3.2 THE ANIMAL REMAINS FROM THE MIDDLE IRON AGE SETTLEMENT AT WARRENS FIELD

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Introduction

The site of Warrens Field was subject to excavation and salvage recording by Oxford Archaeology from 1979 to 1981. Investigations revealed a substantial Middle Iron Age settlement, which was located on three gravel islands and consisted of several round house gullies and enclosures, with numerous associated features. A total of 3,787 hand-collected animal bone specimens were recovered, in varying quantities, from all areas of the site. Most of the material derived from structural features (54%), enclosure ditches (17%) and linear boundaries (14%), with the remainder coming from a variety of smaller ditches (7%), pits (3%) layers (3%) and gullies (2%).

Warrens Field represents the earliest settlement at Claydon Pike and, as such, its zooarchaeological assemblage forms the backdrop against which the animal bones from the later settlements (those at Longdoles Field) can be compared. In addition to its temporal significance, the Warrens Field material provides the opportunity for regional comparisons. Considerable zooarchaeological evidence from other Iron Age sites in Upper Thames Valley is now available and it will be interesting to see if the Warrens Field assemblage fits the patterns for other contemporary sites in the area. At a site level, because the animal bone was recovered from various feature types, the assemblage also offers the opportunity to consider spatial patterning.

Methods

Wilson began recording the Warrens Field assemblage in the 1980s. In 2002, Oxford Archaeology transferred Wilson’s hand-written records to a computer database. The data were then re-analysed and re-tabulated by CAAA (Centre for Applied Archaeological Analyses, University of Southampton) during 2003. These circumstances, where the specialist responsible for writing the report did not record the assemblage, are far from ideal. For example, Wilson’s recording stratagem are not always clear. Many of Wilson’s methodologies can, however, be ascertained. It would appear that all identifiable specimens, from all elements including skull, rib, vertebrae, tarsal and carpal fragments, were recorded to species, with no material being placed in sheep- or cattle-size categories. These data have been used to calculate the basic NISP (Number of Identified Specimens) totals, with complete and partial skeletons being counted as single specimens.

Since Wilson did not employ a ‘zones’ system of recording (for instance Serjeantson, 1996), indices of fragmentation are difficult to ascertain, making calculations of the
MNE (Minimum Number of Elements) and MNI (Minimum Number Individuals) problematic. During the re-analysis, MNE figures were based on epiphyses counts and bones that had been recorded as ‘complete’. The MNI was calculated from the most common element according to the MNE, taking sides into consideration. Fortunately, mandibles - the only elements that Wilson sided consistently – were in almost all cases the best represented element.

For the main domesticates, dental wear was originally recorded using Payne’s (1973) method for sheep/goat and Grant’s (1982) technique for pig. The data for cattle mandibles appear to have been recorded using a hybrid of these two strategies. During re-analysis, all the records for dental eruption and wear were converted to Grant's system; the results are provided in Appendix I. Mandibles, loose deciduous and adult forth premolars, and third molars were placed into age groups following the criteria provided by Payne (1973) for sheep/goat, Legge (1992) for cattle and Maltby (1993) and Hambledon (1999) for pig. Wilson did not take crown-height measurements for equid teeth and does not mention the methods by which he estimated their age. Epiphyseal fusion for all the main domesticates was interpreted using Sisson and Grossman’s (Getty, 1975) timings for epiphyseal closure.

Measurements seem to have been taken following the standards set by von den Dreisch (1976) and the raw data are provided in Appendix II. Where possible, wither heights have been calculated using the factors presented in Driesch and Boessneck (1974). Data accumulated by the Animal Bone Metrical Archive Project (Centre for Human Ecology and Environment n.d) were used for comparison.

Wilson did not record burning, gnawing or butchery marks in a quantifiable manner and therefore the taphonomic history of the assemblage can be little understood.

**Taphonomy**

Bone preservation is characteristically poor on the river gravels of the Thames flood plain and survival rates at Warrens Field were no exception. Wilson & Allison (n.d) noted that much of the material was in bad condition, having suffered considerable leaching and fragmentation. Certainly the percentage of identifiable specimens is low (on average 22%) and it seems likely that many of the more fragile bones, such as unfused specimens, have been completely destroyed. Poor preservation is testified by an almost complete absence of vertebrae and ribs, and the presence of numerous single teeth: loose teeth make up 36% of the identifiable fragments.

