic fowl included in total Domestic fowl count; sheep and goat included in total Caprine count; presence of non-countable specimens only, indicated by '+'.

Taxa	Prehistoric N	Early-Mid Roman N	Early-Mid Roman %	Late Roman N	Late Roman %	Medieval/Postmedieval N
Mammals						
Cattle	1	145.5	44	173	51	3
Caprine	2	76.5	23.8	78	23.2	7
(Sheep		16		13		2)
(Goat				1		
Pig		26.5	8	28.5	8.5	1
Equid		45	12	38	10	3
Dog		10	3.8	4	1.2	1
Dog/fox		3	0.9			
Red deer				5	1.5	1
Roe deer		1	0.3			
Hare		3	0.9	2.2	0.7	
Squirrel		+				
Birds						
Domestic fowl		4	1.2	4	1.2	
(cf. Domestic fowl		4		3		)
Goose		1	0.3			
Duck		2	0.6	2	0.6	
Buzzard		1	0.3			
cf. Woodcock				1	0.3	
Rook/Crow		10	2.9	1	0.3	
Passerine		1	0.3			
Amphibia						
Frog/Toad		4	1.2	3	0.9	
Total	3	333.5		339.7		16

Table 2d

Taxonomic distribution of the faunal remains in hand-collected and coarse-sieved assemblages (Area 8, OKY 005) (bone counts (N), after Davis 1992). Cattle/caprine half distal metapodials and pig metapodials divided by 2; equid phalanges multiplied by 2; canid and leporid metapodials divided by 5 and phalanges multiplied by 2/5; cf. domestic fowl included in total Domestic fowl count; sheep and goat included in total Caprine count; presence of non-countable specimens only, indicated by '+'.

	Early-Mid Roman		Late Roman	
Taxa	N	%	N	%
Mammals				
Cattle	28	37	759	55.3
Caprine	31	38.3	371.5	27.2
(Sheep	8		60	)
(Goat			1	)
Pig	5.5	6.6	129	9.4
Equid	12	14.3	76	6
Dog	1.2	1.5	14.2	1
Dog/fox	1	1		
Red deer			1	0.1
Large cervid	+		+	
Roe deer			1	0.1
Fox			5	0.4
Hare			4	0.3
Birds				
Domestic fowl	1	1.2	16	1.1
(cf. Domestic fowl	1		13	)
Goose	+			
Rockdove/Wood pigeon			+	
Rook/Crow			1	0.1
White-tailed eagle			+	
Amphibia				
Frog/Toad			+	
Total	79.7		1376.7	

Table 3
Taxonomic distribution of the faunal remains in coarse-sieved (1 cm) assemblages from the grey soil and dark earth (bone counts (N), after Davis 1992). Cattle/caprine half distal metapodials and pig metapodials divided by 2; equid phalanges multiplied by 2; canid and leporid metapodials divided by 5 and phalanges multiplied by 2/5; presence of non-countable specimens only,indicated by '+'

Taxa	Grey soil (Areas 1-4) Late Roman N	%
Mammals		
Cattle	225.5	44
Caprine	188	37
Pig	63	12
Equid	24	4.7
Dog	6.2	1.2
Cat	+	
Red deer	+	
Roe deer	+	
Badger	+	
Black/Brown rat	1	0.2
Bird		
Domestic fowl	2	0.4
Fish		
Pike	+	
Total	509.7	

Taxa	Dark earth (Area 7) Early-Mid Roman N	%	Late Roman N	%
Mammals				
Cattle	18.5	39	53	50
Caprine	20	42	24	23
Pig	3	6.3	10	9.5
Equid	3	6.3	15	14
Dog	+			
Dog/fox	2	4.2		
Red deer			1	1
Hare			0.2	0.2
Birds				
Duck			1	1
Domestic fowl	1	2.1	1	1
Total	47.5		105.2	

Taxa	Dark earth (Area 8) Late Roman N	%
Mammals		
Cattle	18	32
Caprine	27	48
Pig	3	5.4
Equid	5	8.9
Dog	1	1.8
Fox	1	1.8
Birds		
Domestic fowl	1	1.8
Total	56	

Table 4

Taxonomic distribution of the faunal remains in fine-sieved assemblages (bone counts (N), after Davis 1992; MNI, calculated for microfauna only). Cattle/caprine half distal metapodials and pig metapodials divided by 2; canid metapodials divided by 5; presence of non-countable specimens only, indicated by '+'

Taxa	Miscellaneous contexts Early-Mid Roman N	Med./Postmedieval N	Cremated deposit Total assemblage N	%	Microfauna MNI	%
Mammals						
Cattle			9	2.2		
Caprine	+	4	140	34		
Caprine/Roe deer			15.5	3.8		
Pig	1		10.5	2.5		
Dog			1	0.2		
Dog/fox			+			
Cat			+			
Hare			+			
House mouse			2	0.5	1	1.12
Wood mouse			6	1.5	3	3.37
Wood/house mouse			2	0.5	1	1.12
Water vole			2	0.5	1	1.12
Bank vole			12	2.9	6	6.74
Field vole			66	16	33	37.1
Common shrew	+		13	3.1	7	7.87
Water shrew			2	0.5	1	1.12
Common/Water shrew			1	0.2		
Pygmy shrew			11	2.7	6	6.74
Mole			3	0.7	2	2.25
Birds						
Domestic fowl			24	5.8		
Swallow			1	0.2		
Passerine			+			
Small bird			15	3.6	4	4.49
Duck			1	0.2		
Crow/rook			+			
Medium size bird (Galliformes/Duck size)			26	6.3		
Reptile			1	0.2	1	1.12
Amphibia						
Toad			3	0.7		
Frog			18	4.4		
Frog/Toad	+		25	6.1	23	25.8
Fish						
Eel	1		2	0.5		
Trout	1					
Cyprinidae (cf. Bream)			1	0.2		
Perch	1					
Other	1					
Total	5	4	413		89	

Table 5a
Distribution of isolated incisors in relation to total isolated tooth counts of cattle, caprines and pigs by Area (Roman assemblage, hand-collected and coarse-sieved remains (1cm))

Period	Isolated incisors N	Total isolated teeth N	% isolated incisors
Areas 1-4			
Cattle			
3, 4	7	30	23
5-except grey soil	2	13	15
5-grey soil, hand collection	1	3	33
5-grey soil, sieve	9	74	12
Caprines			
3,4	1	26	3.8
5-except grey soil	0	5	0
5-grey soil, hand collection	0	24	0
5-grey soil, sieve	2	109	1.8
Pig (excluding canines)			
3, 4	6	15	40
5-except grey soil	3	3	100
5-grey soil, hand collection	2	6	33
5-grey soil, sieve	10	35	29
Area 6			
Cattle			
4	0	1	-
5	0	4	0
Caprines			
4	3	9	33
Area 7			
Cattle			
3	1	1	-
4-except dark earth	3	33	9.1
5-except dark earth	1	3	33
5-dark earth, hand collection	5	15	33
4, 5-dark earth sieve	9	31	29
Caprines			
4-except dark earth	2	18	11
5-except dark earth	0	1	-
5-dark earth, hand collection	6	21	29
4, 5-dark earth, sieve	1	30	3.3
Pig (excluding canines)			
4-except dark earth	10	12	83
5-except dark earth	0	0	-
4, 5-dark earth, hand-collection	6	6	100
4, 5-dark earth, sieve	4	8	50
Area 8			
Cattle			
3, 4	0	4	0
5-except dark earth	32	85	38
5-dark earth, hand collection	19	75	25
5-dark earth, sieve	3	5	60
5-palaeochannel	32	187	17
Caprines			
3, 4	1	6	17
5-except dark earth	0	18	0
5-dark earth, hand collection	5	145	3
5-dark earth, sieve	3	15	20
Pig (excluding canines)			
4	2	2	100
5-except dark earth	15	16	94
5-dark earth, hand collection	27	35	77
5-dark earth, sieve	1	2	50
5-palaeochannel	12	13	92

Table 5b
Distribution of isolated incisors in relation to total isolated tooth counts of cattle, caprines and pigs in pits and ditches (Roman assemblage, hand-collected remains)

Period	Isolated incisors N	Total isolated teeth N	% isolated incisors
Cattle-pits	1	19	5.3
Cattle-ditches	7	57	12
Caprine-pits	2	24	8.3
Caprine-ditches	2	33	6.1
Pig-pits	9	12	75
Pig-ditches	4	5	80

	Isolated premolars N	Isolated premolars and molars -N	% isolated premolars
Cattle-pits	5	18	28
Cattle-ditches	17	50	34
Caprine-pits	7	22	32
Caprine-ditches	4	31	13
Pig-pits	1	3	33
Pig-ditches	0	1	0

Table 6a
Relative frequency of alterations present on bones from Roman contexts: % based on bone counts (N), excluding teeth; butchery % based on cattle, caprine, pig, equid, dog, cervid and domestic fowl bone counts; cattle/caprine half distal metapodials and pig metapodials divided by 2; equid phalanges multiplied by 2; canid and leporid metapodials divided by 5 and phalanges multiplied by 2/5.

Alteration	Early-Mid Roman N	%	Late Roman N	%	Total N	%
Weathering	40.5	7	142.5	9	183	9
Abrasion	126.5	22	418.7	28	545.2	26
Carnivore gnawing	43	8	100	7	143	7
Butchery	84	16	164.5	11	248.5	13

Table 6b
Relative frequency of alterations by context type (Early-Late Roman): % based on bone counts (N), excluding teeth

Context type	Weathering N	%	Abrasion N	%	Exfoliation N	%
Pits	9	5	44	23	7	4
Ditches	21	11	50	26	6	3
Wells	5	5	16.5	15	6	6
Grey soil	38.5	12	132.75	41	4	1
Dark earth	76.5	10	160.25	20	15	2
Palaeochannel	4	4	63	71	12	13

Table 7
Distribution of sheep and goat specimens (bone counts (N))

Element	Prehistoric Sheep N	Prehistoric Goat N	Early-Mid Roman Sheep N	Early-Mid Roman Goat N	Late Roman Sheep N	Late Roman Goat N	Med./Postmedieval Sheep N
dP4			19		28	1+1?	5
hum			6		9		1
mtc	1		6		6	1	2
tib	1		8		43		2
ast	2		2		13		1
cal	2		1		9		1
mtt			10		14		1
Total	6	0	52	0	122	2+1?	13

Table 8a
Relative frequency (%) of the main domestic taxa based on bone counts (N). Cattle/caprine half distal metapodials and pig metapodials divided by 2

	Areas 1-4	Area 7	Area 8	Areas 6-8	Total
Early-Mid Roman period					
Cattle	57	58	43	56	56
Caprine	34	31	48	35	35
Swine	9	11	9	9	9
Total N	283	249.5	64.5	341	635.5
Late Roman period					
Cattle	50	62	60	61	57
Caprine	38	28	30	29	32
Swine	12	10	10	10	11
Total N	714.5	280.5	1265	1549.5	2274.5

Table 8b
Relative frequency (%) of the main domestic taxa based on MNI; The remains from Areas 6-8 and from the entire site are treated as single assemblages and as such, the MNI totals may be less than the cumulative values for the individual areas

	Areas 1-4	Area 7	Area 8	Areas 6-8	Total
Early-Mid Roman period					
Cattle	44	44	too few data	40	41
Caprine	40	48		51	50
Swine	16	7		9	9
Total MNI	25	27		35	58
Late Roman period					
Cattle	25	50	50	48	41
Caprine	62	32	41	43	48.5
Swine	13	18	9	9	10.5
Total MNI	53	22	104	117	171

Table 9
Relative frequency (%) of the main domestic taxa in the grey soil, dark earth and palaeochannel assemblages based on bone counts (N) and MNI

	Grey soil Areas 1-4	Dark earth Area 7	Dark earth Area 8	Palaeochannel Area 8
Bone counts				
Cattle	46	61	49	84
Caprines	41	29	39	7
Swine	13	10	12	9
Total N	554	268	812	291
% MNI				
Cattle	23	37	24	78
Caprine	61	54	64	16
Swine	16	19	12	6
Total MNI	44	16	59	32

Table 10
Distribution of cattle, caprine and pig remains in the 1973 assemblage (bone counts (N) and MNI, from Jones 1977)

	Early Roman		Late Roman		Total	
	N	%	N	%	N	%
Cattle	106	28	740	57	846	50
Caprine	237	62	437	34	674	41
Pig	39	10	114	9	153	9

	Early Roman		Late Roman		Total	
	MNI	%	MNI	%	MNI	%
Cattle	5	21	16	34	21	30
Caprine	17	71	21	45	38	53
Pig	2	8	10	21	12	17

Table 11
Mandible wear stages of cattle, caprines and pig (after Payne 1973; O'Connor 1988)

Cattle

Period	Immature		Subadult		Adult		Elderly		Total
	N	%	N	%	N	%	N	%	N
Late Roman	2	5	12	30	20	49	6.5	16	40
Early-Mid Roman	1	3	7.5	21	17	41	10	29	35

Caprine (mandibles with dP4/P4)

Period	6-12m		1-2yrs		2-3yrs		3-4yrs		4-6yrs		6-8yrs		Total
	N	%	N	%	N	%	N	%	N	%	N	%	N
Late Roman	2	4	7.5	15	16	32	13	26	7.5	15	4.5	9	50
Early-Mid Roman	10	34	3	10	5	17	6	21	5	17	0	0	29

Caprine (mandibles with dP4/P4) by period and area

Period	6-12m		1-2yrs		2-3yrs		3-4yrs		4-6yrs		6-8yrs		Total
	N	%	N	%	N	%	N	%	N	%	N	%	N
Late Roman													
Areas 1-4	1	6	2	12	6.5	38	5.5	32	2	12	0		17
Areas 6-8	1	3	5.5	17	9.5	29	7	21	5.5	17	4.5	14	33
Early-Mid Roman													
Areas 1-4	3	27	2	18	2	18	3	27	1	9	0		11
Areas 6-8	7	39	1	6	3	17	3	17	4	22	0		18

Pig

Period	Juvenile		Immature		Subadult		Adult		Total
	N	%	N	%	N	%	N	%	N
Late Roman	2	7	8	28	16	53	4	13	30
Early-Mid Roman	1	14	1.5	21	3.5	50	1	14	7

Table 12a
Cattle tooth wear stages of isolated teeth and teeth in mandibles (after Grant 1982)

Tooth (Wear stage)	C	V	E	H	a	a-b	b	b-c	c	c-d	d	d-e	e	e-f	f	f-g	g	g-h	h	h-j	j	j-k	k	k-l	l	l-m	m	m-n	n	n-o	o	p	Ind.	Total
dP4																																		
Medieval																							1											1
Late Roman																				1	10	4	6		7				1				1	30
Early-mid Roman																					5	3	2		2			1						13
Prehistoric																						1												1
P4																																		
Medieval									1																									1
Late Roman		4		4	3			1	5	1	1	1	4		5	1	6		2														1	39
Early-mid Roman		1	1	1					5				1		6		6	1	2															24
P3/P4																																		
Med./Postmedieval							1										1		1															3
Late Roman					8		5		3		2	2	6		9	1	2		2		1												1	42
Early-mid Roman													1		2	1																		4
M1																																		
Medieval																			1		2													3
Late Roman															1		10		1		8	1	10		7								1	39
Early-mid Roman																	8		2		2		15	1	7				1					36
Prehistoric																					1													1
M2																																		
Medieval																	1				1													2
Late Roman			1		1		4					1			6		9		1		6		9		1								2	41
Early-mid Roman			1				3								1	1	8		1		6		12		3									35
Prehistoric															1																			1
M1/M2																																		
Med./Postmedieval						1	1								1		1		1						1									6
Late Roman					12	4	6	3	2	2	4		1	3	31	2	39		6		25	2	41		10		2			1		1	3	200
Early-mid Roman					2		1		1		1				1		2		1		1		9	1	2		1						2	25
M3																																		
Med./Postmedieval							1				1			1			1										1							5
Late Roman			1	3	9	3	11	4	2	4	4	1	2		6	4	21		1		6		15		4	1							4	106
Early-mid Roman		2	1	1			5	1				1			3	1	7		1		5		5		4								1	38
Prehistoric				1																														1

Table 12b
Caprine tooth wear stages of isolated teeth and teeth in mandibles (after Payne 1973, 1987)

Tooth	Wear stage C	V	E	H	0	1	2	2-3	3	3-4	4	4-5	5	5-6	6	6-7	7	7-8	8	8-9	9	9-10	10	11	12	13	13-14	14	15	16	17	18	20	23	Ind	Total
dP4																																				
Med./Postmedieval																	1											1	1	2						5
Late Roman																										4	1	10		9	2	2	1		2	31
Early-mid Roman					1																			1				7	1	4	2			3	1	20
P4																																				
Med./Postmedieval																			1									3								4
Late Roman		4	2	5	6		2		1				2		1		6		11	2	8			4	7			2	4							67
Early-mid Roman			1		2												6		5		2				4										1	21
M1																																				
Med./Postmedieval													1				1		1		5				1				1							10
Late Roman															1		1		2		38		4	3	2			1	7							59
Early-mid Roman											1		1		2		4		3		20		2	2	2											37
M2																																				
Med./Postmedieval													1		1		1		1		4															8
Late Roman							1				3		2		4		6		1		26		2	1					1							47
Early-mid Roman		2	3	2								1					5		3		15															31
Prehistoric																					2															2
M1/M2																																				
Med./Postmedieval																					4					1										5
Late Roman					4		4		1	1	3	1	13		32		33		21	10	88	1	2	2	2										5	223
Early-mid Roman							1						5		4		8		6		16	1													3	44
Prehistoric												1									2															3
M3																																				
Med./Postmedieval				2															1		1		1	4											1	10
Late Roman	1	2			5	2	3	1	1		6		6	2	5	1	6	1	6		14		8	27											4	101
Early-mid Roman	1	2	1	2	2				1	1					1		1		3		2		2	10												29
Prehistoric																		1						1												2

Table 12c

Pig tooth wear stages of isolated teeth and teeth in mandibles (after Grant 1982)

Tooth	Wear stage C	V	E	H	a	a-b	b	c	c-d	d	d-e	e	e-f	f	f-g	g	g-h	h	j	j-k	k	k-l	l	m	n	Ind.	Total
dP4																											
Late Roman							1					1		1		1	1		2	1	1		1				10
Early-mid Roman										1					1						1		1				4
P4																											
Medieval				1																							1
Late Roman				1	2	6	5	5		2		1	1														23
Early-mid Roman					2		2			1																	5
M1																											
Medieval										1																	1
Late Roman				1	1		2	2	1	2	1	2	1	1	2	3		1	1	1	2			1			25
Early-mid Roman				1						1		2			2									1			7
M2																											
Medieval					1																						1
Late Roman	2	1	1	2		4	2	3		5	1	2									1					1	25
Early-mid Roman		1					1	1		1				1													5
M1/2																											
Late Roman					1	1	3	2	2	4		1	1			1			1			1			1		19
Early-mid Roman					1																						1
M3																											
Late Roman		5	1	5	7	4	1	1		1																1	26
Early-mid Roman		3		1			1	1		1																	7

Table 13
Epiphysial fusion of cattle, caprine and pig remains (after Silver 1969)
U-unfused; F-fused; * epiphysial fusion incomplete or visible, included in total

Age at fusion	Element	Early-Mid Roman U	F	%fused	Late Roman U	F	%fused
Cattle							
7-10 m.	sca d		13	100		25	100
12-18 m.	hum d	1	12	92	3	27	90
18 m.	p1 p	6	36	86	5	201	98
18-24 m.	tib d	4	10	71	6	33	85
24-30 m.	mtc d	3	20.5	87	10	48.5	87
27-36 m.	mtt d	6	16.5	73	13	48.5	79
24-30/27-36 m	mtp d	0.5	4	89	8.5	13	60
36-42 m.	cal p	1	2		9	8	47
42-48 m.	rad d	1	3		8	9	53
42-48 m.	fem d	2	2			3	
Caprine							
6-8 m.	sca d		8			9	
10 m.	hum d	1	10	91		26	100
13-16 m.	p1 p	2	2		1	28	97
18-24 m.	mtc d	5.5	6.5	54	4	26.5	88
18-24 m.	tib d	2	15	88	10	77	88
20-28 m.	mtt d	7	5	42	5	5	50
18-24/20-28 m	mtp d				2	1	
30-36 m.	cal p	1	1		8	8	50
36 m.	rad d		3		3	11	79
36-42 m.	fem d	1			1	1	
Pig							
12 m.	sca d		1		1	4	
12 m.	hum d		2		2	3	
24 m.	mtc d		0.5		0.5		
24 m.	p1 p				2		
24 m.	tib d	2			5	4	
24/30 m.	mtp d				1	1.5	
24-30 m.	cal p	1			2		
30 m.	mtt d				2.5		
42 m.	rad d	2			4	2	
42 m.	fem d				2		
Equid							
12 m.	sca d		3			1	
13-15 m.	p1 p	1	3		1	12	
15-18 m.	hum d		2			4	
15-18 m.	mtc d		5			4	
16-20 m.	mtt d		2			3	
15-18/16-20 m	mtp d		2			7(1*)	
20-24 m.	tib d		7(1*)			5(1*)	
36-42 m.	fem d		3			3(1*)	
42 m.	rad d		4(1*)			4(1*)	

Table 14
Caprine dental wear and age groups (after Payne 1988): Areas 1-8;
data in Table 12b; unerupted or erupting P4s excluded (stages C, V, E or H)

Late Roman		% killed within age range	Cumulative % killed	Age
0-2 years: 31 dP4	36-38%	36-38%	36-38%	by c. 2 yrs
>2 years: 56 P4 of which 6 unworn	62-64%			
%>2 yrssubdivided on basis of M3 wear stage				
2-3 yrs: 11 M3, wear stages 2A-4A		8%	44-46%	by c. 3 yrs
3-5 yrs: 49 M3, wear stages 5-10		35-36%	80-81%	by c. 5 yrs
6-10 yrs: 27 M3, wear stages 11G		19-20%	100%	by c. 10 yrs
>10 years: 0 M3, wear stages after 11G				
(Total: 87 M3s classified at wear stage 2A or later)				

Early-mid Roman		% killed within age range	Cumulative % killed	Age
0-2 years: 20 dP4	50-53%	50-53%	50-53%	by c. 2 yrs
>2 years: 20 P4 of which 2 unworn	47-50%			
%>2 yrssubdivided on basis of M3 wear stage				
2-3 yrs: 2 M3, wear stages 2A-4A		4-4.5%	54.5-57%	by c. 3 yrs
3-5 yrs: 9 M3, wear stages 5-10		19-20%	77-79%	by c. 5 yrs
6-10 yrs: 10 M3, wear stages 11G		24-25%	100%	by c. 10 yrs
>10 years: 0 M3, wear stages after 11G				
(Total: 21 M3s classified at wear stage 2A or later)				

Table 15a

Distribution of cattle elements (Bone counts (N) and MNI). N is cumulative but not MNI so total MNI may be lower than sum of MNI values from individual areas. Tooth counts include isolated mandibular teeth and teeth in mandibles. P4 includes unassigned P3/P4's divided by two: in the case of uneven numbers, the higher value is attributed to P4. Atlas, axis, mandibles, unassigned metapodials and unfused epiphyses not included.