Rates of preservation and fragmentation do appear to have been consistent across the site. Table 1 shows that the percentage of identifiable fragments varies between the different gravel islands, the assemblage from Island 1 having the lowest percentage (14%) with Islands 2 and 3 having slightly better rates (22% and 23% respectively). Between feature variation is also apparent: Table 2 indicates that assemblages from structural contexts and linear boundaries contain few (19%) identifiable fragments but high frequencies of loose teeth (46% and 44% of the identifiable component respectively), whereas the enclosure ditch assemblages have higher rates of identification and contain fewer loose teeth, suggesting better preservation.
Taxa Representation

Composition of the assemblage is shown, by gravel island, in Table 1. As is the case for most Iron Age sites in southern Britain, the Warrens Field assemblage consists, almost exclusively, of domestic animal remains: cattle, sheep/goat, horse, pig and dog are all represented. Just one wild specimen – a buzzard/kite metatarsus – was identified.

It has been demonstrated repeatedly that – as a result of inter-taxa variation in bone preservation, butchery and disposal practices – species representation can be influenced heavily by context type (Maltby 1985 and Wilson 1996). For instance, it is often noted that the remains of larger mammals, such as cattle and horse, are better represented in peripheral boundary ditches, whereas caprine and pig bones are more numerous in the features close to central zones of activity. To some extent these findings are borne out by the Warrens Field assemblage. Table 2 presents taxa representation data for the three main feature types encountered on the site: sample sizes were insufficient (less than 100 identifiable specimens) for the other deposit types to be examined. It can be seen that the round house features, which must be considered as the site’s central focus, are indeed dominated by caprine bones, whereas the enclosure ditches and linear boundaries contain higher frequencies of cattle and horse. Dog remains are also better represented in these more peripheral features, especially the linear boundaries.

Potentially, such inter-feature variations can complicate inter-area comparisons, especially if the areas are characterised by different deposit types. In this case, however, the gravel islands demonstrate the same range of features, hence the results from each can be compared with confidence. The NISP data (Table 1 and Figure 1) suggest that slight variation exists between the assemblages from the different areas. Whilst cattle and sheep/goat are in all cases the dominant taxa, the ratio of caprines to cattle is high on Gravel Island 3, being lowest on Gravel Island 1. Reasons for this variation are difficult to discern but it could be related to temporal shifts in the animal economy: nationally, the percentage of sheep/goat declines through the Iron Age in favour of cattle (Grant 1989; King, 1991). Although the dating of the gravel islands is not certain, it may be that the settlement migrated through time, with that on Gravel Island 3 being the earliest, followed by Gravel Island 2 and 1. This is certainly suggested by the pottery (see Edgeley-Long, section 4.2). In the absence of a firm chronology, however, it is prudent to view assemblages in aggregation.

Figure 2 presents the relative frequencies of the main domesticates (cattle, sheep/goat, horse and pig) in terms of NISP and MNI. Comparison between the two graphs demonstrate that ranking of the different taxa is dependent largely on quantification technique: fragment counts show cattle to be the best represented animal but sheep/goat become dominant when minimum numbers are considered. This disparity between the two sets of results highlights the issues of fragmentation and preservation set out in Section 3. The bones of larger animals tend to fragment more than those of smaller taxa, hence the cattle frequencies are artificially inflated when considered in terms of NISP. By contrast, sheep/goat and pig NISPs are often reduced due to the susceptibility of their bones to destruction: both taxa have lower bone density than cattle, this is especially the case for pigs since most individuals tend to be culled at a young age before their bones are fully ossified. In this case the MNI counts are perhaps a better reflection of the true species representation, indicating that both
caprines and pig were more numerous than the NISP counts suggests. Regardless of quantification technique, horse frequencies are relatively stable, suggesting that their remains were the least fragmented of all the taxa; an idea confirmed by the fact that many of the horse bones were recovered complete.

**Ageing**

No epiphseal fusion data were available for the Warrens Field pigs but information for cattle, sheep/goat and horse are presented in Tables 3a-c. Without exception, all the bones providing evidence are fused and there is a complete absence of foetal, neonatal and juvenile remains. Considering the taphonomic evidence for the assemblage (see above) it seems probable that the dearth of sub-adult animals is due to poor preservation conditions, with unfused specimens not surviving the processes of disposal and burial. Since teeth are less susceptible to destruction, cull-patterns based on dental evidence should provide a more accurate reflection of flock/herd age structure. Sufficient numbers of mandibles and loose teeth were recovered to allow kill-off patterns to be constructed for cattle (Figure 3) and sheep/goat (Figure 4) but sample sizes were again too small for pigs, the information for which is provided in Appendix I.

Figure 3 shows that while some cattle under the age of 6 months (Stage 3) are represented within the assemblage, the vast majority (64.5%) of animals died between 6-30 months, with particularly heavy mortality at Stage 6 (26-30 months). Few individuals survived beyond this point; just 18% being maintained past 3-6 years (Stage 7) with none surviving into old age. A similar lack of very mature individuals is demonstrated by the cull-pattern for sheep/goat (Figure 4), which indicates that all animals were slaughtered before reaching Stage H (6-8 years of age). Instead, there is a significant drop-off at Stage C (6-12 months) with more animals being slaughtered at Stages E (2-3 years) and F (3-4 years). Only four pig mandibles provided ageing evidence and all were from animals aged under 2 ½ years of age. According to Wilson & Allison’s notes on the Warrens Field equid teeth, most of the mandibles derived from mature individuals, although he identified one set of deciduous incisors as coming from an animal aged under one year.