P: Prehistoric, all areas; M/P: Medieval/Postmedieval, all areas.

	P	Early-Mid Roman											Late Roman													M/P
		Areas 1-4			Area 6	Area 7			Area 8	Total			Areas 1-4			Area 6	Area 7			Area 8			Total			
Element	N	N	MNI	%	N	N	MNI	%	N	N	MNI	%	N	MNI	%	N	N	MNI	%	N	MNI	%	N	MNI	%	N
zygomaticus	3	5	3	27	1	8	4	33	1	15	8	33	7	4	29		2	1	9	24	12	23	33	17	24	1
incisors		7	1	9		7	1	8	1	15	8	33	12	2	14		12	2	18	54	9	17	78	13	19	2
dP4/P4	1	18	9	82	1	18	9	75	3	40	20	83	12	6	43	2	9	5	45	69	35	67	90	45	64	6
M1/M2	2	44	11	100	4	45	12	100	4	96	24	100	52	13	93	1	22	6	55	205	52	100	280	70	100	12
M3	1	19	9	82	1	17	9	75	1	38	19	79	17	9	64	1	10	5	45	78	39	75	106	53	76	5
scapula		14	7	64	1	9	5	42	1	25	13	54	22	11	79		5	3	27	16	8	15	43	22	31	3
humerus		6	3	27	1	5	3	25		12	6	25	8	4	29		2	1	9	21	11	21	31	16	23	5
radius		4	2	18				0	3	7	4	17	7	4	29		1	1	9	8	4	8	16	8	11	
carpal		2	1	9				0		2	1	4	13	7	50		1	1	9	11	6	12	25	13	19	1
metacarpal		11	6	55		7	4	33	5.5	23.5	12	50	15	8	57		14.5	8	73	30	15	29	59.5	30	43	3
innominate		8	4	36		3	2	17		11	6	25	9	5	36		3	2	18	9	5	10	21	11	16	
femur		1	1	9	1	2	1	8		4	2	8	1	1	7		1	1	9			0	2	1	1	
tibia		8	4	36	2	4	2	17	1	13	7	29	16	8	57		7	4	36	15	8	15	38	19	27	3
astragalus		5	3	27		4	2	17	1	10	5	21	16	8	57		21	11	100	30	15	29	67	34	49	2
calcaneum		6	3	27		6	3	25	1	13	7	29	14	7	50		3	2	18	29	15	29	46	23	33	4
metatarsal		14	7	64		7.5	4	33	1	22.5	12	58	26.5	14	100		12	6	55	23.5	12	23	62	31	44	7
phalanx 1	3	22	3	27	7	19	3	25	4	52	7	29	67	9	64		36	5	45	107	14	27	210	27	39	18
phalanx 3	1	6	1	9		4	1	8	1	11	2	8	19	3	21		9	2	18	35	5	10	43	6	9	3

Table 15b

Distribution of caprine elements (Bone counts (N) and MNI). N is cumulative but not MNI so total MNI may be lower than sum of MNI values from individual areas.
Tooth counts include isolated mandibular teeth and teeth in mandibles. Atlas, axis, mandibles, unassigned metapodials and unfused epiphyses not included.
P: Prehistoric, all areas; M/P: Medieval/Postmedieval, all areas.

	P	Early-Mid Roman											Late Roman												P/M
		Areas 1-4			Area 6	Area 7			Area 8	Total			Areas 1-4			Area 7			Area 8			Total			
Element	N	N	MNI	%	N	N	MNI	%	N	N	MNI	%	N	MNI	%	N	MNI	%	N	MNI	%	N	MNI	%	N
zygomaticus													1	1	3							1	1	1	1
incisors		1	1	10	3	6	1	8	1	8	2	8	4	1	3	6	1	14	9	2	5	19	4	5	
dP4/P4		17	9	90	3	16	8	62	5	41	21	88	37	19	58	6	3	45	55	28	65	98	49	59	9
M1/M2	5	40	10	100	6	49	13	100	17	114	29	100	131	33	100	28	7	100	170	43	100	329	83	100	23
M3	1	12	6	60	1	10	5	38	7	30	15	52	28	14	42	12	6	86	61	31	72	101	51	61	10
scapula		5	3	30		5	3	23		10	5	20	6	3	9	2	1	14	4	2	5	12	6	7	2
humerus		6	3	30		5	3	23		11	6	24	14	7	21	2	1	14	10	5	12	26	13	16	6
radius		1	1	10	1	2	1	8		3	2	8	8	4	12	2	1	14	4	2	5	14	7	8	1
metacarpal	1	5.5	3	30		2.5	2	15	4	13	7	28	5	3	9	2	1	14	9.5		0	16.5	9	11	3
innominate		2	1	10		1	1	8	2	5	3	12	4	2	6	2	1	14	6	7	16	12	6	7	1
femur	1	1	1	10		1	1	8	0	2	1	4	1	1	3				1	3	7	2	1	1	
tibia	2	12	6	60		3	2	15	2	17	9	36	25	13	39	11	6	86	51	1	2	87	44	53	3
astragalus	3	1	1	10		2	1	8		4	2	8	18	9	27	1	1	14	4	26	60	23	12	14	1
calcaneum	2	1	1	10				0	1	3	2	8	5	3	9	2	1	14	9	2	5	16	8	10	2
metatarsal		8	5	50		2	1	8	3	13	7	28	3	2	6	3	2	29	10	5	12	16	8	10	
phalanx 1		2	1	10		2	1	8		4	1	4	9	2	6	3	1	14	17	3	7	29	4	5	2
phalanx 3																									1

Table 15c
Distribution of pig elements (Bone counts (N) and MNI). N is cumulative but not MNI so total MNI may be lower than sum of MNI values from individual areas. Tooth counts include isolated mandibular teeth and teeth in mandibles. Atlas, axis, mandibles, unassigned metapodials and unfused epiphyses not included. P: Prehistoric, all areas; M/P: Medieval/Postmedieval, all areas.

	P	Early-Mid Roman								Late Roman									P/M
		Areas 1-4		Area 7		Area 8		Total		Areas 1-4		Area 7		Area 8		Total			
Element	N	N	MNI	N	MNI	N	MNI	N	MNI	N	MNI	N	MNI	N	MNI	N	MNI	%	N
incisors		10	2	11	2	2	1	23	4	17	3	10	2	43	8	70	12	67	1
dP4/P4		4	2	3	2	2	1	9	5	10	5	1	1	16	8	27	14	78	1
M1/M2		10	4	3	1			13	4	28	7	14	4	27	7	69	18	100	1
M3		4	2	3	2			7	4	11	6	3	2	12	6	26	13	72	
scapula				2	1			2	1	6	3	1	1	8	4	15	8	44	2
humerus		1	1	1	1			2	1	3	2			3	2	6	3	17	3
radius		2	1		1			2	1	3	2			3	2	6	3	17	2
metacarpal				0.5				0.5	1			0.5	1	0.5	1	1	1	6	0.5
innominate				1	1			1	1	1	1			2	1	3	2	11	
femur										1	1	1	1			2	1	6	2
tibia	1	2	1	1	1			3	2	4	2			6	3	10	5	28	3
astragalus		1		1	1			2	1	2	1					1	1	6	2
calcaneum		1	1	1	1			2	1	1	1	1	1	4	2	6	3	17	2
metatarsal			1							0.5	1			2	1	2.5	2	11	
phalanx 1										1	1			1	1	2	1	6	
phalanx 3										3	1			1	1	4	1	6	

Table 15d
Distribution of equid elements (Bone counts (N) and MNI). N is cumulative but not MNI so total MNI may be lower than sum of MNI values from individual areas. Incisors include maxillar and mandibular teeth; premolars and molars grouped together. Atlas, axis, mandibles, unassigned metapodials and unfused epiphyses not included. P: Prehistoric, all areas; M/P: Medieval/Postmedieval, all areas.

	P	Early-Mid Roman period								Late Roman period									P/M
		Areas 1-4		Area 6	Area 7		Area 8	Total		Areas 1-4		Area 7		Area 8		Total			
Element	N	N	MNI	N	N	MNI	N	N	MNI	N	MNI	N	MNI	N	MNI	N	MNI	MNI%	N
zygomaticus										1	1			1	1	2	1	20	1
incisors					13	2	1	14	2	2	1	5	1	9	1	16	2	40	
canines			1			1		2	1	2	1	1	1	1	1	4	1	20	1
P/M		7	1		6	1	1	14	2	9	1	11	2	23	2	43	4	80	1
scapula		1	1	1	1	1		3	2	2	1	1	1	1	1	4	2	40	3
humerus		2	1					2	1					4	2	4	2	40	1
radius		2	1		2	1		4	2	2	1			2	1	4	2	40	
metacarpal		2	1	1	3	2		6	3	1	1	3	2	2	1	6	3	60	2
innominate		2	1		4	2		6	3	2	1	1	1	2	1	5	3	60	
femur		3	2					3	2	1	1			2	1	3	2	40	2
tibia	1	5	3		2	1	1	8	4	1	1	1	1	3	2	5	3	60	
astragaus		2	1		1	1		3	2	2	1	3	2	4	2	9	5	100	1
calcaneum	1	1	1		1	1	1	3	2	2	1	2	1	3	2	7	4	80	2
metatarsal					2	1		2	1	2	1	1	1			3	2	40	
phalanx 1		1	1		3	1		4	1	3	1	4	1	6	2	13	4	80	1
phalanx 3			1		1	1		1	1	2	1					2	1	20	1

Table 15e
Distribution of canid (including dog and dog/fox) and cat elements (bone counts (N). Metapodials divided by 5; phalanges multiplied by 2/5. P: Prehistoric; ER: Early-Mid Roman; LR: Late Roman; M/P: Medieval/Postmedieval

Element	Canid P N	ER N	LR N	M/P N	Cat P N	ER N	LR N
atlas		1	1	1			
axis			1	1			
maxilla							+
mandible	1	11	10	2	1		
incisor				6			
canine	1		2	1			
scapula		1	1	2			
humerus		3	4	2			
radius		1		2			
metacarpal		0.4	0.2	0.8			
innominate		4	5	3			
femur		1	1	2			
tibia		2	5	2		1	
astragalus				2			
calcaneum		1	3	2			
metatarsal			0.2	1.2			
metapodial			0.2				
phalanx 1		0.4	1.6	2			
phalanx 3				0.8			
Total	2	25.8	35.2	32.8	1	1	+

Table 15f
Distribution of wild mammal elements (bone counts (N)). Leporid metapodials divided by 5
ER: Early-Mid Roman; LR: Late Roman; M/P: Medieval/Postmedieval

Element	Red deer ER N	LR N	M/P N	Fallow deer ER N	Roe deer ER N	LR N	Hare ER N	LR N	Fox LR N	Badger LR N	Squirrel ER N	Rat LR N
antler	+	+		+		+						
cranium		+										
mandible							1	1	1			
incisor		2										
scapula						1						1
humerus		2						1				
radius						+						
ulna										+		
metacarpal					1			+				
innominate									2			
femur			1					1	1	1	+	
tibia		1					2	2	1			
calcaneum								1				
metatarsal								0.2				
phalanx 1		1										
	0	6	1	0	1	1	3	6.2	5	1	0	1

Table 15g
Distribution of bird elements (bone counts (N)). ER: Early-Mid Roman; LR: Late Roman; M: Medieval

Element	Domestic fowl			Duck		Goose	Pigeon	Woodcock	Rook/Crow		Passerine	Buzzard	Eagle
	ER	LR	M	ER	LR	ER	LR	LR	ER	LR	ER	ER	LR
	N	N	N	N	N	N	N	N	N	N	N	N	N
sternum							+						
coracoid	1	1							1				
scapula		1											
humerus	2	6			1			1	2	1		2	
radius					1								
carpometacarpus	1	1			1				1			1	
innominate		1							1				
femur	5	2				1			2			2	+
tibiotarsus	4	7							2	1			
tarsometatarsus		6		2					1		1	1	
Total	13	25		2	3	1	+	1	10	2	1	6	+

Table 16a

Number of bones showing butchery marks. The counts refer to number of modified specimens, irrespective of type and frequency of marks: the counts are consequently lower than the sum of categories in Table 16b. % based on total taxon counts, excluding teeth.

	Early-Mid Roman		Late Roman		Total	
	N	%	N	%	N	%
Cattle	63	23	126.5	15	189.5	17
Caprine	11	8	14	4	25	5
Pig	4	15	17	15	21	15
Equid	2	3	4	5	6	4
Dog	1	5			1	2
Red deer			2	50	2	50
Roe deer	1	100			1	50
Domestic fowl	2	15	1	4	3	8
Total	84	15.9	164.5	11.2	248.5	13

Table 16b

Butchery marks by element. Numbers in brackets refer to non-countable specimens. ? possible butchery mark.

	Early-Mid Roman						Late Roman					
	Chop	Cut	Fine cut	Shave	Longitud	Hole	Chop	Cut	Fine cut	Shave	Hole	Saw
Cattle												
horn	(-3-)						(4+1?)					
axis	1	1	2				1					
atlas							9	1				
mandible	5	1	4				1	1	1?			
scapula	15+3?		1			2+2?	14+5?	5	10	1	2+2?	
humerus	3	1	2				6+3?	3	1	2		
radius	1?				2?							
carpal							2					
metacarpal	1				1		1?	1	2			
innominate	3+1?		1		1		11+2?	2	2			
femur	1											
tibia	4	1?	1	1			3		1	1		
astragalus	1+2?						6+4?		2			
calcaneum	4	1	1				13+1?	2	3			
metatarsal			1									
metapodial	1				1+6?		1	1	1?			
phalanx 1	1		5						33	1		
Total	39+7?	4+1?	18	1	3+8?	2+2?	69+16?	16	54+2?	5	2+2?	
Caprine												
axis	2		1									
atlas			2									
scapula	1								1			
humerus	1?						1		2			
radius		1?										
innominate	1						3					
femur								1				
tibia			1				1+1?		1+1?			
astragalus									2			
Total	4+1?	1?	4				5+1?	1	6+1?			
Pig												
cranium	2											
mandible	2+1?						3+4?	1	2			
scapula	1	1					1		2			
innominate							1					
tibia							1					
metapodial								1?				
Total	5+1?	1					6+4?	1+1?	4			
Equid												
humerus	1?								1			
femur	1?						1?					
tarsal							(-1-)					
metapodial							1					1
Total	2?						1+1?		1			1
Dog												
tibia			1									

Table 16b - cont.
Butchery data

	Early-Mid Roman						Late Roman					
	Chop	Cut	Finecut	Shave	Longitud.	Hole	Chop	Cut	Finecut	Shave	Hole	Saw
Red deer												
antler	(1?)						(4+1?)	(1?)	(-1-)			
cranium							(-2-)					
humerus							2?					
femur									1			
tibia							1					
Total							3+2?		1			
Fallow deer												
antler	(-1-)		(-1-)									
Roe deer												
antler							(–2-)	(-1-)	(-1-)			
metacarpal			1									
Domestic fowl												
femur			2						1			

Table 17a

Summary of cattle measurements. Husing: v-fusion line visible; unfused specimens excluded;
n-number of specimens; Min-minimum; Max-maximum; SD-standard deviation; CV-coefficient of variation

Element	Period	n	Mean	Min	Max	SD	CV	
M/1-Breadth	Late Roman	9	14.9	13.2	15.8	0.9	6	
	Early-Mid Roman	12	14.6	13.6	16.7	0.7	4.8	
M/2-Breadth	Late Roman	11	15.7	14.4	16.8	0.9	5.7	
	Early-Mid Roman	9	16.4	15.2	17.7	1	6.1	
M/3-Breadth	Late Roman	56	15.2	13.2	17.4	1	6.6	
	Early-Mid Roman	11	16.2	14.6	18.3	1.1	6.6	
Scapula-SLC	Late Roman	32	46.1	37	62	5.5	12	
	Early-Mid Roman	20	47.3	37.1	57.3	5.7	12	
Humerus-BT	Late Roman	10	68.8	65.1	72.8	2.6	3.8	
	Early-Mid Roman	6	73.6	68.3	80.1	5	6.8	
Humerus-HTC	Late Roman	19	30.3	26.2	33.8	1.9	6.3	
	Early-Mid Roman	9	33.3	30.4	36.1	2	6	
Radius-Bd	Late Roman	3	60.7	44.6	74.5			
Metacarpal-GL	Late Roman	8	197	187.2	206.1	7.5	3.8	2f, 1v
	Early-Mid Roman	1		206.8				
Metacarpal-BFd	Late Roman	41	59.3	49.4	71	6	10	
	Early-Mid Roman	17	55.9	48.1	70.3	5	8.9	
Metacarpal-Bd at fusion	Late Roman	44	54.4	42.8	69.3	5.1	9.4	
	Early Roman	17	51	43.6	59.4	3.8	7.5	
Metacarpal-Dd	Late Roman	27	32.1	27.9	36.7	2.4	7.5	
	Early Roman	14	30.3	25.7	35.7	2.3	7.6	
Tibia-Bd	Late Roman	11	58.5	51.1	65.7	4.3	7.4	
	Early-Mid Roman	6	60.4	54.5	67	5	8.3	
Astragalus-GL	Late Roman	33	64	58.5	72.6	3.3	5.2	
	Early-Mid Roman	7	65.6	61	70.4	3.7	5.6	
Astragalus-Dl	Late Roman	36	35.8	31	41	2.4	6.7	
	Early-Mid Roman	6	36.4	34	39.1	2	5.5	
Astragalus-Bd	Late Roman	37	41.2	35.2	48.4	3.6	8.7	
	Early-Mid Roman	5	41.1	37.6	44.3	3.2	7.8	
Metatarsal-GL	Late Roman	6	223.1	200.9	238.7	13.7	6.1	
	Early-Mid Roman	2		228.4	231.1			
Metatarsal-BFd	Late Roman	38	55.6	45.3	68.7	5.6	10	
	Early-Mid Roman	15	54.2	46.4	63.3	5.1	9.4	
Metatarsal-Bd at fusion	Late Roman	42	52.5	46.8	61.2	4.2	8	
	Early Roman	16	50.4	42.2	56.6	3.8	7.5	
Metatarsal-Dd	Late Roman	33	31.4	28.1	36.7	2	6.4	
	Early Roman	14	31.1	27	34.1	2.3	7.4	

Table 17b
Summary of caprine measurements. n-number of specimens; Min-minimum; Max-maximum; SD-standard deviation; CV-coefficient of variation

Element	Period	n	Mean	Min	Max	SD	CV
M/1-Breadth	Late Roman	9	6.8	6.5	7.1	0.3	4.4
	Early-Mid Roman	7	7	5.7	8.6	0.9	13
M/2-Breadth	Late Roman	8	7.8	7.3	8.3	0.3	3.8
	Early-Mid Roman	2		7.9	8.5		
M/3-Breadth	Late Roman	31	7.6	6.4	8.4	0.5	6.6
	Early-Mid Roman	6	7.3	6.6	8	0.6	8.2
Scapula-SLC	Late Roman	10	18	15.6	21	1.6	8.9
	Early-Mid Roman	7	19.6	15.4	21.8	2.1	11
Humerus-HTC	Late Roman	16	13.6	11.5	15.5	1.06	7.8
	Early-Mid Roman	10	13.4	11	17	2	15
Humerus-BT	Late Roman	14	27.1	23.1	31.1	2	7.4
	Early-Mid Roman	9	25.7	21.1	33.2	4	16
Radius-Bd	Late Roman	10	27.5	24.4	30.1	2	7.3
	Early-Mid Roman	3	27.9	26.6	29.5		
Metacarpal-GL	Late Roman	6	125.3	122.2	128.8	2.3	1.8
	Early-Mid Roman	2		126.1	128.7		
Metacarpal-BFd	Late Roman	8	24.7	23	28.2	1.8	7.3
	Early-Mid Roman	4	23.1	22.4	23.8		
Metacarpal-Bd at fusion	Late Roman	9	24.9	22.5	28.3	2.2	8.8
	Early-Mid Roman	5	23.7	22.4	26.6		
Tibia-Bd	Late Roman	63	25.4	21.5	28.9	1.7	6.7
	Early-Mid Roman	12	24.1	20.1	26.7	2.2	9.1
Calcaneum-GL	Late Roman	7	55.2	47.7	60.4	4.2	7.6
	Early-Mid Roman	1		58.7			
Astragalus-GL	Late Roman	19	28.1	23.7	33.6	2.4	8.5
	Early-Mid Roman	3	31.4	28.3	33.6		
Astragalus-Dl	Late Roman	17	15.5	13.4	19.1	1.6	10
	Early-Mid Roman	3	17	16.2	17.7		
Astragalus-Bd	Late Roman	20	17.8	15.5	21.6	1.7	9.6
	Early-Mid Roman	2		18.5	20.5		
Metatarsal-GL	Late Roman	6	143.7	131.6	156	9.3	6.5
	Early-Mid Roman	4	141	133.9	143.5		
Metatarsal-BFd	Late Roman	8	24.3	23.2	25	0.6	2.5
	Early-Mid Roman	4	24.3	22.7	25.7		
Metatarsal-Bd at fusion	Late Roman	11	23.7	21.8	25.6	1.4	5.9
	Early-Mid Roman	3	24.2	22.9	24.9		

Table 17c
Summary of more common pig measurements. n-number of specimens; Min-minimum; Max-maximum; SD-standard deviation; CV-coefficient of variation

Element	Period	n	Mean	Min	Max	SD	CV
dP/4-Wp	Late Roman	10	8.5	8	8.9	0.3	3.2
	Early-Mid Roman	3	8.9	8.5	9.2		
M/1-Wa	Late Roman	19	10.2	9.6	11.3	0.4	3.9
	Early-Mid Roman	6	10.3	9.5	10.7	0.4	3.9
M/1-Wp	Late Roman	18	10.7	9.9	11.5	0.4	3.7
	Early-Mid Roman	5	11	10	11.6	0.6	
M/2-Wa	Late Roman	14	13.2	12.3	14.6	0.7	5.3
	Early-Mid Roman	4	13.3	12.7	14.4		
M/2-Wp	Late Roman	14	13.7	12.3	15.2	0.8	5.8
	Early-Mid Roman	3	13.6	13.4	13.9		
M/3-Wa	Late Roman	9	15.3	14	17.7	1.1	7.2
	Early-Mid Roman	3	14.9	14	15.6		
M/3-Wc	Late Roman	10	14.7	12.8	16.2	1	6.8
	Early-Mid Roman	4	14.75	13.9	15.4		
Scapula-SLC	Late Roman	8	21.5	18.1	24.4	2.3	11
	Early-Mid Roman	2		22.2	24.2		
Humerus-HTC	Late Roman	2		18.1	19.1		
	Early-Mid Roman	2		17.4	18.8		

Table 18
Cattle and caprine measurements; comparison between the Early-Mid and Late Roman periods: (Student's t-test)

Measurement	Early-Mid Roman N	Early-Mid Roman Mean	Late Roman N	Late Roman Mean	P	T	Direction of change
Cattle							
M3-Breadth	11	16.2	56	15.2	0.002**	3.26	decrease
Scapula-SLC	20	47.3	32	46.1	0.46	2.01	
Humerus-HTC	9	33.3	19	30.3	0.001***	3.9	decrease
Humerus-BT	6	73.6	10	68.8	0.07	2.18	
Metacarpal-BFd	17	56.9	41	59.3	0.04*	-2.12	increase
Tibia-Bd	6	60.4	11	58.5	0.42	0.84	
Astragalus-GLl	7	65.6	33	64	0.25	-0.08	
Metatarsal-BFd	15	54.2	38	55.6	0.41	-0.86	
Caprine (goat excluded)							
M1-Breadth	7	7	9	6.8	0.56	0.57	
M3-Breadth	6	7.3	31	7.6	0.21	-1.27	
Scapula-SLC	7	19.6	10	18	0.08	2.1	
Humerus-HTC	10	13.4	16	13.6	0.73	-0.36	
Humerus-BT	9	25.7	14	27.1	0.33	-1.02	
Metacarpal-Bdfusioi	4	23.1	8	24.7	0.12	-1.69	
Tibia-Bd	12	24.1	63	25.4	0.02*	-2.36	increase

* significant at 5% level
** significant at 1% level
*** significant at 0.1% level

Table 19
Cattle measurements from Roman-Late Roman sites: Astragalus GLl (data from Crabtree 1989, 1994; Dobney et al. 1995; Jones 1985; Jones et al. 1985; Maltby 1979; O'Connor 1988)
* most Scole data from mid 2nd-late 3rd C.

Site	Date	N	Mean	Range	SD
Scole	4th C.	33	64	58.5-72.6	3.3
Scole	1st-3rd C. *	7	65.6	61-70.4	3.7
West Stow	5thC.	27	61.6	54-66	3.2
West Stow	1st-2nd C.	4	60.8	60-63	
Icklingham	3rd-4th C.	52	63.5	58-71	3
Brancaster	2nd-4th C.	2		60-69	
Exeter	300+	18	58.3	54.3-62	2.48
Exeter	55-300	14	55.2	50.7-59.6	2.59
Lincoln	4th C.	167	61.5	53-70.8	4.6
Lincoln	3rd C.	5	63.9	60.5-65.7	2
Lincoln	1st C.	8	56.8	50.6-69	6
York	late 2nd-early/mid 3rd (	10	61.9	?	1.3

Table 20
Caprine measurements from Roman sites: tibia Bd (data from Crabtree 1989, 1994; Dobney et al. 1995; Jones et al. 1985; Luff 1982, 1993; Maltby 1979; Wilson 1978); * most Scole data from mid 2nd C.-late 3rd C.: ? not provided in publication

Site	Date	N	Mean	Range	SD
Scole	4th C.	63	25.4	21.5-28.9	1.7
Scole	1st-3rd C. *	12	24.1	20.1-26.7	2.2
West Stow	5thC.	42	26.2	23-29	1.7
West Stow	1st-2nd C.	9	25.6	22-27	1.9
Icklingham	3rd-4th C.	37	26.5	23-29	1.4
Brancaster	2nd-4th C.	4	26.3	26-27	
Brancaster	Early and Late Roman	31	?	23.2-27.7	
Colchester	3rd-4th C.	41	25.5	19.1-29.1	1.9
Colchester	1st-2nd C.	86	23.6	21.1-30.4	1.9
Sheepen	1st C.	33	22.8	20.5-25.6	1.4
Chelmsford	4th C.	2		24.2-26.4	
Chelmsford	3rd C.	6	26.2	24-28.8	2
Chelmsford	late 1st-late 2nd C.	14	25	22.3-28.3	1.7
Chelmsford	1st C.	2		23-28.3	
Alcester	Late Roman	59	25.5	21.2	29.4
Alcester	100-200	9	23.6	21.1-26	
Exeter	300+	15	23.9	22.3-27	1.25
Exeter	100-300	30	23.3	21.4-25.9	1.21
Exeter	55-100	21	23.1	21.3-29.2	1.54
Lincoln	4th C.	54	25.6	20-28.8	1.8
Lincoln	3rd C.	14	26.6	24.2-30	1.8
Lincoln	2nd C.	2		23.2-25.7	
Lincoln	1st C.	5	22.7	21.6-24.1	1.2

Table 21
Shoulder height of dogs. * factors for longbones from Harcourt 1974; factors for metapodials from Clark 1995

Period	Context	Element	GL (mm)	Factor*	Shoulder height (mm)
4	11603	rad	156.9	(3.18xtl)+19.51	518
4	11603	mc3	61.4	(0.83*GL)-2.03	489
4	80110	mc4	44	(0.84*GL)-2.60	344
5	80709	hum	173.5	(3.43xtl)-26.54	569
5	80709	uln	198.6	(2.78*GL)+6.21	558
5	80709	mt2	88.3	(0.86*GL)-2.04	739
Skeleton					
7	20235	hum	175.9	(3.43xtl)-26.54	577
7	20235	rad	176.3	(3.18xtl)+19.51	580
7	20235	fem	183	(3.14xtl)-12.96	562
7	20235	tib	189.9	(2.92xtl)+9.41	564
7	20235	tib	191.9	(2.92xtl)+9.41	57
7	20235	mc2	58.4	(0.94*GL)-1.56	533
7	20235	mc3	67	(0.83*GL)-2.03	536
7	20235	mc4	66.7	(0.84*GL)-2.60	534
7	20235	mc5	55.5	(0.98*GL)-1.56	528
7	20235	mt2	64.5	(0.86*GL)-2.04	534
7	20235	mt2	64.5	(0.86*GL)-2.04	534
7	20235	mt3	71.9	(0.77*GL)-2.26	531
7	20235	mt3	72.1	(0.77*GL)-2.26	533
7	20235	mt4	72.6	(0.75*GL)-2.68	518
7	20235	mt4	72.7	(0.75*GL)-2.68	518

Table 22
Comparative cat measurements; n-number of specimens; Min-minimum; max-maximum; SD-standard deviation; 1- Albarella and Davis 1994a; 2- Albarella and Davis 1994b; 3- Crabtree 1989; 4- Luff and Moreno-Garcia 1995

Element	Measurement (mm) n	Mean	Min	Max	SD	Date	Site	Source
L alveolus LM1	1		6.2			Prehistoric	Scole	
Height of mandible	67	8.38	7.09	9.49	0.57	Postmedieval	Bene't Court	4
behind M1	1		8.5			Prehistoric	Scole	
Humerus GL	1		89.5			Postmedieval	Scole	
	2		77.9	84		Early-Mid Medieval	Raunds	1
Humerus Bd	1		17.1			Postmedieval	Scole	
	4	16.5	15.6	17.9		Medieval-Postmedieval	Launceston	2
	14	15.8	14.1	17.6	11.6	Early-Late Medieval	Raunds	1
Tibia GL	1		105.9			Postmedieval	Launceston	2
	2		97.1	101		Early-Mid Medieval	Raunds	1
	3	113.8	106.1	121		Anglo-Saxon	West Stow	3
	1		86.5			Mid Roman	Scole	

Plates 1-4: Vertebrate remains from Scole-Dickleburgh.

Plate 1a: Lateral view of cattle scapula, with perforation (unit 30786, #1)

Plate 1b: Lateral view of cattle scapula, with perforation (unit 10998, #1)

Plate 1c: Distal view of cattle scapula, with butchery marks (unit 30786, #3)

Plate 1d: Distal view of cattle scapula, with butchery marks (unit 10998, #1)

Plate 2a: Lateral view of cattle scapula, with perforation (unit 10908)

Plate 2b: Lateral view of cattle scapula, with perforation (unit 30786, #2)

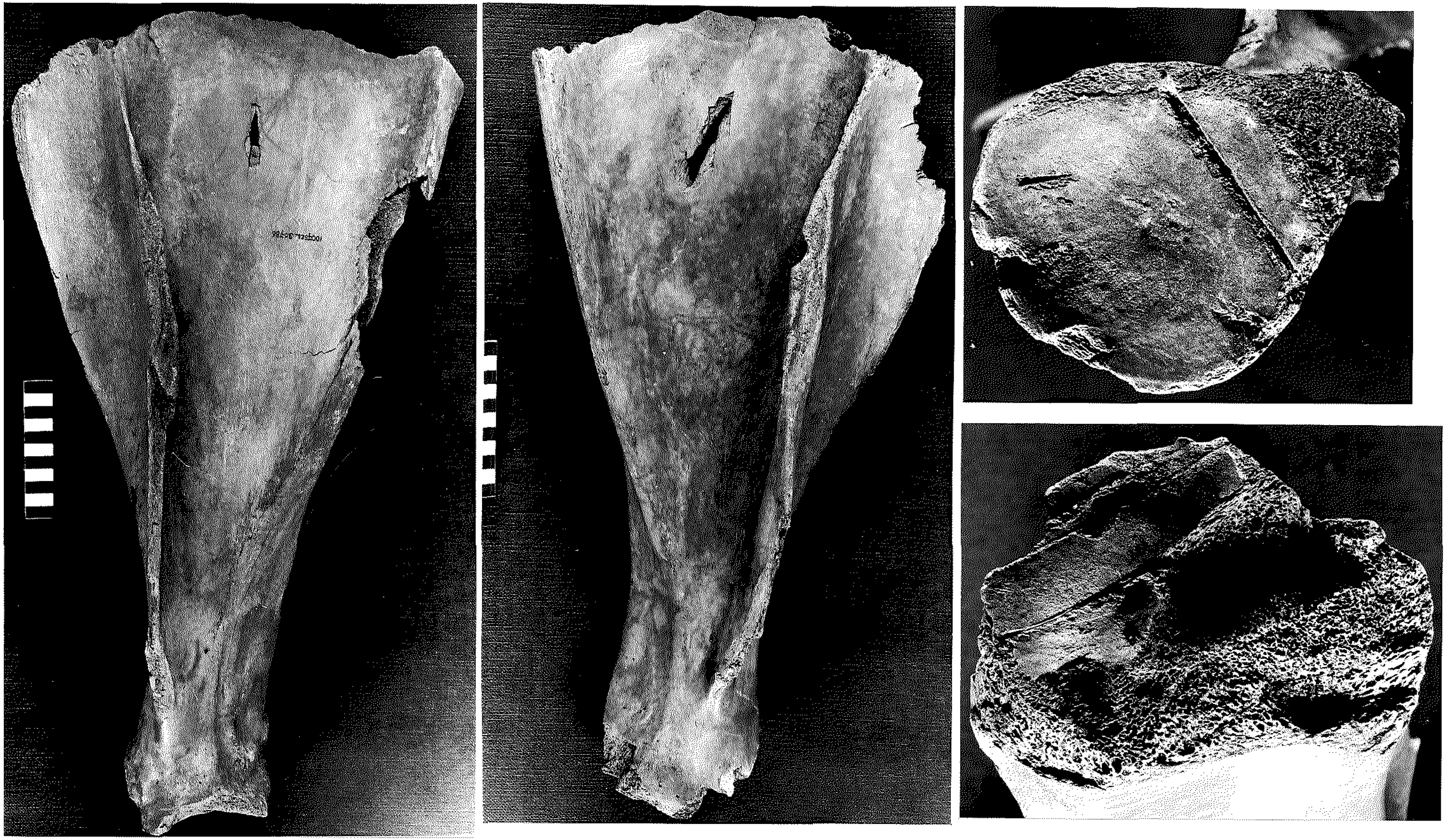
Plate 2c: Lateral view of cattle scapula, with perforation (unit 10630)

Plate 3a: Shed antler of red deer (unit 10994)

Plate 3b: Cranial end of roe deer antler with chopped pedicle (unit 10998)

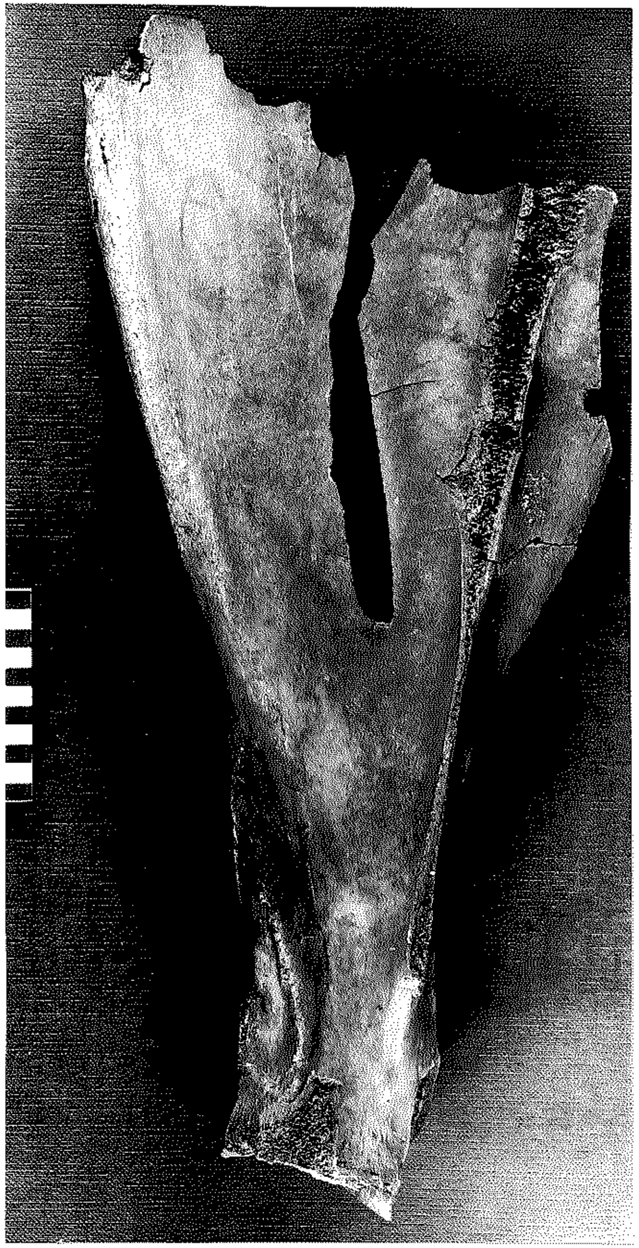
Plate 4a: Shed antler of fallow deer (unit 30786)

Plate 4b: Detail of butchery in palmate area of shed fallow deer antler (unit 30786)



1a **1b** **1c** Top **1d** Bottom

Plate 1



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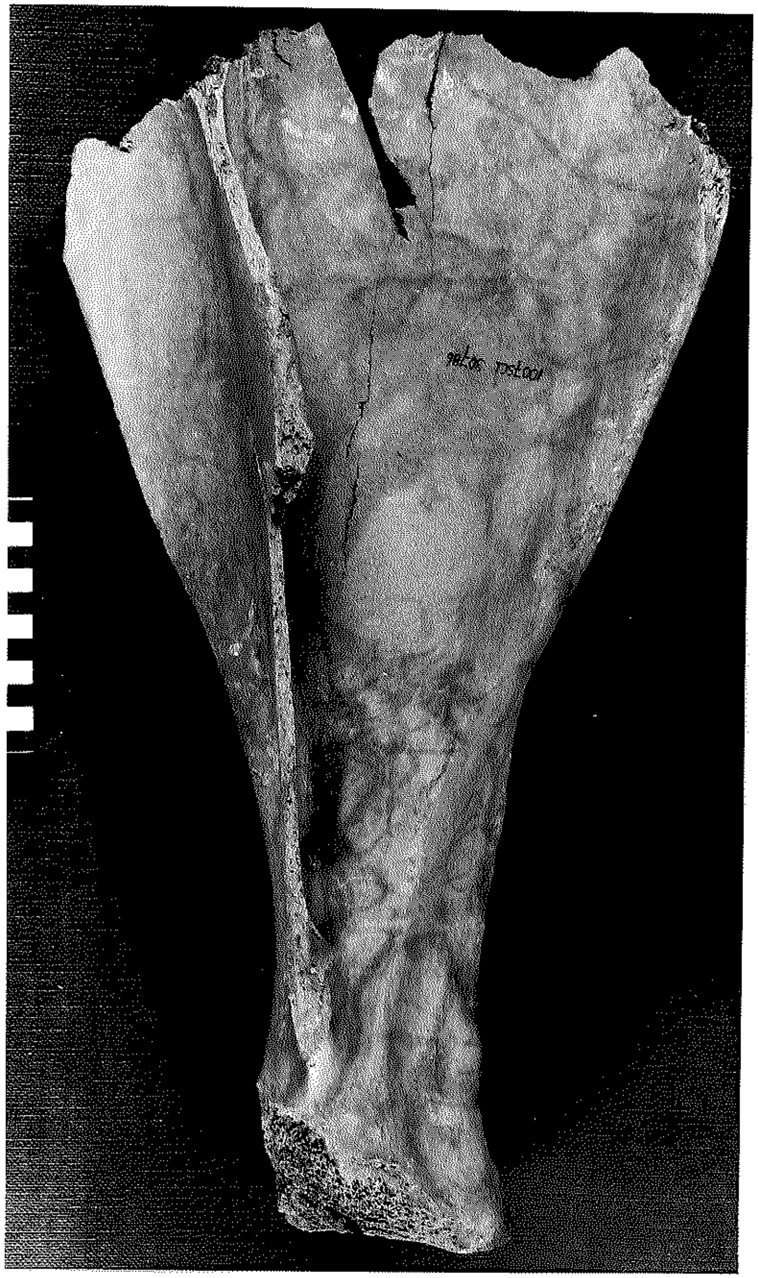
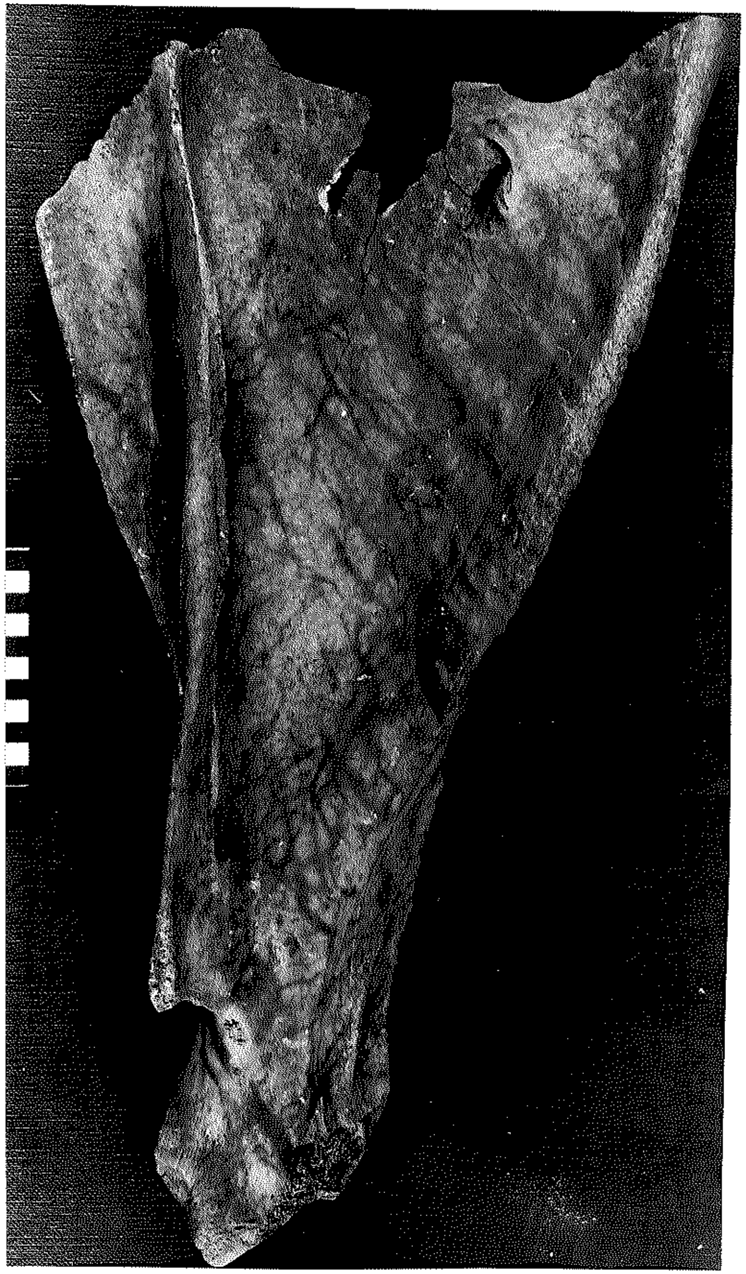
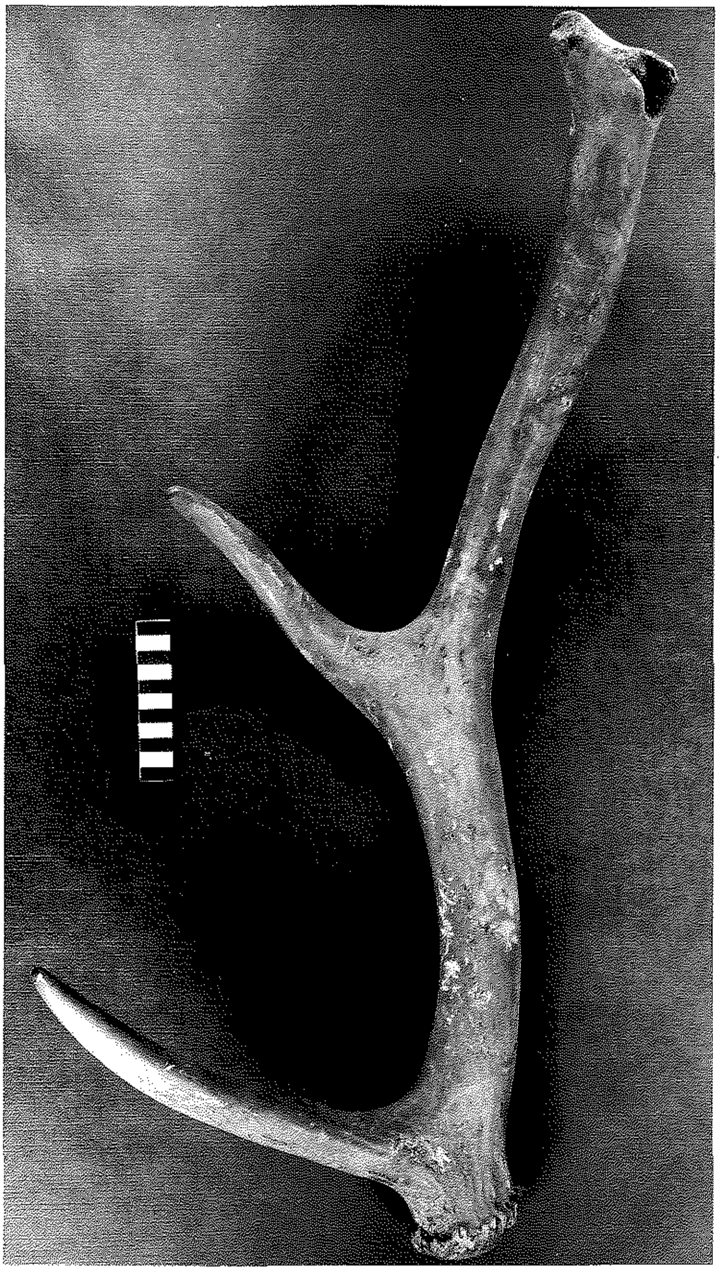


2b



2c

Plate 2



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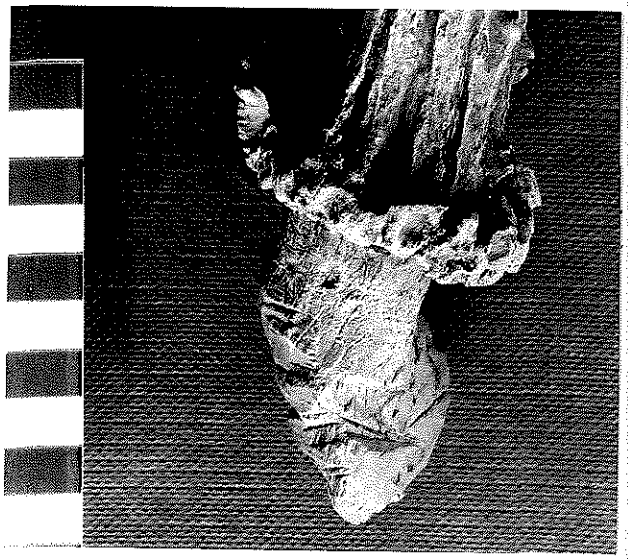
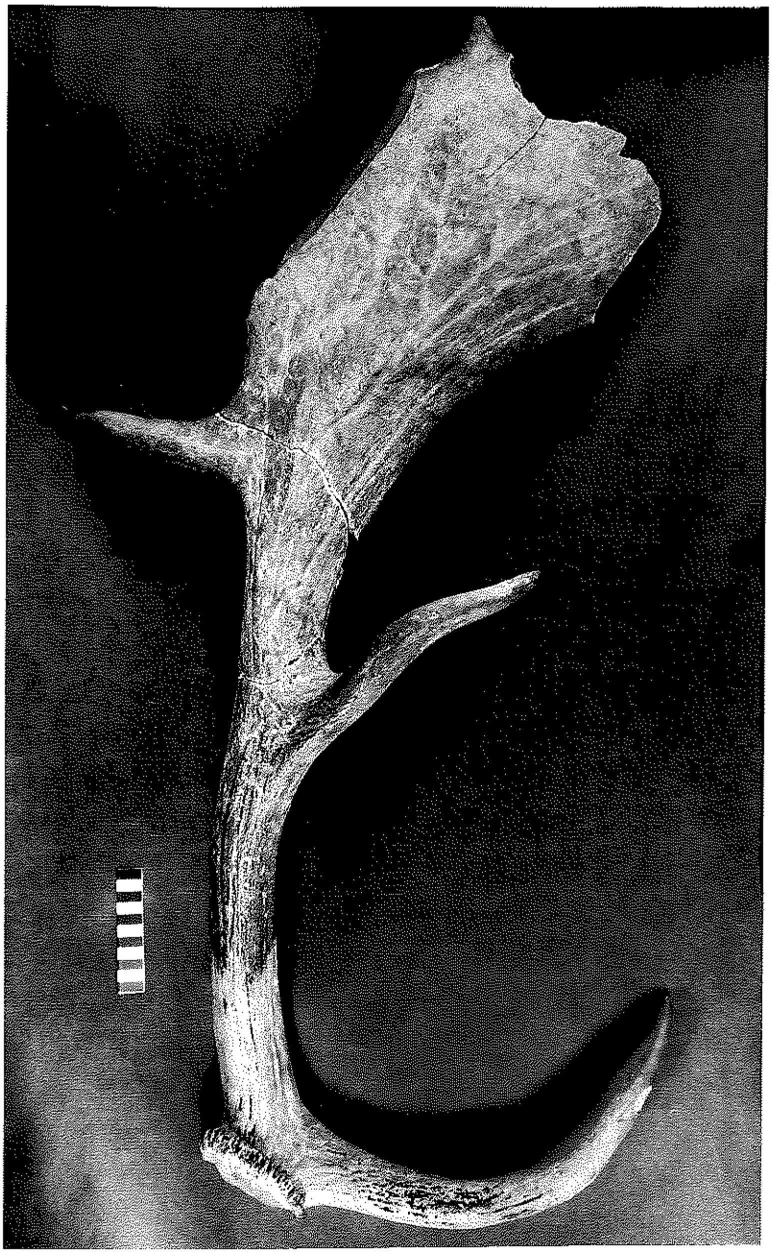
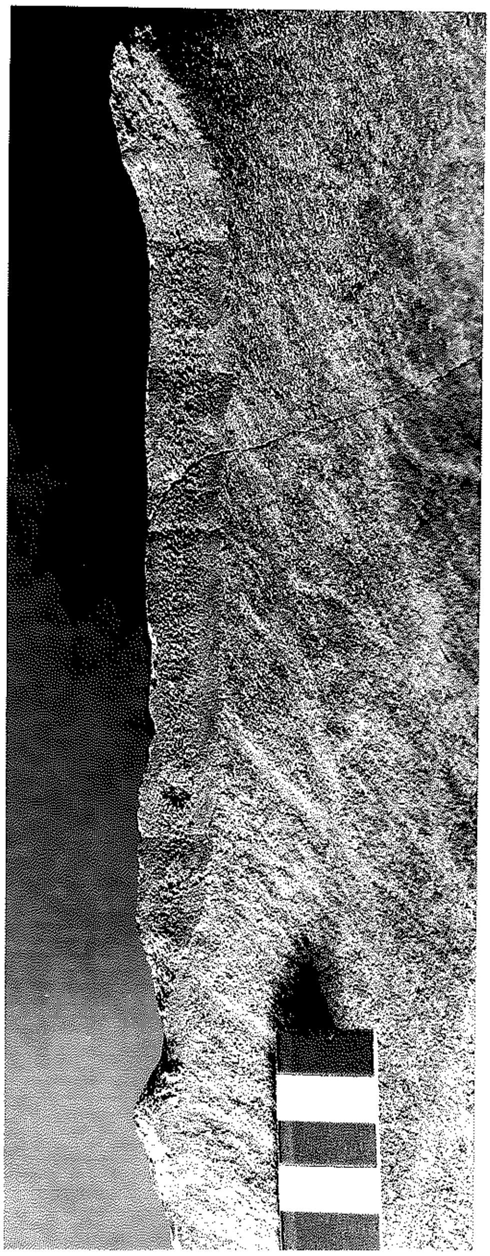


3b

Plate 3



4a



4b

Plate 4

Appendix 1
Cattle mandible tooth wear sequences and wear stages (after Ewbank et al. 1964; Grant 1982; O'Connor 1988)

Context	dP4	P4	M1	M2	M1/M2	M3	Wearstage
Prehistoric							
10839	j-k		j	f		1/2	S
Early-Mid Roman							
10526	k		g	b			S
60056	j		g				S
70509	l		j	g		1/2	S
11457	j		g	b		Er	S
70265			g	g		v	S
70469	j		h	b		v	S
81220		v	k				S/A
81336		1/2	j				S/A
11226			j	f-g			S/A
10430		Er	k	g		f	A
10997	k		g	g		b	A
40380	j-k		k	j		b	A
70379			h	f		b	A
30786			k	g		b-c	A
10636				g		d-e	A
30786		c	g	g		f	A
30786		f	g	g		g	A
30786		c	k	j		g	A
70230		f	l	l		g	A
70230		f	l	l		g	A
70297		c	k	j		g	A
70509		f	k	j		g	A
10774				k		h	A
30596		g	k	k			A/E
70321		f	k	k			A/E
30596		g	k	k		j	E
30623		g-h	k-l	k		j	E
11051		g	k	j		j	E
30623			k	k		k	E
70301		h	l	k		k	E
70301		h	l	k		k	E
70230			l	k		l	E
60282			n	l		l	E
70317			l	k		l	E
10636	j-k		g	Er			I
Late Roman							
80709			g	a			I
80875	j		f	Er			I
20169	k		j				S
80303		1/2	j				S
80303			g	b			S
80303		v		g			S
80303		v	j	g			S
80812			h	b			S
81326			g	d-e			S
10337	j		g	b			S
80302	k		g	f		1/2	S
80303			j	f		1/2	S
10630			g	f		1/2	S
81261	k		j	f		Er	S
80952		c	j				S/A
70188	j		g	b			S/A
10152			h	g		b	A
80845		g	l	g			A
81261	k		j	f		a-b	A
30845	k		g	g		b	A
80303		1/2	j	g		c	A
80706		v	j-k	g		c-d	A
80706		c	g	f		c-d	A
80709		1/2	k	g		d	A
80303		c	k	j		f	A

Appendix 1
Cattle mandible tooth wear sequences and wear stages

Context	dp4	P4	M1	M2	M1/M2	M3	Wearstage
70120		c	k	j		f	A
80709		e	k	g		f-g	A
80300		d-e	l	k		g	A
80706		c-d	k	j		g	A
80709		c	k	h		g	A
80709		h	k	k		g	A
80834		e	l	k		g	A
80952		b-c	j	j		g	A
10211				k		g	A
80303			k	j			A/E
80950		g	k	ind			A/E
70035		d	k	j			A/E
80127		g	l	k		j	E
80709		f-g	l	k		k	E
80933			l	k		k	E
80951				l		l	E
80952		g	l	k		l	E

Appendix 1
Caprine mandible tooth wear sequences and wear stages (after Ewbank et al. 1964; Payne 1973)
(ovc: caprine; ova: sheep; oa?: cf. sheep)

Context	Sp	dP4	P4	M1	M2	M1/M2	M3	Wearstage
Prehistoric								
10647	ovc				9A		7A/8G	E/F
Early-Mid Roman								
30847	ova	16L		6A				C
20340	ova	14L		4B				C
30939	ova	14L/16L		7A	v			C
70200	oa?	14L		7A				C
70317	oa?	14L		7A				C
80149	ova	14L		6A	1/2			C
80217	ova	14L		8A	Er			C
70257	ova	16L		8A	Er			C
70379	ova	17L		8A	Er			C
70257	oa?	16L		7A	v			C
70286	ovc				1/2		Cr	C
10392	ova	17L		9A	4A/5B		0	D
30103	ovc		8A	9A	9A		1/2	D
70257	ovc			9A	7A		1/2	D
70419	ova	23L		9A	7A		Er	D
80289	ovc			9A	7A		v	D
10454	ovc			9A	7A			D/E
70509	ovc			9A	7A			D/E
10738	ovc		9A	9A	8A			E
10738	ovc		ind	9A	8A			E
70418	ovc		Er	9A	8A			E
80144	ovc		8A	9A	9A		3B/4A	E
70265	ovc		7S	9A	9A		7A	E
10429	ovc		7A	9A	9A		10G	F
30786	ovc		8A	9A	9A		8G	F
70432	ovc		7S	9A	9A		8G	F
80131	ovc		7S	9A	9A		9G	F
11051	ovc		7A	9A	9A		9G	F
80131	ovc		12S	11A				F/G
70312	ovc		12S	10A	9A			F/G
10332	ovc				9A		11G	G
80144	ovc			12A	9A		11G	G
30603	ovc		8A	10A	9A		11G	G
30786	ovc		12S	9A	9A		11G	G
60255	ovc		9A	12A	9A		11G	G
70286	ovc		12S	11A	9A		11G	G
70379	ovc		8A	9A	9A		11G	G
Late Roman								
80835	ova	14L		6A				C
10953	ova	14L		8A				C
30005	ova	17L		8A				D
70121	ovc		1/2	9A				D
80818	ova	16L		9A	2A			D
81300	ovc			9A	4A			D
10205	ova	16L		9A	4A			D
80946	ovc			9A	4C			D
80846	ovc	16L		9A	5A			D
80950	ovc			9A	5A			D
80946	ovc			9A	6A			D
80950	ova	18L		9A	6A		Cr	D
10630	ovc			9A	6A		v	D
70123	ovc			9A	7A		v	D
80855	ovc		3B	9A				D/E
80845	ovc		v	9A	7A			D/E
80952	ovc		v	9A	7A			D/E
20032	ova	16L		9A	8A			E
20032	ovc		1/2	9A	7A		1B	E
70220	ovc		1/2	9A	7A		2A	E
80951	ovc		6S	11A	9A		3C	E
80856	ovc		5B	9A	9A		4A	E
80865	ovc		8A	9A	9A		4A	E

Appendix 1
Caprine mandible tooth wear sequences and wear stages

Context	Sp	dP4	P4	M1	M2	M1/M2	M3	Wearstage
80823	ovc						5A	E
80952	ovc		8B	9A	7A		5A	E
80950	ovc		5A	9A	9A		5A	E
10994	ovc		9A	11C	9A		5A	E
80830	ovc				9A		7A	E
10425	ovc		8A	9A	9A		7A	E
10630	ovc		7S	9A	9A		7A	E
80145	ovc		7S	9A				E/F
80866	ovc		7S	9A				E/F
10988	ovc		7S	9A				E/F
10165	ovc		8A	9A				E/F
80847	ovc		7S	9A	9A			E/F
80950	ova	16L		9A	9A			E/F
10112	ovc			9A	9A			E/F
40028	ovc		8A	9A	9A			E/F
10259	ovc		8A	12A				F
80951	ovc		12A		9A		10G	F
10283	ovc		9A	9A	9A		10G	F
10951	ovc		11S	9A	9A		10G	F
81300	ovc						8G	F
80300	ovc		8A	9A	9A		9G	F
80962	ovc		9A	9A	9A		9G	F
70126	ovc		8A/9A	9A	9A		9H	F
10081	ovc		12S	10A				F/G
40021	ovc		8A/9A	10A				F/G
70374	ovc		9A	10B				F/G
80947	ovc		9A	10B	9A			F/G
80947	ovc		15A	11A				G
10951	ovc		12S	15A	9A			G
80245	ovc				9A		11G	G
80867	ovc		11S	12A	9A		11G	G
80950	ovc		12S	15A	9A		11G	G
80952	ovc		11S	15A	9A		11G	G
10227	ovc				9A		11G	G
80835	ovc		15A	15A				G/I
80952	ovc		11S	15A	10A			H
80245	ovc		14S	14A	10B		11G	H
80832	ovc		15A	15A	11A		11G	H
80855	ovc		15A	15A	15A		11G	H
Medieval								
10080	ovc			9A	6A		1/2	D
10813	ovc			9A	8A		1/2	D
10813	oa?	16L		9A	7A			D/E
10092	ovc		8A	9A				E/F
10080	ovc			12A	9A		11G	G
10080	ovc		14S	9A	9A		11G	G
Postmedieval								
30634	oa?	14L		7A				C
30050	ova	14L/16L		5B				C
10329	oa?	16L		8A	5A			D
10279	ovc		14S	15A	9A			G

Appendix 1
Pig mandible tooth wear sequences and wear stages (after Ewbank et al. 1964; Grant 1982; O'Connor 1988)

Context	Sex	dP4	P4	M1	M2	M1/M2	M3	Wearstage
Early-Mid Roman								
10241		d		1/2				J
20074		l		e	v			I
70457			b	e				I/S
11226			a	d	b		v	S
30879				f-g	c		v	S
10998			b	f-g	d		v	S
70509			d	m	f		c	A
Late Roman								
80946		f		1/2				J
80847		e		a	v			J
80935		jk		b	Cr			I
70232		j		c	1/2			I
80841				c-d	Cr			I
10177				d	1/2			I
70224		l		e	Er			I
80952		k		b				I
70147					a-b		1/2	I/S
10255					a-b		v	I/S
40022					Ind		v	I/S
20032			a	e-f	a-b		v/Er	I/S
70183				g	a-b			I/S
40021			b	h				I/A
80874			b	g	e		1/2	S
10630			d	f	c		1/2	S
80300					d		a	S
10133					d		a	S
81350					e		a	S
80300				j	d		Er	S
70126			a-b	g	b		v	S
80935			c	j-k	c		v	S
80936		j		c	c		v	S
70101			1/2	d	b			S
70218			a	f-g				S
80934					de		ab	S/A
80837			a-b	e	d			S/A
80847			b	d-e				S/A
80961	m		b	k	d			S/A
10254			ef	k				S/A
80858					k		c	A
Medieval								
20169			1/2	d	a			I
10092			a-b	e-f				S+

Appendix 2

Cattle mandibular teeth measurements (after Davis 1992): breadth of M3 measured across both cusps rather than separately at the first and second cusps.

Period	Context	Tooth		L		W
1	10839	dP4			c.	13.2
4	81336	dP4				12.1
4	70201	dP4			c.	12.6
4	70375	dP4		26.6		12.6
4	60056	dP4		26.5		12.7
4	40380	dP4		28.2		13.1
4	10526	dP4			c.	13.2
4	70469	dP4	c.	27		13.3
4	11457	dP4		27.2		13.5
4	10997	dP4	c.	28		18.2
5	70188	dP4	c.	26		12.2
5	80303	dP4		24.3		12.3
5	80709	dP4		24.4		12.3
5	80706	dP4		20.7		12.4
5	80706	dP4		25.3		12.4
5	80709	dP4		24.5		12.4
5	10104	dP4		25.3		12.5
5	80303	dP4				12.5
5	30845	dP4		25.2		12.6
5	80303	dP4		25		12.6
5	80706	dP4		25.8		12.6
5	10337	dP4	c.	27.3	c.	12.7
5	80302	dP4		25.7		12.7
5	40017	dP4		24.4	c.	12.9
5	80303	dP4		25.2		13
5	80848	dP4				13
5	80303	dP4		27.9		13.1
5	70101	dP4		26.1		13.3
5	80302	dP4		27		13.3
5	80302	dP4		26.5		13.4
5	80303	dP4		26.1		13.4
5	81261	dP4		27.1		13.4
5	81261	dP4		27		13.5
5	80860	dP4		29.4		13.7
5	80875	dP4		27.2		13.7
5	80920	dP4		27		13.9
5	80303	dP4		27.8		14.7
5	80709	dP4		21.6		16.6
6	20169	dP4	c.	24.8	c.	12.6
4	10774	M3				14.6
4	70301	M3		33.7		15.4
4	70323	M3		35.7		15.4
4	30623	M3		35.1		15.5
4	70301	M3		34.6		15.6
4	70230	M3	c.	35.6		16.2
4	81336	M3		40.4		16.6
4	30623	M3		36.3		16.7
4	70317	M3		37.3		16.9
4	70380	M3		37.3		17.4
4	10774	M3		37.2		18.3
5	80302	M3		31.8		13.2
5	80302	M3			c.	13.3
5	80303	M3		32.9		13.5
5	80303	M3		32.5		13.6
5	80825	M3		33.5		13.7
5	80302	M3		33.1		13.8
5	80303	M3		32.6		13.9
5	80706	M3		31.7		13.9
5	80300	M3				14.1
5	80302	M3		31.9		14.1
5	80303	M3		31.9		14.1
5	80302	M3		31.5		14.2
5	80303	M3		35		14.4
5	80709	M3		31.7		14.4
5	80303	M3		28.3		14.5

Appendix 2
Cattle mandibular teeth measurements

Period	Context	Tooth		L		W
5	80303	M3		35.4		14.6
5	80303	M3		32.1		14.7
5	80303	M3		32.4		14.7
5	80706	M3	c.	33.7		14.7
5	80303	M3		35.5		14.8
5	80303	M3		34.7		14.9
5	80303	M3		33.1		15
5	80303	M3		36.2		15
5	80303	M3		36.5		15
5	10214	M3		22.3		15.1
5	80303	M3		36.5		15.1
5	80272	M3		35.6		15.2
5	80303	M3		34.7		15.2
5	80302	M3		34.2		15.3
5	80303	M3		34.2		15.3
5	80303	M3		35.1		15.3
5	80303	M3		36.3		15.3
5	80303	M3		34.4		15.3
5	80303	M3		33.4		15.3
5	80303	M3		33.5		15.4
5	80303	M3				15.5
5	80303	M3		32.6		15.5
5	10257	M3	c.	36.5		15.6
5	80127	M3	c.	36.6		15.6
5	80303	M3		34.2		15.6
5	10199	M3		35.4		15.7
5	80302	M3		37.3		15.8
5	80303	M3				15.8
5	80946	M3		36.9		15.8
5	80932	M3				15.9
5	80303	M3		37.1	c.	16
5	80950	M3		37		16.1
5	80230	M3		36.2		16.3
5	80303	M3		37.5		16.3
5	80931	M3		33.6		16.3
5	80975	M3		38.7		16.3
5	70225	M3		37.6		16.7
5	80806	M3		38.1		16.7
5	80952	M3		37.6		16.7
5	80302	M3		36.5		17.4
5	80951	M3	c.	38.3		17.4
6	10152	M3		33.2		15.6
7	10233	M3				14.7

Appendix 2
Cattle horncore and postcranial measurements (after von den Driesch 1976; Davis 1992)
(Pf: proximal fusion; Df: distal fusion; f: fused; g: fusing; v: fusion visible; M: missing specimen; A: assymetrical)

Period	Context	Elem	Pf	Df	Min d	Max d	Outer curve
1	10647	hrn			c. 52		
3	80178	hrn			35.9	52	157
3	10554	hrn			37.3	47.3	
3	10728	hrn			48.1	59.3	
3	11275	hrn			58.5	73.5	
4	30879	hrn			30.4	46.1	
4	30593	hrn			c. 31.8		
4	11398	hrn			32.1	41.5	
4	70509	hrn			c. 33.6	c. 45.8	
4	30786	hrn			34.5	43.1	
4	30596	hrn			34.6	45.5	c. 123
4	30786	hrn			35.6	45.6	c. 84
4	70240	hrn			36.1	51.1	
4	10526	hrn			37.8	49.5	
4	10872	hrn			38.6	45.3	
4	70298	hrn			39.2	56.8	
4	70206	hrn			39.6	51.5	
4	70290	hrn			c. 42.7	54.6	
4	30623	hrn			c. 43.6	57.7	
4	20177	hrn			48.1	62.7	222
4	30786	hrn			48.4	66.5	215
4	30786	hrn			48.6	65.7	214
4	70206	hrn			50.5	38.4	
4	60265	hrn			c. 53.4	c. 64.3	
4	60284	hrn			53.5	65.5	
4	70266	hrn			53.5	78.2	
4	30786	hrn			57	77.6	202
4	10908	hrn			58.7	80.5	
4	30904	hrn			61.5	78.4	
5	80303	hrn			29		
5	80303	hrn			29.1	41.3	
5	80303	hrn			29.2	37.6	
5	30845	hrn			30.5	46.2	c. 140
5	80906	hrn			30.8	39.2	
5	10994	hrn			32.5	45	
5	80142	hrn			32.5	42.6	
5	70224	hrn			32.7	38.4	
5	80303	hrn			33.4	42.2	
5	70147	hrn			33.9	47.4	154
5	10259	hrn			c. 34	c. 53	
5	11385	hrn			34.2	43.2	c. 110
5	80303	hrn			34.2	39	c. 150
5	40018	hrn			34.3	43.2	
5	70147	hrn			34.4	48.1	
5	80706	hrn			34.4	52.1	
5	80706	hrn			34.6	46.4	
5	80246	hrn			34.8	46.5	
5	10954	hrn			35.1	46.2	c. 145
5	30021	hrn			35.4		
5	80950	hrn			c. 35.6	c. 44.5	
5	10953	hrn			36.2	45.3	c. 161
5	10630	hrn			36.6	46.2	
5	80302	hrn			37.9	46.1	
5	80706	hrn			c. 37.9	c. 46	c. 115
5	81261	hrn			37.9	50.9	133
5	10167	hrn			38.1	46	
5	80952	hrn			c. 38.1	49.5	
5	30021	hrn			39.3	c. 61.5	
5	80300	hrn			41.5	52.2	c. 150
5	10070	hrn			43.1	60	
5	10227	hrn			44.8	62.2	
5	80300	hrn			45.3	56.1	
5	80302	hrn			45.4	63.4	
5	30845	hrn			46.4	56.1	
5	11465	hrn			47.7	c. 70.3	
5	11677	hrn			51.1	51.8	
5	70224	hrn			54.9	73.4	
5	11465	hrn			56.5	80	
5	80302	hrn				43.2	
6	40026	hrn			34.9	42.7	c. 127

Period	Context	Elem	Pf	Df	SLC	GLP	LG	BG
?	70021	sca			38.1			
1	10647	sca			46.2			
3	80244	sca			37.1			
3	30293	sca		f	42.7	c. 63.5		
3	30885	sca			47.4			
3	20069	sca		f				48

Appendix 2
Cattle postcranial measurements

				SLC	GLP	LG	BG
4	70265	sca	v	c. 37.3	55.8		
4	80172	sca		40.8			
4	30786	sca	f	40.9			c. 41.9
4	70323	sca	f	44.5	c. 61	50.5	43
4	30786	sca		45.7			
4	30904	sca	f	46.3	64.3	53.7	46.3
4	60276	sca	f	48.1	68.8	56.2	49.1
4	70230	sca		48.2			
4	70254	sca		48.4			
4	80159	sca	f	48.5		51.5	c. 45.3
4	70230	sca	f	49.7	68.3	56.4	c. 48
4	10908	sca		50.2			
4	70286	sca	f	50.2	67.1	51.1	47.1
4	30786	sca	f	50.3		52	
4	70226	sca		56.3			
4	10998	sca	f	56.5			
4	70240	sca		57.3			55.6
5	10259	sca		37			
5	80951	sca	?	c. 38.6			
5	80808	sca		38.8			
5	70224	sca		39.8			
5	11123	sca	f	c. 40	c. 59		
5	80269	sca		40.3			
5	80964	sca		41			
5	80920	sca	f	42.5			41.6
5	80951	sca	?	42.5			
5	10630	sca	f	42.5	60	49.5	c. 41.4
5	10257	sca	f	43.2	64.8	c. 52.2	44.9
5	80951	sca	f	44.3			
5	70154	sca		45.2			
5	10630	sca		45.3			
5	40021	sca	f	45.4	62.4	49.9	42.5
5	80806	sca	?	45.8			45.2
5	81261	sca	f	45.8	c. 64.5	c. 52.4	c. 49.5
5	81261	sca	f	46.7	64.6	52.7	49
5	10630	sca		46.9			
5	11677	sca	f	47			c. 46.6
5	10945	sca	f	47.5	63.6	c. 48.4	39
5	10994	sca		47.8			
5	10257	sca		48.3			
5	10227	sca		49			
5	70102	sca	f	49			
5	10994	sca	f	50.5	c. 72.7		
5	11676	sca	f	50.8		61.1	51.1
5	30672	sca	f	51		56.3	c. 46.8
5	70102	sca	f	52.4	76		62.2
5	11677	sca	f	53.1	77.1	60.8	c. 52.8
5	80952	sca	f	56.7			c. 56.2
5	11677	sca	f	62	81.1	c. 65.2	53.6
5	10994	sca					49.9
5	80142	sca			43.3		
5	80300	sca	f				c. 42.1
5	10994	sca	f		c. 68.9	59.1	
6	10092	sca	f	53.6			
6	20099	sca	f		63.7		45.5
6	10153	sca	f		70.1	57.6	51.4

					GL	SD	BT	HTC	Bd	Bp
1	10821	hum		f				31.6		
4	70230	hum		f			68.3	30.4	70.8	
4	70230	hum	f	f	280.4	31.6		31.2		c. 93.9
4	70226	hum		f			71.4	31.6		
4	30786	hum		f			68.6	32.8	74.7	
4	60265	hum		f				33.2		
4	70230	hum		f				c. 34.5		
4	30623	hum		f			80.1	34.8	88.3	
4	10991	hum	f	f	307	40.8	78.4	35.4	86.5	
4	70510	hum		f			74.6	36.1	81.1	
5	10258	hum		f				25.5		
5	80302	hum		f				26.2		
5	80302	hum		f			65.1	27.5		
5	80854	hum		f				28.7		
5	80706	hum		f			68.6	28.7		
5	80820	hum		f				28.9		
5	80950	hum		f				29.2		
5	10993	hum	f	f	239	30.8	66	29.5	c. 58.9	
5	10993	hum		f		31.3		30.3		
5	80880	hum		f			66.8	30.3		
5	80831	hum		f			c. 69.1	31.2		
5	80300	hum		f				31.3		
5	80303	hum		f			66.6	31.5		

Appendix 2
Cattle postcranial measurements

				GL	SD	BT	HTC	Bd	Bp
5	30583	hum	f				32		
5	80951	hum	f			c. 70.4	c. 32.5		
5	80921	hum	f				33.1		
5	70220	hum	f				33.8		
6	10153	hum	f			c. 65.4	30.3		
6	10092	hum	f			c. 65.2			
7	20067	hum	g			69.8	35.7	79.2	

					GL	SD	Bd	Bp
4	30623	rad		f				84.7
5	10630	rad	f	f	282.3	34.1	44.6	51.4
5	80300	rad	f	v	254.8	34.7	62.8	69.7

				GL	SD	BFd	Bdfus	Dd	1	a	4	b
3	80310	mtc	f		c. 26.3	c. 48.1	43.6	c. 25.7	20.5	22.8	19.4	
3	20082	mtc	f			50.2	46.2	27.5	20.8	24.4	19.3	23.4
3	20082	mtc	f			52.6	48.7	29.4	21.7	25.5	20.8	24.8
3	10378	mtc	f			52.3	48.8	29.8	22.3	25.3	20.6	24.1
3	20062	mtc	f			c. 62.3			25.8	30.2	23.8	28.7
4	80223	mtc	f			56.7	46.7			24.9		c. 24.3
4	70202	mtc	f			54.2	49.3	30.9	23.4	26.3	21.3	26
4	70469	mtc	f			53.5	49.4	30.7	23.5	26	22.4	25.4
4	30786	mtc	f		29.9		50.3	28.6	22.3	26.6		
4	81220	mtc	f			54.7	51.5	30.6	22.8	25.8	21.9	c. 25.6
4	30786	mtc	f			54.8	51.8	30.1	22.6	26.6	20.6	25.1
4	80132	mtc	f			56.7	51.8		23.5	27.2	22.6	26.6
4	70230	mtc	f			55.8	52.1		27.3	22.8	26.6	
4	10526	mtc	f			60.8	53.1		25.4	30.1	23.4	28.1
4	10998	mtc	v			54.7	54.2	c. 30.1	22.8	c. 26.6	21.2	25.5
4	70227	mtc	f	206.8	31.2	56.3	54.8	31.4	23.7	27		25.7
4	30548	mtc	f			55.8	55.1		24.1	26.8	23.3	26.3
4	70375	mtc	f				c. 59.4	c. 35.7	27.2		26.2	31.7
4	81336	mtc	vf					30.6	22.7	28		
4 (M)	10353	mtc	f			70.3		32.5	26	c. 32.8	c. 25.1	34.8
5	30021	mtc	f				42.8					
5	30033	mtc	f			49.4	45.4		20.5	c. 23.2		
5	70374	mtc	f			53.6	48.5		21.5	25.5	20.1	25
5	70215	mtc	f			52.8	48.9	27.9	21	25.9	19.4	24.8
5	30038	mtc	f				49.5		23.2			
5	70121	mtc	f			53.7	49.5	28.3	22.6	25.5	21.4	26.3
5	70058	mtc	f			53.6	50.2	29	21.8	25.3	21.6	25.2
5	10994	mtc	v	187.2	27.1	51.7	50.3		21.4	c. 25.2		
5	80958	mtc	f			c. 51.8	50.4	30.8	21.7	26.7	23.2	c. 27.7
5	80939	mtc	f			54.2	50.4	30.4	23.2	26.2	22.5	25.3
5	10199	mtc	f			56.2	50.7		22.9	27.1	22.1	26.1
5	80934	mtc	f			56	51.2	c. 30.2	22.9	27.7	21.5	25.7
5	40257	mtc	f			56.3	51.2					
5	70140	mtc	f			55.6	51.5	30.9	23.4	26.5	22.2	26.5
5	80824	mtc	f			54.9	51.8	c. 30.7	23.1	26.4	21.4	25.8
5	70144	mtc	g				52.1				21.1	24.4
5	80945	mtc	f			56.9	52.3	30.4	23	27.3	22.2	27
5	80951	mtc	f	191	31	55.1	52.6	29.2	21.8	26.5	20.2	25.8
5	80962	mtc	f			58.6	53.1		22.4	28.2	21.7	
5	80963	mtc	f			52.7	53.2		22.8	27.2	24.1	
5	70383	mtc	f			57.3	53.4	c. 30.8	23.8	27.2	22.5	26.7
5	80951	mtc	f			55.8	53.6	c. 30.9	22.9	26.7	21.7	26
5	70143	mtc	f			58.6	54	32.8	26.1	28.5	24.3	27.8
5	80854	mtc	f			57.3	54.2			27.4	23.6	27.3
5	30009	mtc	f			60	54.2		24.7	28.9		
5	80867	mtc	f			57.7	54.3	32.4	24	27.4	22.4	27
5	70155	mtc	f			60.2	54.4	32.9	24.6	28.7	23.8	28.7
5	30846	mtc	f	206.5	33.3	60.1	55.3		24.3			
5	80936	mtc	f			65.1	55.9	34.3	27.2	32.4	24.7	30.2
5	81261	mtc	g	203.7	31	56.8	56.6	31.8	24.4	27.5	22.7·	26.4
5	10254	mtc	f	196.5	35.2	c. 58.9	56.6	31.9	25.3	28.6	23.2	
5	80936	mtc	f			62.3	56.7	36.7	25.2	28.8	26.4	30.5
5	10994	mtc	f	189.1	36	61.7	57	32.8	24.7	30.5	22.7	28.7
5	81261	mtc	g	205.2	c. 36.2	c. 58.2	c. 57.6	31.9	24.4	28.1	23.2	27
5	80857	mtc	f			63.7	57.7		25	29.6	26.7	30.8
5	80950	mtc	f			c. 69.4	58.6	35.5	27.2	33	25.7	34.2
5	80855	mtc	f			71	58.6	35.4	28.1	33.1	26.1	35.6
5	70128	mtc	f			68.2	60.3	36	27.8	32.6	26.8	31.8
5	40017	mtc	f			66.8	60.6		26.5	32.6		31.6
5	70151	mtc	f			68.1	61.6	32.5	25.1	31.4	27.2	33.5
5	70169	mtc	f			69.8	62.7		26.9	34.3	24.3	33.8
5	70215	mtc	f			66.8	62.9	34.9	27.1	32.6	25	31.4
5	80950	mtc	f			67.5	63.6	35.5	26.7	32.9	25.6	31.2
5	80961	mtc	f	197.1	37.3	66.4	69.3		26	31.9	23.1	31.1
5	10993	mtc	f						26.6			
5	70121	mtc	v						20.6	24.5		
5 (A)	80142	mtc	f						28.1	36.3	26.5	c. 32.6

Appendix 2
Cattle postcranial measurements

					GL	SD	BFd	Bdfus	Dd	1	a	4	b
5	80199	mtc		f						23.2	25.6		
5	80820	mtc		f						23.1	27.8		
5	80950	mtc		f						23.9	33.6		
6	10153	mtc		f	177.8	29.6	53.8	48.7		22.5	26.3	20.7	25.4
6	10092	mtc		f			57.3	53	c. 30.5	23.8	27.9	21.8	27.2
7 (A, M)	10030	mtc		f			64	55.6	20.8	25	32.2	22.3	28.3

					Max pub	Min pub	LA	LAR
1	30432	inn			19.8	10.4		
4	70230	inn			19.2	12.5		
4	30813	inn			19.7	14.4		
4	11051	inn			20.3	13.8	c. 68.7	
4	70230	inn			c. 21.2	c. 13.3	69.7	c. 62
4	30904	inn			21.7	c. 12.8	c. 63	
4	70469	inn			22.3	20.8		
4	70226	inn			23.3	16.9		
4	70240	inn			23.3	15.7		
4	30786	inn		u	26.6	15.6	c. 70.1	
4	70469	inn			27	20.8		
4	10241	inn				20.4		
4	30623	inn					c. 60.5	
4	30630	inn					69.2	
4	30733	inn					69.2	
5	80945	inn			10.2	18.8		
5	80845	inn			11.2	20.3		
5	80821	inn			11.5	21.6		
5	80915	inn			13.4	c. 19.1		
5	80945	inn			13.8	24.4		
5	80812	inn			14.3	22.4		
5	80962	inn			14.3			
5	80956	inn			14.6	21.1		
5	80957	inn			16	25		
5	80957	inn			16.1	c. 26		
5	80951	inn			16.2	24.4		
5	81261	inn			16.6	24.2	c. 71.7	
5	80855	inn			16.8	19.9		
5	81261	inn			17.1	23.3	c. 72	
5	70374	inn			17.6	14.3		
5	10993	inn			21	12.1	c. 68	
5	40017	inn			21.7	13.8		
5	10047	inn			22	14.9		
5	70224	inn			23.7	18.5		
5	70223	inn			24.6	15.5		
5	11677	inn			25.8	14.6	72.4	
5	11123	inn			29.5	19.9		
5	80845	inn				27.4		
5	80932	inn				17.6		
5	10252	inn					62.5	
5	80813	inn					c. 62.8	
5	10257	inn					c. 67	
5	80303	inn					69.6	c. 58.4
5	70120	inn					71.7	65.5

					GL	SD	Bd
4	60283	fem	f	v		32.4	c. 88.6
4	70424	fem		f			89.5
5	10198	fem		f			86.1

					GL	SD	Bd	Bp
3	20062	tib		f			60.3	
4	60148	tib		f		c. 32.5	54.5	
4	70265	tib		f			57.4	
4	60148	tib		f		34.6	57.5	
4	10774	tib		f			65.9	
5	70194	tib		f			51.1	

					GL	SD	Bd	Bp
5	80712	tib		f			53.7	
5	10169	tib		f			c. 56.4	
5	10993	tib		f			56.6	
5	80302	tib		f		34.3	56.8	
5	80302	tib		f			57.1	
5	70125	tib		f			59.5	
5	30583	tib		f			61.4	
5	40257	tib	f	f			62.8	
5	10993	tib		f			65.7	
6	10152	tib		f			57	
6	10813	tib		f			c. 63.5	
7	10179	tib		v			52.2	

Appendix 2
Cattle postcranial measurements

			GLl	Dl	Bd
3	10616	ast	70.2	37	44.1
4	70265	ast	61	34	37.6
4	80172	ast	62	34	38.2
4	70202	ast	64.3		
4	70265	ast	64.9	37.6	41.3
4	10866	ast	c. 66.6	c. 36.7	
4	10636	ast	70.4	39.1	44.3
5	10132	ast	58.5	33.1	36.1
5	10170	ast	59	32.8	39.1
5	80246	ast	59.4	31.9	35.6
5	80303	ast	60.3	33.2	45
5	80963	ast	60.5	33.4	40.2
5	80806	ast	60.6		37.4
5	70140	ast	60.9	32.8	37.7
5	70103	ast	61.3	32.9	37.2
5	80832	ast	61.7	37.9	
5	70121	ast	61.8	35.1	39.7
5	70197	ast	62.1	35.4	39
5	80964	ast	62.3	33.3	36.8
5	70035	ast	62.5	34.9	39.1
5	70147	ast	c. 62.8	c. 35.1	40.1
5	80925	ast	63.7	35.6	39.2
5	10630	ast	64	35	37.6
5	80934	ast	64.2	36.4	42.2
5	80950	ast	64.4	35.8	43.5
5	10205	ast	64.5	33.6	39.3
5	30500	ast	64.7	35.3	
5	70140	ast	65.1	36.7	41.8
5	80825	ast	65.2	37.1	
5	80947	ast	65.3		
5	80950	ast	65.3	36.8	40.2
5	80803	ast	65.4	37.2	
5	70035	ast	65.5		
5	70104	ast	65.6	36.3	40.7
5	80950	ast	66.3		
5	30012	ast	67.2	38.3	45.9
5	10257	ast	69	39.7	44.4
5	80846	ast	69.2	38.4	45.6
5	70143	ast	70.8	38.1	44.6
5	80963	ast	72.6	38.7	45.7
5	10212	ast		c. 37	
5	10252	ast		41	
5	40018	ast		c. 35.1	
5	70142	ast		37.1	
5	70242	ast		31	35.2
5	80837	ast			39
5	80950	ast			42.3
5	80936	ast			43.2
5	80947	ast			43.7
5	80833	ast			44.1
5	80951	ast			c. 44.6
5	80846	ast			47
5	70034	ast		c. 39.6	47.4
5	80939	ast		38.7	48.4
6	10152	ast	62.1	34.3	38.4
6	20290	ast	63.7	34.9	

				GL
4	70226	cal	f	121.8
5	10175	cal	f	122.8
5	80847	cal	f	129.5
5	80956	cal	f	130
5	80302	cal	f	137.6

				GL	SD	BFd	Bdfus	Dd	1	a	4	b
3	10430	mtt	f			46.4	42.2	27	20.5	21.8		
3	20082	mtt	f			49.1	44.8	28.4	21.8	23.7	21	22.7
4	10872	mtt	f			51.4	48.2	30.7	22.5	24.4	21.4	23.7
4	70380	mtt	v			46.6	48.7	c. 28	20.4	22.5	19.6	21.5
4	30548	mtt	f			53.5	49.4		23.3	25.7		
4	70231	mtt	v			54.3	49.8	31.7	22.5	25.8	21.6	24.7
4	20074	mtt	f			60.4	50	33.8	24.7	29.1	23.2	27.4
4	30603	mtt	f			51.6	50.1		21.6	24.2		
4	70209	mtt	f				50.2	29.7	23.5	25.4	21.7	24.7
4	30623	mtt	f	228.4	26.3	51.8	50.4	31.7	23	25.2	22.4	24.1
4	80110	mtt	f			54	50.5	32.1	23.3	26	21.7	25.4
4	70074	mtt	f			59.4	54	c. 30.9	23.9	28.2	22.7	26.9
4	11051	mtt	f	231.1	31.5	58.9	55.2	33.9	26.3	28.4	24.4	27
4	70230	mtt	f		27.7	59.7	55.2	33.3	25.4	28.4	24.3	c. 27.7
4	70265	mtt	f			63.3	56.6	34.1	26.2	30.7	25.1	28.6
4	70257	mtt	f						24.4	29.4		

Appendix 2
Cattle postcranial measurements

				GL	SD	BFd	Bdfus	Dd	1	a	4	b
4	30603	mtt	f			52.5		29.8	22.5	c. 25.3	21.8	
5	80950	mtt	f			49.9	46.8	c. 28.1	20.9	c. 23.8	20.2	23
5	80952	mtt	f			52.3	47.4		20.1	25.7		23.9
5	80939	mtt	f				47.5		21.6	25.1		
5	70140	mtt	f			51.4	47.6	31.5	22.8	25.8	21.5	23.4
5	80835	mtt	f			51.1	47.7	29.2	20.1	24.4	20.7	22.9
5	10630	mtt	f	200.9	23.9	45.3	48.2					
5	10218	mtt	f			c. 49.8	48.2			23.2	20.2	23.1
5	10425	mtt	f			50.4	48.2	29.4	21.3	24.2	21.2	c. 23.1
5	81256	mtt	f			50.5	48.4		21.8	24.6	20.7	22.7
5	70168	mtt	f				48.5		21.2			
5	70374	mtt	f			51.6	48.9	29.8	22.4	24.9	21.6	23.5
5	70120	mtt	f			52.6	48.9	c. 31.2	23.4	25.4	22.4	24
5	80945	mtt	f			51.8	49.3	31.5	23.4	24.9	22.2	24.3
5	80820	mtt	f			54.3	49.3	30.7	23	26.8	21.7	26
5	80303	mtt	f	224.2	26.4	51.6	49.8	29.5	21	24.5	20.1	23.9
5	80951	mtt	f			54.4	50.1	32.8	23.8	25.9	22.8	24.7
5	70126	mtt	f			46.2	50.4	31	22.6	25	20.6	23.5
5	70224	mtt	f			53.1	50.7	31.6	24.4	25.2	22.7	23.6
5	80824	mtt	f			52.7	51.1	c. 30.5	22.7	25.6	21.4	24.3
5	10167	mtt	f			55.2	51.5		22.2	27.3	21	24.4
5	80812	mtt	f				51.6		22.7	25.8		
5	80855	mtt	f			52.9	51.6	30.6	22.4	25.2	21.3	24.1
5	80813	mtt	f			53.5	51.6	28.2	20.2	25.7	19.9	24.6
5	10257	mtt	f	213.7	29.7	56.2	52.1	31.4	22.6	27.6	20.6	26
5	10252	mtt	f			55.2	52.5	33.1	23.8	26.2	22.7	26
5	30033	mtt	f			59.4	52.7	c. 32.6	25.3	29.1	22.9	27.4
5	80812	mtt	f				53				23.6	26.8
5	10112	mtt	f			49.9	54.3	c. 31	24.7	28.7	22.8	c. 26.6
5	81261	mtt	g	229.7	c. 26.7	53.3	54.3	32.1	23.6	25.5	22.6	24.5
5	70062	mtt	f			58.9	54.6	33.4	25	28.1	24.1	27.2
5	10994	mtt	f	231.1	30.5	58.1	55.4	33.8	25.8	27.6	24.3	27
5	70224	mtt	f			61.8	56.6	34.5	25.2	30.2	23.9	29
5	40017	mtt	f			61.4	56.7		24.8	c. 30.2	22.3	c. 28
5	80848	mtt	f			60.3	57	33.5	25.3	28.6	24.4	27.9
5	80931	mtt	f			68.7	57.3		25.1	31.3	24	
5	10257	mtt	f			59.1	58.1	31.4	24.8	28.9		23.2
5	70121	mtt	v			60.3	58.5	30.8	23.4	28.9	22.3	28.2
5	80936	mtt	f			62.7	58.7	33.6	24.5	29.3	24.7	29.3
5	30583	mtt	f	238.7	30.1	64.5	58.8		25.3	c. 31.8		
5	80272	mtt	f			61.4	59.4	32.9	24.4	29.7	23.5	27.7
5 (A)	70035	mtt	f			66.2	60	33.8	25.5	34.6	23.1	29.5
5	10212	mtt	f			c. 64	c. 61.2	36.7	27.4	30.6	25.3	29.7
5	10259	mtt	f						21.2			
5	20031	mtt	f						22.1	24.5		
5	30021	mtt	f						22.9	29.5		
5	40021	mtt	f						24.8	28.4		
5	70035	mtt	f						24.8			
5	80142	mtt	f					29.7	22	24.6		
5	80858	mtt	f						25.2			
5	80934	mtt	f					27.8	20.1	22.6		
5	80956	mtt	f					29.3	21	21.7		
6	20168	mtt	f			48.4	43.5		20.6	23.2	19.2	22.9
6	10092	mtt	f	221.6	23.8	50.4	47.7	29.5	21.8	24.5	19.6	22.7
6	10080	mtt	f			54.7	52.4	28.9	22.1	26.3	21	25.5
6	10152	mtt	f			59.7	53.8		24.5	28.8	22.3	27.7
7	30574	mtt	f			53.6	49.4		22.8	25.9	21.4	24.6

Appendix 2
Caprine mandibular teeth measurements (after Davis 1992): breadth measured across both cusps rather than separately at the first and second cusps.
(ovc: caprine; ova: sheep; oa?: cf. sheep; cah: goat; M: missing)

Period	Context	Species	dP4-W	M1-W	M2-W	M3-W	M1/M2-W
1	70313	ovc					7.3
1	10647	ovc			7.8	8.3	
2	10332	ovc			7.1		
2	10897	ovc					7
3	10392	ova	5.9				
3	20340	ova	5.8				
3	30847	ova	6.8				
3	30939	ova		6.3			
3	81324	ovc				6.7	
3	10616	ovc					7.6
3	30550	ovc					7
4	10454	ovc		8.6	8.5		
4	10353	oa?	5.4				
4	60153	ova	6.6				
4	70203	ova	6.3				
4	70230	ova	6.9				
4	80217	ova	6.7				
4	10738	ovc		6.8			
4	11014	ovc		c. 5.7			
4	30786	ovc		7.3			
4	30786	ovc		7.2			
4	80131	ovc		7.1			
4	60255	ovc			7.9		
4	10738	ovc				8	
4	30596	ovc				7.7	
4	70202	ovc				6.6	
4	80131	ovc				7	
4	80223	ovc				7.8	
4	10353	ovc					6.4
4	10353	ovc					6.8
4	10353	ovc					7.4
4	10526	ovc					6.5
4	10615	ovc					8
4	11603	ovc					7.6
4	11603	ovc					7.7
4	60255	ovc					7.5
4	70201	ovc					7.4
4	70201	ovc					8.1
4	70202	ovc					6.8
4	70202	ovc					7
4	70206	ovc					8.1
4	70208	ovc					7
4	70209	ovc					6.4
4	70209	ovc					7.1
4	70209	ovc					7.7
4	70230	ovc					7.2
4	70230	ovc					8.1
4	70240	ovc					7.3
4	70265	ovc					6.6
4	70286	ovc					7.2
4	70363	ovc					7.2
4	80144	ovc					8.2
5	10112	ovc		6.5	7.8		
5	10953	ova	6.5	6.5			
5	40028	ovc	6.6	6.6	7.3		
5	80951	ovc		6.7		7.9	
5	10142	ova	6.2				
5	10157	ova	6.3				
5	10170	ova	6.7				
5	11213	ova	6.6				
5	30005	ova	5.9				
5	30007	ova	6.9				
5	30013	ova	6.2				
5	30021	ova	6.2				
5	40257	ova	6.4				
5	40257	ova	6.6				
5	40257	ova	6.8				
5	70101	cah	7.1				
5	80145	ova	5.6				
5	80818	ova	6				
5	80830	ova	6.2				
5	80836	ova	6.6				
5	80846	ovc	6				
5	80855	ova	7.2				

Appendix 2
Caprine mandibular teeth measurements

Period	Context	Species	dP4-W	M1-W	M2-W	M3-W	M1/M2-W
5	80856	ova	6.7				
5	80935	ova	6.3				
5	80947	ova	6.2				
5	80950	ova	c. 6.7				
5	80950	ova	5.8				
5	70121	ovc		6.8			
5	70374	ovc		7.1			
5	80820	ovc		7.1			
5	80855	ovc		7			
5	80866	ovc		7.1			
5	10227	ovc			7.6		
5 (M)	10255	ovc			7.8		
5	20032	ova			8.3		
5	80245	ovc			8.1		
5	80935	ovc			7.7		
5	80947	ovc			7.5		
5	10081	ovc				7.7	
5	10220	ovc				7.8	
5 (M)	10255	ovc				c. 8.2	
5	10308	ovc				7.8	
5	10349	ovc				7.2	
5	30009	ovc				7.4	
5	30033	ovc				6.7	
5	40013	ovc				6.4	
5	70121	ovc				7.8	
5	70130	ovc				8	
5	80145	ovc				7.4	
5	80166	ovc				7.8	
5	80191	ovc				7.7	
5	80808	ovc				7.5	
5	80816	ovc				7.7	
5	80823	ovc				7.8	
5	80834	ovc				7.1	
5	80847	ovc				7.1	
5	80854	ovc				7.8	
5	80855	ovc				8.1	
5	80857	ovc				7.3	
5	80868	ovc				7	
5	80884	ovc				8.4	
5	80904	ovc				7.5	
5	80939	ovc				7	
5	80946	ovc				8.3	
5	80947	ovc				7.6	
5	80948	ovc				7	
5	80962	ovc				7.8	
5	80963	ovc				8.3	
5	10048	ovc					7.9
5	10109	ovc					7.2
5	10111	ovc					7.9
5	10132	ovc					7.7
5	10133	ovc					8.4
5	10142	ovc					6.6
5	10142	ovc					7.3
5	10155	ovc					8
5	10156	ovc					8.8
5	10157	ovc					7.6
5	10157	ovc					7.9
5	10157	ovc					c. 7.4
5	10160	ovc					7.3
5	10160	ovc					8.1
5	10165	ovc					6.6
5	10167	ovc					6.8
5	10167	ovc					7.8
5	10175	ovc					6.9
5	10183	ovc					7.6
5	10185	ovc					7
5	10190	ovc					6.4
5	10205	ova					5.8
5	10249	ovc					7.8
5	10252	ovc					7.9
5	10258	ovc					6.8
5	10258	ovc					7
5	10259	ovc					7
5	10264	ovc					7.8
5	10264	ovc					8
5	10264	ovc					9.2
5	10524	ovc					8
5	30009	ovc					6.8
5	30041	ovc					8

Appendix 2
Caprine mandibular teeth measurements

Period	Context	Species	dP4-W	M1-W	M2-W	M3-W	M1/M2-W
5	30304	ovc					6.9
5	40013	ovc					6.9
5	40013	ovc					7.3
5	40017	ovc					8.4
5	40021	ovc					7.6
5	40038	ovc					6.9
5	40254	ovc					6.3
5	40254	ovc					7.7
5	40257	ovc					7
5	40257	ovc					7.1
5	40257	ovc					7.5
5	40257	ovc					8
5	70035	ovc					6.9
5	70040	ovc					8.5
5	70062	ovc					7.6
5	70062	ovc					7.8
5	70101	ovc					8.2
5	70104	ovc					7.1
5	70106	ovc					6.6
5	70142	ovc					6.8
5	70158	ovc					8.1
5	70183	ovc					7.2
5	70221	ovc					7.8
5	80121	ovc					7.9
5	80145	ovc					6.6
5	80145	ovc					7.6
5	80191	ovc					6.8
5	80191	ovc					7.6
5	80802	ovc					7.2
5	80803	ovc					7.5
5	80806	ovc					6.9
5	80814	ovc					6.8
5	80815	ovc					6.7
5	80817	ovc					6.3
5	80822	ovc					6.6
5	80822	ovc					7.6
5	80823	ovc					7
5	80823	ovc					7.7
5	80830	ovc					7.1
5	80830	ovc					7.3
5	80830	ovc					7.6
5	80835	ovc					7.9
5	80837	ovc					6.9
5	80838	ovc					6.6
5	80841	ovc					7.4
5	80843	ovc					7
5	80846	ovc					7.3
5	80846	ovc					7.9
5	80847	ovc					7.8
5	80847	ovc					7.8
5	80852	ovc					7.3
5	80854	ovc					7.3
5	80854	ovc					7.4
5	80855	ovc					7.1
5	80855	ovc					7.1
5	80855	ovc					8.3
5	80857	ovc					6.8
5	80866	ovc					7.6
5	80867	ovc					7.6
5	80868	ovc					7
5	80869	ovc					6.7
5	80870	ovc					7.3
5	80891	ovc					6.9
5	80904	ovc					6.7
5	80904	ovc					6.8
5	80904	ovc					7.4
5	80904	ovc					7.7
5	80907	ovc					7.5
5	80907	ovc					8.7
5	80915	ovc					7.4
5	80915	ovc					7.9
5	80920	ovc					7.3
5	80920	ovc					8.5
5	80931	ovc					6.4
5	80931	ovc					8
5	80935	ovc					6.8
5	80935	ovc					7.2
5	80944	ovc					6
5	80946	ovc					7.7

Appendix 2
Caprine mandibular teeth measurements

Period	Context	Species	dP4-W	M1-W	M2-W	M3-W	M1/M2-W
5	80947	ovc					8.1
5	80950	ovc					7.4
5	80951	ovc					7.1
5	80951	ovc					7.7
5	80951	ovc					7.9
5	80952	ovc					6.4
5	80952	ovc					8.3
5	80956	ovc					8.1
5	80957	ovc					7.4
5	80961	ovc					7.2
5	80962	ovc					6.8
5	80964	ovc					7.6
5	80964	ovc					8.1
5	80964	ovc					8.2
5	80965	ovc					6.8
5	80969	ovc					7.5
5	81201	ovc					7.8
5	81258	ovc					7.6
5	81261	ovc					7.3
5	81318	ovc					7.4
6	10813	oa?	5.7				
6	10080	ovc			8.1		
6	10080	ovc				8.3	
6	10153	ovc				7.3	
6	10153	ovc					7.4
6-7	70238	ovc				7	
6-7	70238	ovc					7
6-7	70238	ovc					7.1
6-7	70272	ovc					7.4
7	30050	ova	6.4	6.8			
7	10329	oa?	6.2				
7	10428	ova	6.3				
7	30634	oa?	6.3				
7	10329	ovc				7.2	
7	10052	ovc					7.3

Appendix 2
Caprine postcranial measurements (after von den Driesch 1976; Davis 1992)
(ovc: caprine; ova: sheep; oa?: cf. sheep; cah: goat; Pf: proximal fusion; Df: distal fusion;
f: fused; g: fusing; v: fusion visible)

Period	Context	Species	Elem	Pf	Df	SLC	GLP	LG	BG
3	10453	ovc	sca		f		c. 29.7	c. 23	
4	70333	ovc	sca		f	15.4	30.2	c. 22.5	18.8
4	70240	ovc	sca			c. 19.5			19.6
4	70282	ovc	sca		f	19.6	31.5	c. 24.4	19.6
4	70418	ovc	sca		f	19.6	33.6	c. 25.2	21.1
4	70286	ovc	sca		f	20.4	34.5	26.1	21.5
4	31044	ovc	sca		f	21.2	35.9	27.3	22.9
4	10908	ovc	sca		f	21.8			21.6
5	10133	ovc	sca		f		31.6	25.1	20.1
5	10253	ovc	sca		f			27.4	20.9
5	11508	ovc	sca		f		31.5	24.1	19.9
5	80843	ovc	sca			15.6			
5	80858	ovc	sca			15.7			
5	70035	ovc	sca		f	17.6	c. 17.8	21.4	
5	70102	ovc	sca		f	17.7			
5	80962	ovc	sca			17.9			
5	10109	ovc	sca			18.1			c. 17.6
5	80937	ovc	sca		f	18.5	32	23.5	20.2
5	80303	ovc	sca		f	18.7		c. 21.5	c. 17.7
5	30009	ovc	sca		f	19			19.2
5	10995	ovc	sca		f	21	31.7	23.3	21.4
6	10080	ovc	sca			19.1			
7	20206	ovc	sca			17.7			

Period	Context	Species	Elem	Pf	Df	GL	SD	BT	HTC	Bd
3	20062	ova	hum		f			24.6	11.7	
4	70287	ovc	hum		f			22.7	11.3	
4	70321	ovc	hum		f			21.1	11.3	23.4
4	40377	ovc	hum		f			24.7	12.3	26.3
4	30879	oa?	hum		f			26.4	12.8	c. 26.9
4	70200	oa?	hum		f			21.3	12.9	
4	70230	oa?	hum		f			27.7	c. 13.4	29.6
4	70209	ovc	hum		f				15.3	
4	10998	oa?	hum		f			29.3	c. 15.7	30.7
4	70416	oa?	hum		f			33.2	17.2	
5	10953	ova	hum		f			26.3		26.5
5	10264	ovc	hum		f			23.1	11.5	
5	10273	ovc	hum		f			25.3	11.6	26.3
5	80858	oa?	hum		f			26.2	12.5	
5	10175	ovc	hum		f			26.4	13.1	27.5
5	80860	oa?	hum		f			26.8	13.2	
5	10046	ovc	hum		f			26.8	c. 13.6	
5	40004	ovc	hum		f				13.6	
5	80946	ovc	hum		f			27.3	13.9	
5	10198	ovc	hum		f				c. 14	
5	80834	oa?	hum		f			27.4	14	
5	30304	oa?	hum		f			26.3	14.2	27.8
5	70126	ova	hum		f			27.6	14.2	29.7
5	80831	ovc	hum		f			31.1	14.3	
5	80962	ovc	hum		f			28.9	14.4	
5	30036	oa?	hum		f				14.6	
5	70125	oa?	hum		f			30.2	15.5	32
6	10152	ovc	hum		f			28.2	14	
7	30574	ovc	hum		f		12.6			
7	10279	ovc	hum		f				12.9	
7	10076	ovc	hum		f				c. 13.8	
7	10233	oa?	hum		f			29.2	14.9	30.5

Period	Context	Species	Elem	Pf	Df	GL	SD	Bd	Bp
4	70201	ovc	rad		f			26.6	
4	10908	ovc	rad		f			27.5	
4	60255	ovc	rad		f			29.5	
5	81261	ovc	rad						
5	80845	ovc	rad	f	f	c. 146	c. 13.6	24.4	c. 26.2
5	80199	ovc	rad		f			24.8	
5	10157	ovc	rad		f			25.8	
5	10202	ovc	rad		f			27.3	
5	80303	ovc	rad	f	f	149	15.5	27.6	29.2
5	10220	ovc	rad		f			27.7	
5	80303	ovc	rad		f			28.4	
5	10819	ovc	rad	f	f		16	29.5	
5	10142	ovc	rad		f			29.7	
5	70183	ovc	rad		f			30.1	
6	40026	ovc	rad		f			26	

Appendix 2
Caprine postcranial measurements

					GL	SD	Bd	Bdfus	Dd	DEM	WCM	DEL	WCL
2	10332	ova	mtc	f	113	10.6	20.3	19.7	12.9	8.6	c. 9.6	8.3	9.4
4	11263	ovc	mtc	f			23.1						
4	30630	oa?	mtc	f	126	11.6	23	22.4	23	10.2	10.9	10.2	11
4	70424	ovc	mtc	f				c. 22.8		10.2	11.3		
4	70287	ova	mtc	f			22.4	22.9	14.5	9.6	10.5	10.1	11
4	30630	oa?	mtc	f	129	12	23.8	23.9	15.5	11.2	c. 11	10.5	11
4	31044	ova	mtc	f	> 139	14.9		26.6		11.2	c. 11.4	10.6	
5	10386	oa?	mtc	f	124	12.5			15.6	10.4	11.3		
5	30029	ovc	mtc	f			23.2			10.8	10.8	10.8	
5	70120	ova	mtc	f	126	11.9	23.2	22.5	15.2	10.6	11	10.1	11
5	80948	ova	mtc	f	122	13.3	23	22.6	14.7	9.8	c. 11.1	9.5	11
5	10994	ovc	mtc	f	129	13.5		23.2		9.9	11.5		
5	80303	ova	mtc	f	127	12.1	24.1	24.2		10.9	11.3	10.2	11
5	80845	ova	mtc	f	124	c. 14.8	25.8	26.3		10.2	12.2	10.6	12
5	80867	ova	mtc	f			24.2	24.2	16	10.6	11.5	9.8	11
5	70034	ovc	mtc	f			25.5	25.3	c. 15.9		11.8	10.3	11
5	10175	ovc	mtc	g				c. 27.8					
5	80933	oa?	mtc	v			28.2	28.3	18.5	12.6	13.5	12.2	13
5	80956	cah	mtc	f	108	14.6	25.1	26.1	15.7	9.4	11.6	9.2	11
6	10080	ova	mtc	f	118	11.5			13.6			9.3	10
7	30579	ova	mtc	f	121	10.9		21.7	21.9	9.9	c. 10.1	9.6	10

				Min pub	Max pub	LA	LAR
3	80200	ovc	inn	6	7.2	c. 27.1	
3	10554	ovc	inn			c. 29	
4	80104	ovc	inn	6.5	7.8	c. 28.7	c. 23.3
4	10908	ovc	inn			29	
4	70509	ovc	inn			c. 30	25.2
5	70151	ovc	inn	8.3	4		
5	80145	ovc	inn	5.1	7.7		
5	80816	ovc	inn	6.2	8.7		
5	80856	ovc	inn				
5	80880	ovc	inn	7.8	7.5		
5	70179	ovc	inn	7.7	3.9	26.6	21.6
5	80945	ovc	inn			c. 28	
5	10220	ovc	inn			c. 28.3	24.5
5	10561	ovc	inn			c. 28.4	
6	10153	ovc	inn			29.4	
6-7	70272	ovc	inn	7.8	7.6		

					GL	SD	Bd	Bp
1	70313	ovc	tib	f			20.3	
1	10647	ova	tib	f			22.3	
3	31079	oa?	tib	f			25.5	
4	70387	oa?	tib	f			20.1	
4	30703	oa?	tib	f			c. 21.3	
4	70373	ovc	tib	f		12.4	21.4	
4	80179	ovc	tib	f			23.2	
4	31001	oa?	tib	f			23.6	
4	11051	ovc	tib	f			24.6	
4	11594	ova	tib	f			24.7	
4	10526	oa?	tib	f		14.5	25	
4	10908	oa?	tib	f			26.3	
4	80219	oa?	tib	f			26.7	
5	10993	ova	tib	g		14.9	26.8	
5	70158	ovc	tib	f			21.5	
5	80302	ova	tib	f			22.1	
5	20032	ovc	tib	f			22.2	
5	80813	oa?	tib	f			22.2	
5	80824	ovc	tib	f			22.6	
5	80300	ov?	tib	f			22.9	
5	80303	oa?	tib	f			23	
5	10337	oa?	tib	f			23.3	
5	80866	ovc	tib	f			23.3	
5	70140	ova	tib	f			23.4	
5	80859	ovc	tib	f			23.4	
5	70151	ovc	tib	f			c. 23.7	
5	80302	ovc	tib	f			23.8	
5	80303	ova	tib	f			23.9	
5	10109	ova	tib	v			24	
5	80711	oa?	tib	f			24	
5	11385	ovc	tib	v			c. 24.2	
5	80948	ova	tib	f			24.3	
5	80303	ova	tib	f			24.5	

					GL	SD	Bd	Bp
5	80833	ovc	tib	f			24.5	
5	80940	ovc	tib	f			24.6	
5	30037	oa?	tib	f			24.9	
5	10257	oa?	tib	f			25	
5	80866	ova	tib	f			25	

Appendix 2
Caprine postcranial measurements

						GL	SD	Bd	Bp
5	11677	ova	tib		f			25.1	
5	80907	ovc	tib		vf			25.1	
5	80947	ova	tib		f			25.1	
5	10993	ova	tib		f			25.3	
5	10090	ovc	tib		f			c. 25.4	
5	80870	ova	tib		f			25.4	
5	10156	ovc	tib		f			25.5	
5	10205	ovc	tib		f			25.6	
5	10230	oa?	tib		f			25.6	
5	80302	ova	tib		f			25.7	
5	80813	ovc	tib		f			25.8	
5	80837	ova	tib		f			25.8	
5	80860	ovc	tib		f			25.9	
5	80957	ova	tib		f			26.1	
5	40257	oa?	tib		f			26.2	
5	80802	ovc	tib		f			c. 26.2	
5	80935	ova	tib		f			26.2	
5	80945	ova	tib		f			26.2	
5	80947	ovc	tib		f			26.2	
5	10630	oa?	tib		f			26.3	
5	11385	ova	tib		f			26.3	
5	80812	ovc	tib		f			c. 26.3	
5	70182	oa?	tib		f		14.5	26.5	
5	70220	ovc	tib		f			26.5	
5	80950	ovc	tib		f			26.5	
5	80821	ovc	tib		f			26.8	
5	80957	ova	tib		f			26.9	
5	80946	ovc	tib		f		14.8	27.1	
5	10170	ova	tib		f			c. 27.2	
5	10994	oa?	tib	g	f	c. 224	15	27.2	c. 40
5	40028	ovc	tib		f			27.2	
5	70120	oa?	tib		f		15.9	27.2	
5	80834	ovc	tib		f			27.2	
5	80891	ovc	tib		v			27.2	
5	70102	oa?	tib		f			27.5	
5	80952	ovc	tib		f			27.5	
5	70128	oa?	tib		f			28.2	
5	80803	ova	tib		v			28.2	
5	80945	ova	tib		f			28.9	
6-7	70055	oa?	tib		f			19.4	
6-7	70049	ova	tib		f			23.8	

				GLl	Dl	Bd
1	10647	ova	ast	27	14.8	17.1
1	10821	oa?	ast	29.2	16.2	19.2
2	40143	ovc	ast	28.3	16	18.6
3	30766	oa?	ast	29.1	16.2	18.5
4	70318	ovc	ast	31.5	17	
4	70375	oa?	ast	33.6	17.7	20.5
5	10156	ovc	ast		14.3	16.1
5	10169	oa?	ast			17.3
5	80824	oa?	ast			17.6
5	10563	oa?	ast	23.7	13.4	15.7
5	10142	oa?	ast	25.5	14.3	16.8
5	80303	ovc	ast	25.6	14.4	15.5
5	10111	oa?	ast	25.9	14.7	16.2
5	10102	ovc	ast	26.2	19.1	16.3
5	40004	ovc	ast	26.2		16.8
5	10156	oa?	ast	27.3		17.7
5	80303	oa?	ast	27.6	c. 14.8	18.1
5	10142	oa?	ast	27.8	15.6	18.2
5	10198	oa?	ast	27.8	14.7	
5	10141	ovc	ast	28.3	c. 14.7	16.9
5	40004	ovc	ast	28.8	16.3	18.5
5	40021	ova	ast	28.8	15.9	18.5
5	10264	oa?	ast	29.1	15.7	18.5
5	10198	oa?	ast	29.3	15.9	17.8
5	10142	ovc	ast	30		
5	10177	ovc	ast	31.4	17.4	21.6
5	70106	ova	ast	31.8	18.6	20.7
5	80907	ovc	ast	33.6		20.5
6	10080	oa?	ast	25.4	13.5	16.7

					GL
1	10647	oa?	cal	f	54.8
2	10897	oa?	cal	f	58.7
5	80303	ovc	cal	f	47.7
5	80843	oa?	cal	f	53.3
5	80957	ovc	cal	f	53.6
5	30174	oa?	cal	f	55.1
5	80832	ova	cal	f	57.7

Appendix 2
Caprine postcranial measurements

					GL
5	70058	ova	cal	f	58.6
5	80931	ova	cal	f	60.4

					GL	SD	Bd	Bdfus	Dd	DEM	WCM	DEL	WCL
3	10430	ova	mtt	f	143	12.6	24.1	24.9	15.7	10.2	11.6	9.6	11
4	10454	ova	mtt	f	143	11.4	22.7	22.9	16.4	10.2	c. 10.9	10.2	9.3
4	70388	ova	mtt	f	144	12.5	24.7		17	10.6	12.2	10.6	11
4	70245	oa?	mtt	f	134	12.7				10.7			
4	31044	ova	mtt	f	> 149	13.4	c. 25.7	24.7	c. 16	10.1	11.6	9.7	11
5	70214	oa?	mtt	f		10.8		21.8		8.5	10.5	8.7	9.9
5	80843	ova	mtt	f	132	11.6	23.2	22.1		9.5	11.2	8.9	11
5	80833	ova	mtt	f	137	10.6	23.7	22.6	16.3	10	11.5	9.6	11
5	10227	ova	mtt	f	142	12		23	16.4	10.4	11.2	9.9	10
5	70054	ova	mtt	f	c. 143	11.8		c. 23	16.9			10.5	11
5	80952	ova	mtt	f	153	12.5	24.7	24	16.4	10.9	11.6	10.6	11
5	80807	ova	mtt	f			24.4	24.1	16.3	10.5	11.5	10.3	11
5	80957	ova	mtt	f			24.5	24.2		10.1	11.4	9.5	10
5	81300	ova	mtt	f			24.2	24.4	16.3	10.3	11.2	10.3	c. 11
5	80856	ova	mtt	f	156	14	24.9	25.6	16.9	10.8	11.7	10.6	11
5	80845	ovc	mtt	f			25	25.3	16.9	10.6	12.2	10.2	11
6	10080	oa?	mtt	f				22	15	9.2	11	8.8	10

Appendix 2
Pig mandibular teeth measurements (after Payne and Bull 1988)

		dP4		M1			M2			M3			M1/M2		
Per	Context	L	Wp	L	Wa	Wp	L	Wa	Wp	L	Wa	Wc	L	Wa	Wp
3	10517												16.8	9.8	10.3
4	10241		9.2												
4	80132	17.5	8.5												
4	70469		9.1												
4	11226				9.5	10		12.7	13.5						
4	30879				c. 10.3			12.9	13.9						
4	10998				10.5	11									
4	20074				10.3	11.2									
4	70457				10.5	11.1									
4	70509				10.7	11.6									
4	10998							c. 14.4							
4	70509							13.3	13.4						
4	40380									30.3	14	13.9			
4	70418									36.7	15.6	14.8			
4	70469									c. 32.9		14.9			
4	70509									c. 36.5	15	15.4			
5	80847	17	8.4												
5	80933		8.9												
5	80952	c. 16.5	8												
5	80952	c. 16.3	8.6												
5	70101	17.4	8.5												
5	10133			c. 14.6	9.6	10.1									
5	80847	17	8.4	c. 15.5	9.6	9.9									
5	80946	c. 17	8.7		c. 9.7										
5	80300			13.8	9.8	10.2	c. 18	12.4	12.5						
5	70101				9.8	10.6									
5	70224				10	10.9									
5	80874			c. 14.7	10.1	10.2	17.7	13.3	13.7						
5	70218			c. 16	10.1	10.7									
5	80935		8.3		10.1	10.8									
5	70183				10.2	10.6		13.6	13.5						
5	80936		8.3		10.2	10.6									
5	10254				10.3	10.8									
5	40021				10.3	11.4									
5	80961			c. 14.8	10.4	11.3	c. 20.4	13.9	14.4						
5	80837			15.8	10.4	11.1	19.2	13.7	14						
5	70232		8.8		10.5	11									
5	20032				10.6	10.8		13.1	13.2						
5	80847			c. 15.7	10.7	11.5									
5	80935				11.3	10.7		12.8	14.3						
5	80858						20.3	14.6	15.2	37.2	17.7	15.5			
5	80934						20.1	13.8	14.6		15.2	14.7			
5	81350						c. 18.5	13.1	14.3		15.7	15.3			
5	80300						18.9	12.5	13.5		14.8	14.6			
5	10177					11.1									
5	10133							12.3	12.3						
5	70147							13.7	14.2						
5	70101							12.3	12.7						
5	10133										14.3	13.5			
5	10175									32.4		16.2			
5	40017									28.5	14.7	13.9			
5	70034									31.8	15.3	15.3			
5	80837									34	15.8	c. 15.2			
5	80952									26.6	14	12.8			
5	80841												c. 15.2	10.2	10.5
5	10157												16.1		14.1
5	10175												15.6	10.2	11.5
5	10175												20.3		17.9
5	10177												c. 14.5	9.5	10.2
5	10186												c. 15.4	c. 10.3	11.1
5	10186												15.7	9.9	10.8
5	10386												15.7	10.4	11.2
5	30007												20.4	13.1	12.8
5	30012												15.4		10
5	30037												17.5	10.1	11.3
5	30304													14.7	
5	40017												18.3	12.5	12.6
5	40017												18.6	12	12.6
5	40018												14.8	9.3	10.2
5	40021												20.8	13.9	14.5
5	70034													10.3	
5	70034												20	15.8	16.2
5	80823												15.7	10.5	11.4
5	80838												19.8	13.8	14.2
5	80845														14
6	20169				10.2	11		13.3							
6	10092				10.4	11									

Appendix 2
Pig postcranial measurements (after von den Driesch 1976; Payne and Bull 1988)
(Pf: proximal fusion; Df: distal fusion; f: fused; v: fusion visible)

Period	Context	Element	Pf	Df	Measurements				
					SLC	**GLP**	**LG**	**BG**	
4	70209	sca			24.2				
4	70321	sca		f	22.2	33.7		22.9	
5	80300	sca		f	23.6	35.4			
5	80801	sca			18.1				
5	80847	sca			24.4				
5	80915	sca			22.1				
5	10138	sca			22.5			c. 20.4	
5	10170	sca		f	18.2	28.6	y 24	20.3	
5	10264	sca		f	21.4		31.1	22.4	
5	70120	sca			21.5				
7	20101	sca			19.2				
					GL	**SD**	**BT**	**HTC**	**BT**
4	10564	hum		f			30.6	17.4	36.9
4	70205	hum		f			31.5	18.8	29.2
5	80303	hum		f			32.8	18.1	
5	10993	hum		f				19.1	36.6
6	10080	hum		f				19.4	
					GL	**SD**	**Bd**		
5	40021	rad		f			31		
					GL	**SD**	**Bd**	**Bp**	
4	70265	mc4		f	76.9	12.8	17.5	20.2	
							LA	**LAR**	
4	70331	inn						31.2	
5	80303	inn						33.5	
5	10993	inn					c. 31		
					GL	**SD**	**Bd**	**Bp**	
5	10993	tib	v	f	184.4	18.4	25.6	43	
					GLl				
4	10998	ast			c. 42				
4	70203	ast			40.9				
5	10175	ast			38.2				
7	40250	ast			43.5				
					GL	**SD**	**Bd**	**Bp**	
5	80951	mt3		v	111.6	14.5	19.4		

Appendix 2
Equid mandibular teeth measurements (after Davis 1987)
(* tooth in mandible; M: missing specimen)

Period	Context	Element		L1	L2	L3	Wa	Wb	Wc	Wd
3	81246	P/M								
4	70227	P/M		c. 27.5	12.6	c. 11.8	11.3	10.9	9.8	4
4	80174	P/M		24.4	12.6	8.2	14	12.8	11.5	2.8
4	80217	P/M		25.5	13.2	13.3	11.7	11.1	10.1	1.3
5	70054	P/M		30.4	15.1	12.4	13.7	12.8	11.8	3.4
5	70101	P/M								
5	70102	P/M								
5	70102	P/M		29.1	14.8	13.2	c. 12.2	c. 12	13	c. 5.5
5	80151	P/M		27.6	13.7	10.1	12.2	11.7	10.6	2.1
5	80812	P/M		23.7	12.9	7.6	13.8	12.3	11.6	3.3
5	80856	P/M		23.1	12.8	7.2	13.7	13.8	11.5	3.1
5	80858	P/M		25.2	13.3	9.3	14.3	13.2	12	2.5
5	80891	P/M		29.4	15.8	14.7	13.9	15	13.4	6.7
5	80911	P/M		28.2	13.2	12.9	12.4		11.6	5.9
5	80956	P/M		24.9	18	9.3	14.3	13.5	12.7	3.3
5	80964	P/M		26	14	12.2	11.7	12	10.6	3.9
5	80964	P/M								
6-7	70238	P/M		c. 22.2	c. 13.7	7.2	c. 13.5	c. 11.8	11.1	3.1
3	10728	P2/P3			12.8	12.6				
3	30900	P2	*	c. 31	12.4	14.7		15.4	14	c. 6.1
4	70265	P2	*							
4	70265	P2	*	29.8	15.1	c. 16	10.5	14.2	13.1	c. 7.4
5	40004	P2								
5	70102	P2		30.9	14.1	c. 8.7	c. 12.5	c. 13.8	11.7	
5	70112	P2								
5	80272	P2		33	12.5	15.8	11.6	14.1	13.8	8.3
5	80834	P2		28.5	13.6	12.7	13.3	14.1	11.5	7.4
5	80932	P2		30.8	13.9	15.3	13.9	15.3	11.6	c. 7.2
3	30900	P3	*	c. 27.5	c. 16.7	10.6	15.4	c. 15.9	14.7	3.5
4	70265	P3	*							
4	70265	P3	*	c. 26.7		c. 13.5	15.2	15	13.2	6.2
5	80272	P3		28.5	16.6	13.2	15.4	15.6	14	7.8
5	80932	P3		26.6	15.4	13.5	14.4	14.8	13.6	7.3
3	30900	P4	*	c. 25.7	15	9.2	c. 15.6	14.6	13.1	3.1
4	70265	P4	*	c. 26.6	14.9	c. 17	14.1	14.6	17.3	5.2
4	70265	P4	*	c. 28.9	17	9.8	14	12.6	11.8	3.7
5	80245	P4	*	25.5	13.4	11.6	13.6	14.6	12.5	5.3
5	80272	P4		26.4	15.9	11.3	15.6	15.8	13.8	6.5
5	80932	P4		26.2	14.6	12.1	14.8	c. 15.4	12.8	6.5
5	20035	P4?								
4	30603	M1/M2		33	17.1	c. 12	15.7	13.6	12	3.6
5	10209	M1/M2		26.3		9.2			17.8	2.6
5	10209	M1/M2		24.5	13.3	11.2	c. 13.2	12.5	11.4	3.2
5	10254	M1/M2		27	15.2	10	15.5	14.7	13	4
5	30040	M1/M2		26.3	11.8	10.5	11.8	11.4	10.2	4
5	20035	M1/M2								
5	80302	M1/M2		24.3	14.5	7.2	14.1	11.9		2.9
3	30900	M1	*	23	12.3	7.2	c. 13.1	11.8	11.1	2
4	70265	M1	*	24.3	13.3	8.4	13.4	8	11.2	3.5
4	70265	M1	*		16.7	13	12.5	12.5	11.3	6.2
5	80245	M1	*	24.5	12.5	8.4	13.2	12.9	11.2	2.7
5	80272	M1		25.2	14.3	7.5	15.4	13.4	12	3.5
5	80874	M1		22.7	12.1	6.2	13.5	13	11.6	2
3	30900	M2	*	23.1	12.6	7.2	c. 15.1	12.4	11.5	2.8
4	70265	M2	*	c. 24.6	14.4	9.9	13.4	12.6	11	3.3
4	70265	M2	*		13.4	12.4	11	9.6	10	5.4
5	80245	M2	*	24.3	11.4	9	12.4	12.9	11.6	2.7
5	80272	M2		24.2	12.5	8.2	13.6	12.7	11.7	3.9
5	80874	M2		24	13.2	7.4	13.6	13.1	10.9	2.4
3	30900	M3	*	30.3	11.3	8.6	11.6	10.9	10	2
3	81351	M3 (M)		25.2	16.6	8.8	10	9.2	7.9	1.2
4	10284	M3	*	c. 22.7	11	c. 10.4	8.4	8.4		4
4	30895	M3		c. 26.2	10.5	9.8	10.4	c. 8.7	7.6	c. 3.7

Appendix 2
Equid mandibular teeth measurements

Period	Context	Element		L1	L2	L3	Wa	Wb	Wc	Wd
4	11019	M3		30.5	12.1	c. 11.8	12.2	10.9	9.8	3
4	70265	M3	*	19.6	12.1	c. 11	11.8	11.6	10.4	2
4	70227	M3								
4	80174	M3		31.2	13.3	10	13	c. 12.7	11.2	1.7
4	80132	M3		30.7	12.3	8.1		10.5	9.7	2.4
5	80245	M3	*	29.3	11.3	11.6	11.5	10.8	10.3	3.1
5	10254	M3		31.5	12.9	c. 9.6	c. 13	12.7	10.8	5
5	40004	M3		29.5	13.3	11.9	11.5	9.9	9.7	4.4
5	70101	M3								
5	70169	M3		34.5		17.1			11.3	
5	80272	M3		29	12.6	10.3	12.8	11.8	10.5	4.7
5	80300	M3		27.1	11.8	10.5	11.4	10.2	9.3	4.3
5	80874	M3		29.8	12.4	9.1	14.1	c. 13.4	12	2.3
5	80920	M3		31.5	11.6	9.6	13	11.8	10.8	3.6

Appendix 2
Equid postcranial measurements (after von den Driesch 1976)
(Pf: proximal fusion; Df: distal fusion: f: fused; g: fusing; v: fusion visible; M: missing specimen)

Period	Context	Element	Pf	Df	SLC	GLP	LG	BG
4	60149	sca		f	53.5	79.9	49.8	43.4
4	10908	sca		f	60.4		53.1	47.6
4	70331	sca		f		72.6	47.4	34.3
5	70121	sca		f	56.8	80.1	50.4	43.5
5	10993	sca			58.1			39
5	30845	sca						
5	80937	sca					60.3	
6	20169	sca		f	55.1	89.2	52.6	41.8
6	10152	sca		f		79.2	50.2	38.9
7	20067	sca						47.3

Period	Context	Element	Pf	Df	GL	SD	BT	HTC
4	30623	hum		f				29.3
5	80156	hum		f				c. 31.4
5	80831	hum		f				30.6
5	80934	hum		f			62.2	29.7
5	80947	hum		f			74.7	35.6
6	20054	hum		f			60.5	30

Period	Context	Element	Pf	Df	GL	SD	BFd	Bd	Bp
3	20082	rad	f	v	288.1	31.5	65.5		
4	70317	rad	f			31		73.3	
4	10564	rad	f	f	283.2	31.4	57	c. 66.6	74.3
4	70265	rad		f			59.4	c. 66.6	
4	70453	rad		f			66.2		
5	30907	rad		f			62.5		
5	30845	rad		v		34.7	70		
5	81054	rad	f	f	325.2	37.2	60.1	70.7	

Period	Context	Element	Pf	Df	GL	SD	BdF	Bd	Dd	Dp	Bp	Ll
4	70317	mtc		f	205.4	27.8	44.3	42.3	34.1	30.8	43.9	
4	10636	mtc		f	232.3	39.4		46.8	35.7	33.2		
4	70257	mtc		f				41.4	33.4			
4	70287	mtc		f			45.3	44	35.3			
5	70374	mtc		f	220.1	34.1	51.1	47.8	35.8			
5	30037	mtc		f	226.6	31.6	46.1	45.5	35.7		48.6	
5 (M)	70131	mtc		f			45.7	44.8	35.6			
5	81054	mtc		f			44.9	44				
5	70260	mtc		f			c. 44.7	c. 44.4				
6	10153	mtc		f	211.3	31.3	48.2				46.5	
6	20099	mtc		f			41.1	40.4	30.4			

Period	Context	Element	Pf	Df	LA	LAR
4	70418	inn			74.6	65.4
4	30904	inn			63.3	57.4
4	30891	inn			c. 57.6	
4	70230	inn			65.2	58.8
4	70379	inn			65.8	c. 56.6
4	70345	inn				65.2
5	10993	inn			c. 65	
5	30845	inn			c. 64.5	
5	70102	inn			67.6	62.2
5	80962	inn			c. 84.8	73.9
6-7	70272	inn				

Period	Context	Element	Pf	Df	GL	SD	Bd
3	10809	fem		f			98.7
4	10908	fem	v?	f		34.3	80.1
4	20073	fem		f			81.3
5	81261	fem		f		37	82.7
5	80957	fem		f			
7	40272	fem		f		31.4	74.2

Period	Context	Element	Pf	Df	GL	SD	Bd	Dd	Bp
1	10821	tib	f	f	354.8	40		47.3	c. 87.9
3	30293	tib	f	f	344.6	42.7	75.3		
4	10636	tib		f		38	70.1	c. 43.1	
4	30812	tib		f		37.9	69.3	45.9	
4	20046	tib	f	f	c. 340	34.1	64.4	38.8	
4	70230	tib		f			68.7		
4	30603	tib		f					
5	10630	tib		f		38	71.7		
5	81314	tib		g			66.6		
5	80831	tib	f	f		41			
5	80932	tib		f			65.3	37.5	

Appendix 2
Equid postcranial measurements
(Pf: proximal fusion; Df: distal fusion: f: fused; g: fusing; v: fusion visible)

Period Context Element Pf Df Measurements

Period	Context	Element	Pf	Df	GH	GB	LmT	BFd
4	11432	ast			46.1	57.8	55.3	
4	70317	ast			55.4	55	56.3	46.6
4	10353	ast			60.4	59.8	59.4	53.1
5	80950	ast			51.8	51	52.3	
5	10993	ast			52.6	54.2	52.3	46.5
5	70103	ast			54	54.4	53.1	
5	70194	ast			55.6	57	56.4	48.2
5	80963	ast			56.7	58.5	57.4	49.8
5	80965	ast			56.9	61.5	56.3	51.3
5	80889	ast			58.6	c. 65.8	60.6	
5	10156	ast			58.1		58.4	49.1
5	70168	ast			c. 58.5			
6	10080	ast			57.3	59.7	58.3	51.6

Period	Context	Element	Pf	Df	GL
5	80952	cal	f		107.6

Period	Context	Element	Pf	Df	GL	SD	BFd	Bd	Dd	Dp	Bp	Ll
4	60148	mtt		f	249	27.4		43.4	34.1			242
4	30904	mtt		f	284.8	31.2	50			48.6	54.7	
4	70265	mtt		f	267.9	30.2	47.2	45.3	36.7	41.2	48.1	
4	70453	mtt		f	205.7	27.8	c. 44.5		34.2		44.2	
5	80957	mtt		f	267.3	31.2	50.5	49.6	36.6			
5 (M)	10630	mtt		f	239	25.9	39.8		20.7		41.4	234
5	30037	mtt		f			46.9	44.4				
5 (M)	70128	mtt		f	c. 254.4	28.4	45.8	44.9	36.8			
4	10353	mtp		f			44.8	42.8	33.1			
4	80149	mtp		f			46.7	44.9				
5	10219	mtp		f			c. 48.6					
5	40021	mtp		v			43.7	42.5				
5	70182	mtp		f			46.6					
6	10153	mtp		f			43.8					

Period	Context	Element	Pf	Df	GL	Bp	Dp	SD	Bd	Dd
4	70230	p1	f		76.8	52.1	36.4	31.6	42.3	24.2
4	70453	p1	f		77.5	50.1	31.4	32	42.7	
4	20073	p1	f		90.9	57.7	37.7	36.6	48.6	
5	70155	p1	f		78.2	49.2	32.7	32.4	43.3	21.8
5	80951	p1	f		80.7	53.7	36	33.4	44.7	24.1
5	10630	p1	f		83.4	53.2	39.2	33.7	43.4	24.9
5	30041	p1	f		87.5	52.8	36.5	33.4	46.3	24.3
5 (M)	10283	p1	f			51.6	35.2			
5	70149	p1	f				32.6	31.6		
5	80141	p1	f					31.3		
5	80269	p1	f					28		
5	80806	p1	f			47.2	30.3	29.9	39.5	
5	80952	p1	f				28.8			
6-7	70238	p1	f		77.1	51.6	31.8	33.9	45.2	21.5

Period	Context	Element	Pf	Df	GL	Bp	SD	Bd
4	70317	p2	f		41	48.9	42.4	47.6
5	10048	p2	f		44.5	51.6	43.3	49

Period	Context	Element	Pf	Df	GL	Bp	BFp	Dp	SD
4	20046	p3							
5	30029	p3			39.7	45.9	39.4	27.4	c. 40.2
6	20099	p3			60.3				

Appendix 2
Dog mandibular and maxillar measurements (after von den Driesch 1976)
(* associated mandibles; M: missing specimen)

Measurements Mandible

Per.	Context	P1 L	P1 W	P2 L	P2 W	P3 L	P3 W	P4 L	P4 W	M1 L	M1 W	M2 L	M2 W	M3 L	M3 W	P1-P4	P2-P4	M1-M3	P1-M3	P2-M3	Height between M1-M2
1	11455									21.5	8.4					37.9	32.2	c. 33.7	c. 71.6	c. 65.1	18.6
3	10554					7.1	3.4	8.2	4.1	16.5	6.1	c. 5.5	4.6			25.2	c. 21.2	c. 21.2	c. 46		7.4
3	30777			7.7	3.8	9.4	4.6	10.5	5.5	c. 18.6	7.6	c. 7.6	c. 5.4			31.2	27.3	c. 32.5			15.8
3	31155	4.2	3.3	7.2	3.9	8.9	4.4	11.1	5.4	18.7	7.4					c. 31.9	27.1			c. 14.7	
4	10245									19.6	8.2	c. 8.2	6.1	c. 3.8	3.5			30.5			
4	60267*															22.7		c. 22.7	44.5		
4	60267*															67.5		22.9	44		
4	70231									17.6	6.9										
4	70321											8	6.4								23.3
4	70361									c. 22	9.3	c. 9.2	6.6								
4	70469							9.7	5.2	18.8	7.8		5.7					29			17.9
4	70469					8.5	4.4	9.8	5.3	18.9	7.4	7.3	5.2				c. 35.6	c. 30.4		64.7	18.1
5 (M)	10264					10	5.2	11.2	6.3	21.2	9.4	8	6.2			35.5	y 30.6	y 33.3	c. 66.8	62.8	c. 21.7
5 (M)	10264			8.3	4.4			11.2	6.3	c. 20.9	9.1	8.2	6.3			35.1	c. 30.7	c. 33.8	c. 66.6	62.3	21.5
5	70147									21.1	8.9			5.2	4.3		33.7				22.4
5	80303			10	4.9	12.4	5.5	12.4	6.3	24.2	9.7	9.2	6.8			44.4	39.2				c. 29.2
5	80706					c. 12.5	5.7	13.3	7.4	24	c. 10.6										
5	80812					c. 8	4	c. 9.6	4.7	c. 17.1	6.5	5.9	c. 5			28			53.1		14.6
5	80812					7.7	3.8			17.2	6.6	c. 5.5	4.9	c. 3.7	3.4	c. 26.9		c. 25	52.1		15
5	80815	3.8	2.9	c. 7.2	3.9					c. 19.1	c. 8	8	6.3			31.7	28	29.7	c. 60.6	c. 56.4	19.4
5	80950			6.8	3.3	7.5	4	8.5	4.6			6.2	5.1			c. 32	27.5	c. 25.3	c. 56.4	52	15.6
5	81313									22.5	9					40.9	35.6				
5	20235*	4.8	3.5	9.3	4.8	c. 11	5.2	c. 11.7	6.3	c. 22.7	8.6	c. 9.8	6.8			40	34.4	36.6	c. 74	c. 68.3	
5	20235*	4.7	3.5	9	4.8	10.4	5.1	11.7	6.4	c. 23	8.8	c. 9.6	7			c. 40.1	34.2	c. 36.8	c. 73.5	68.3	c. 23.2
	Maxilla																				
3	30777							c. 15.7	c. 8.4	c. 11.6	12.5										
5 (M)	80870							25.4	14.4			8.8	11.5								

Appendix 2
Dog postcranial measurements (after von den Driesch 1976)
(Pf: proximal fusion; Df: distal fusion; f: fused; M: missing specimen)

Period	Context	Element	Pf	Df	SLC	GLP	LG	BG
5	11385	sca		f	21.6	26.3	24.2	15.3
7	20235	sca		f	22.4	28.3		17.6
7	20235	sca		f	22.6	27.8		

Period	Context	Element	Pf	Df	GL	SD	BT	HTC	Bd	Bp	Dp
3	70377	hum		f		8.6		8.8	c. 19.2		
3	70377	hum		f						16.1	
4	70419	hum		f			c. 30.4				
5	80709	hum	f	f	173.5	13	22.7	12.2	32.7	30.8	40
5	80709	hum		f		c. 18		17.2			
5	11385	hum		f		10.8	29.5				
7	20235	hum	f	f		10.8	c. 21.2	11.3	30.4	28.5	39
7	20235	hum	f	f	175.9	10.4	c. 21.4	11.3	29.6	28.9	39.2

Period	Context	Element	Pf	Df	GL	SD	Bd	Bp
4	11603	rad	f	f	c. 156.9	12		17.6
7	20235	rad	f	f	176.3	12	22.6	17.8
7	20235	rad	f	f		12.2	22.7	17.8

Period	Context	Element	Pf	Df	GL	BPC	SDO	DPA
4	80311	uln				c. 14.7		
5	81256	uln	f			c. 12.2	15.6	18
5	80709	uln	f	f	198.6		20.8	25.5
5	80709	uln				20.3	c. 29.7	33.8

Period	Context	Element	Pf	Df	GL	SD	Bd
7	20235	mc2	f		58.4		8.7
4	11603	mc3	f		61.4		9.1
7	20235	mc3	f		67		8.4
4	80110	mc4	f		44	5.5	8.4
7	20235	mc4	f		66.7		8.3
7	20235	mc5	f		55.5		8.8

Period	Context	Element	Pf	Df	LA	LAR
4	70230	inn			17.6	15.2
4	10269	inn				c. 18.3
5	70125	inn				15
6	10080	inn			c. 26	20.5
7	20235	inn			c. 23	c. 21

Period	Context	Element	Pf	Df	GL	SD	Bd	Bp	DC	GLC
1	11455	fem				8.7				
4	70230	fem				8.5		25.1	12.7	
5	80931	fem	f			10.6			c. 14.2	
5	10630	fem	f	f		14.3	33.8			183
7	20235	fem	f	f		11.4	29.4	37.4	17.6	
7	20235	fem	f	f	183	11.4	30	36.9	17.4	

Period	Context	Element	Pf	Df	GL	SD	Bd	Bp	Dp	Dd
5	80166	tib		f			25.5	19.4		
5	10201	tib	f					29.3		
5	70173	tib		f		8	14.6		10.3	
5	10201	tib		f			19.1			14.9
5	80709	tib		f		16.3				
4	30895	tib				9.8				
4 (M)	70252	tib		f		10.1			c. 14.6	
6	20290	tib		f				37.8		
6	20290	tib		f				38.2		
6	10813	tib		f		7.2		20.8		
7	20235	tib	f	f	189.9	11.3	21.6	32.3		
7	20235	tib	f	f	191.9	11	21.6	32.5		

Period	Context	Element	Pf	Df	GL
7	20235	ast			26.9
7	20235	ast			26.8

Appendix 2
Dog postcranial measurements

Period	Context	Element	Measurements				
				GL			
5	10104	cal	c.	38.7			
5	10133	cal		25.2			
5	70192	cal		32.4			
7	20235	cal		43.6			
7	20235	cal		43.4			
				GL	**SD**	**Bd**	
5	80709	mt2		88.3	7.5	11.2	
7	20235	mt2		64.5		8.5	
7	20235	mt2		64.5		8.5	
7	20235	mt3		71.9		8.5	
7	20235	mt3		72.1		8.7	
7	20235	mt4		72.6		8.2	
7	20235	mt4		72.7		8.1	
				GL	**SD**	**Bd**	**Bp**
4	60238	p1	c.	25.5	5.9		
5	10104	p1		20.8	7.2	4.4	6.4
5	10144	p1		29	9.8	7	8.5

Appendix 2
Cat, hare, badger, postcranial measurements (after von den Driesch 1976)

Period	Context							
				M1-length alveolus	**Height behind M1**			
2	10776	Cat	mand	6.2	8.5			
				GL	**SD**	**Bd**	**Bp**	**Dp**
7		Cat	hum	89.5	5.9	17.1	15.3	19.1
4	10866	Cat	tib	86.6	4.8	10.5	14.9	
5	70260	Hare	tib			16.2		
5	80953	Hare	tib			c. 11.5		
5	80961	Hare	tib			11.8		
5	11672	Badger	fem		10.2	26.2		

Appendix 2

Deer measurements (after von den Driesch 1976; Davis 1992)

(Pf: proximal fusion; Df: distal fusion; f: fused; * measurement taken above burr)

Period	Contex	Elem.	Pf	Df	Measurements								
Roe deer					**Min.d.***	**Max.d.***	**Circ.***						
5	10994	antler			c. 20	c. 22	c. 66						
					SLC	**GLP**	**LG**	**BG**					
5	80843	sca		f	17.6	29	20.6	21.4					
								Bp					
5	10160	rad	f					25					
					GL	**SD**	**Bd**	**BdF**	**Dd**	**DEM**	**WCM**	**DEL**	**WCL**
4	10997	mtc		f	153.5	11.8	18.8	19.7	18.8	9.8	c. 9	c. 9.6	8.7
Fallow deer					**Min.d.**	**Max.d.**	**Circ.***	**D. coronet**					
4		antler					c. 145	c. 3.7x4.7					
Red deer					**Min.d.***	**Max.d.***	**Circ.***						
5	10994	antler			c. 22.4	37.2	c. 106						
					GL	**SD**	**Bd**	**BT**	**HTC**	**Bp**			
5	70260	hum		f			c. 52.3	c. 50.5					
5	80934	hum		f			c. 51.3		30.1				
5	70374	tib		f			47						
5	81270	tib				26							
5	70035	p1	f		60.8	16.4	19.5			21.9			
6-7	70238	fem		f		c. 25.7							

Appendix 1
Bird measurements (after von den Driesch 1976)
(Pf: proximal fusion; Df: distal fusion; f:fused; g: fusing)

Period	Context	Element	Pf	Df	GL	SD	Bd	Dd	Did	Bp	Dp	Dip
Domestic fowl												
5	40017	cpm	f			12.3						
4	30904	hum				6						
4	70323	hum	f	f	65.3	5.9	13.3					
4	70469	hum	f	f		6				17.1		
5	80824	hum	f							21.1		
5	80857	hum		f			13.6					
5	80859	hum		f			15.3					
5	70125	hum		g			14.2					
6	10092	hum		f			13.2					
5	80936	rad	f			2.7	6.1					
5	80300	uln	f	f	58.9	3.6			8.4			
5	40021	uln		f					10.2			
5	70130	uln		f					8.8			
5	70182	uln		f					8.7			
3	10546	fem	f								16.6	11.6
4	80110	fem		f			13.4		11.4			
4	30904	fem	f	f	63.2	5.6	11.8		10.2			
4	30904	fem	f	f	67.8	5.7	12.5		10.4			
4	30904	fem	f	f	69.5	5.5	12.6		9.8			
5	80835	fem	f				13.3					
5	30304	fem	f							c. 15.9		
5	10227	fem	f							15.2	10.5	
5	20035	fem	f							c. 16.1		
5	10259	fem	f								c. 13.9	
5	40028	fem	f							16.4		
3	20062	tbt	f									18.4
4	11667	tbt		f			10.4	11.1				
4	30904	tbt	f	f	88.6	4.7	9.1	9.3				
4	30904	tbt	f	f	96.6	5.2	9.6	10.3				
5	80931	tbt		f			10.1					
5	10273	tbt	f	f	c 105.3	6.2	10.2	11				
5	10138	tbt		f			10.8	11.3				
4	70230	tst	f							12.3		
5	80821	tst		f			13.9					
5	80903	tst	f							12		
5	70034	tst		f			13.8					
5	70034	tst	f							15.9		
					Dia							
5	40018	inn			c. 8.3							
Duck												
5	70058	cpm		f					7.7			
5	40018	hum		f			15.1					
5	70034	rad	f	f	73.6	3	6.4					
4	70331	tst	f	f	47.4	4.4	9.4			9.8		
Goose												
4	70419	fem	f	f	69	7.1	17.2	13.5		16.2		
Eagle												
5	80272	fem	f							29.4	17.5	
Buzzard												
4	70230	cpm	f	f	64.6	15.1			9.4			
4	30786	hum		f			18.1					
4	30786	hum	f	f	119.6	7.3	18.4			21.3		
4	30786	uln	f	f	128.3	5.6			10.7	12.8		14.1
4	30786	fem	f	f		7	17.1	12.5		15.8	8.9	
4	30786	fem	f	f	78.6	6.6	16.5	12.4		15.2	8.8	
4	30786	tst	f	f	80.5	5.4	14.3			14.2		
Rook/crow												
4	70469	cpm	f	f	53.1	13.4						
4	70469	hum		f		6.7						
4	70469	hum	f	f	69.4	6.8	17					
5	70260	hum		f			14.2					
4	70469	uln	f			5.2				10.9		12.2
4	70469	uln	f	f	84.4	5.2				10		12
5	70260	uln	f						c. 10.5	9.7		
4	70226	fem	f	f	49.4	4.6	9.9	7.8		9.5	6.4	
Crow/rook												
4	70469	fem		f		4.9	11.4	9.6				
4	70230	tbt		f		4.4	8.6	8.2				
4	70469	tbt	f	f	92.2	4.6	9.1	8.8		14.7		
5	81327	tbt		f			11.6	10.3				

Appendix 1
Bird measurements

Period	Context	Element				GL	SD	Bd	Dd	Dld	Bp	Dp	Dip
Crow/rook													
4	70469	tst	f								10.2		
4	70469	tst	f	f		60.6	3.9				10.2		
5	70260	tst	f								9.7		
						Lm							
4	70469	crc	f	f		43.4							
						Dia							
4	70469	lnn			c.	7							
cf. Woodcock													
5	70260	hum		f							10		

Scole-Dickleburgh: List of faunal specimens lost during reorganisation of AML laboratory, Fortress House, London (Dec. 1996/Jan. 1997)
(specimens identified in metric Appendices with M (missing); additional metric information included in this table, in mm)

Context	Taxon	Element	Side	Part	Proportion of bone-%	Pf	Df	Tooth wear dP4	P4	M1	M2	M1/2	M3	Notes
10030	Bos taurus	metacarpal		distal	40		f							flaring and different length of condyles, see diagram; carnivore gnawing
10169	Equus sp.	P2-maxillar			100									worn to base of crown; moderate abrasion
10169	Equus sp.	P2-maxillar			100									
10169	Equus sp.	P2-maxillar			100									
10255	Ovis aries/Capra hircus	M2-mandibular			100						9A			probably associated with M3, possible growth arrest
10255	Ovis aries/Capra hircus	M3-mandibular			100								6A/7G	possible growth arrest
10259	Bos taurus	metapodial		distal epiphysis	-10									eburnation on articular surface
10264	Canis familiaris	mandible with teeth	l		100									with P3-M3; aboral side of canine-condyle 104.5 (von den Dreisch meas. #4)
10264	Canis familiaris	mandible with teeth	r		100									with P2, P4-M2; wear indicates c. 1 year; aboral side of canine-condyle 104.9
10283	Equus sp.	proximal phalanx		proximal	80	f								many osteocytes, possibly arthritic
10353	Bos taurus	metacarpal		distal	20		f							exostoses, possibly age related; modern damage
10425	Ovis aries/Capra hircus	mandible with teeth		P3-M3	40				8A	9A	9A		7A	P2 absent; M1-M3 c. 45.9
10630	Equus sp.	metatarsal			100		f							chopmark on medial distal shaft; GLl 237.1; Ll 234.4?; Bp 41.4
11788	cf. Ovis aries	cranium		frontal	50									hornles sheep?; possibly chopped longitudinally
60180	Equus sp.	maxilla with teeth												
70101	Equus sp.	M3-mandibular		crown	50									von den Dreisch measurements: L 33.8; B c.14.4
70102	Equus sp.	dP2-mandibular			100									resorption of roots
70102	Equus sp.	P2-mandibular		crown	50									Internal fold is tiny v shape,external fold shows no penetration
70105	Bos taurus	middle phalanx			100	f								heavy development of osteocytes and lipping
70112	Equus sp.	P2-mandibular			100									crown height is very low=18.3, possible bit wear, see text; von den Dreisch L 31.5; B c.16.6
70128	Equus sp.	metatarsal			100		f							spavin,heavy growth of osteocytes at proximal end, GL is approximate
70131	Equus sp.	metacarpal ?		distal	30		f							possibly sawn transversally through distal shaft
70252	Canis familiaris	tibia		distal	80		f							transversal finecuts on anterior aspect above articulation
70265	Equus sp.	mandible with teeth		P2-M3	60									Carnivore punctures?, moderate abrasion; Ht from P2=47.4mm P2-P4 87.1; M1-M3 80.8; P2-M3 c. 168.1; Ht at M1 72.2; Ht behind M3 96.6
70265	Equus sp.	mandible with teeth		Incisor-M3	60									P2and P4 worn,P3 is erupting, I3s unerupted; Ht from P2=51.7mm; P2-P4 92.2
80245	Ovis aries/Capra hircus	mandible with teeth		dP2-M3	70				14S	14A	10B		11G	with P2-M3,extreme wear oral-aboral, swelling buccal and lingual; P2-M3 70.9; Ht at M1 36.1
80821	Bos taurus	proximal phalanx			100	f								osteocytes at distal end and flaring
80821	Bos taurus	middle phalanx			100	f								osteocytes proximal and distal ends, flaring at proximal end
80834	Equus sp.	centrotarsale			100									chop/cut on proximal articular surface
80847	cf. Gallus gallus	humerus			100	f	f							osteopetrosis
80849	cf. Gallus gallus	humerus			100	f	f							osteopetrosis
80855	Ovis aries/Capra hircus	mandible with teeth		P2-M3	50				15A	15A	15A		11G	uneven wear,see diag; P2-P4 19.2; M1-M3 43.3; P2-M3 62.2; Ht at M1 20.5; Ht behind M3 31
80870	Canidae	maxilla with teeth		P4-M2	30									with P4 and M2,size of Canis lupus, M1-M2=22.4mm
81351	Equus sp.	M3-mandibular		crown	50									very small, internal fold v-u shape,external fold complete penetration

Worked specimens

10141	mammal	worked bone, possible pin
70105	mammal	bone fragment with polished end, possible use as awl
80826	mammal	worked bone, possibly for pin?
80867	mammal	worked bone, possibly for pin?, see sketch

Abbreviations: Pf-proximal fusion; Df-distal fusion; f-fused