**Skeletal Representation**

Little variation in body part representation was noted between the different context types. This, combined with the generally low sample sizes, dictated the decision to combine the results from all features and areas of the site: Table 4 provides the data for the main domesticates in terms of NISP and MNE. Anatomical representation for each taxon is similar, in each case mandibles are abundant with elements of high bone density – such as the distal tibia, proximal radius, distal metapodia and distal humerus – also being comparatively well represented. Density-dependent patterning of this kind suggests that differential preservation, rather than human impact, is the main factor influencing anatomical representation; although scarcity of the smaller elements, in particular the astragalus, calcaneum and first phalanx, may be accounted for by the lack of on-site sieving. There is no evidence to suggest that pre-butchered
joints of meat were either imported to, or exported from, the site, and the data provide no insight into specialist activities or disposal strategies.

**Articulating Remains**

Two contexts produced collections of articulating remains: pit number 58 yielded a group of cattle bones, and horse remains were recovered from ditch 999. Table 5 shows the anatomical distribution for these two assemblages and it can be seen that both consist predominantly of foot bones, with some evidence – in the form of either mandibles or skull fragments – for the presence of head elements. The presence of such specific body parts and the absence of other limb bones suggests that disarticulation of the skeleton must have occurred. No butchery marks were recorded for any of the specimens, though it is possible that poor bone condition may have masked any such traces.

All the cattle and horse bones appear to have been fused. The latest fusing bones of each suggest that both individuals were adult: on the basis of the fused distal metacarpal the horse was probably older than 18 months, whilst the cattle remains derived from an animal of at least 3-4 years of age, since the calcaneum was fused. Additional dental ageing information was available for the cattle remains. The two mandibles contained adult dentition but their third molars were not in full wear, the distal cusps being unworn (Grant Stage D). According to Legge’s (1992) definitions, this suggests an age at death of approximately 26-36 months, suitably consistent with the epiphyseal fusion evidence.

The remains from these deposits were amongst the best preserved on site and, as such, several of the elements provided measurements. Calculations based on the cattle metatarsals suggest an animal with a shoulder height of about 1.03 m. A wither height of 1.17 m was indicated by the horse metacarpal.

**Metrical Analysis**

Measureable cattle and caprine bones were scarce within the Warrens Field assemblage and none were available for pig. Little can, therefore, be said about the size and conformation of the main domesticates. Perhaps the only statement that can be made with confidence is that the cattle and sheep/goat were of a size consistent with those from other contemporary sites in southern Britain (Centre for Human Environment and Ecology, n.d).

Since many of the equid bones were relatively complete, the data set for horse measurements is more substantial that that for the other domesticates. Five metacarpals and three metatarsals provided greatest length measurements, allowing wither heights to be calculated. Table 6 shows that shoulder height estimates range from 1.17 m-1.23 m with an average of 1.23 m. Whilst these figures fit the range for other Iron Age horses (Centre for Human Environment and Ecology, n.d), they are significantly smaller than the animals represented in the later phases at Claydon Pike (Sykes n.d).
Discussion

In most respects, the assemblage is in keeping with the regional evidence. As is the case with other Upper Thames Valley sites, fragment counts suggest cattle and sheep/goat to be represented in roughly equal proportions with pig being much less numerous (Hambleton 1999, 46). Unlike Iron Age sites in Wessex, caprines do not dominate the assemblage, perhaps suggesting that the environmental conditions along the Thames floodplain were more suited to cattle husbandry (Grant, 1984a).

Ageing data indicate that most of the cattle were killed in their prime (between Stage 5 and 7) with a few animals surviving to older ages. Kill-off patterns for caprines show a similar preponderance of young and prime aged animals, again with smaller numbers being kept beyond 3-4 years (Stage F). These cull-patterns are typical of assemblages from the Upper Thames Valley, and Hambleton (1999) has argued that they suggest a mixed animal economy, whereby cattle and caprines were managed primarily for their meat but also for their secondary products. Presumably cattle would have been used for traction, whilst caprines would have provided wool; both animals may have contributed to dairying. Such a management strategy would fit well within a regime of arable production, since cattle and caprines would have been important suppliers of manure for fertilising the fields. Concentration on arable production could explain the low frequency of pigs, since wherever grains are raised pigs will compete with humans (Harris 1997). Furthermore, being solely a meat animal, pigs may have been deemed less useful than either sheep/goat or cattle.

It is difficult to ascertain whether or not livestock were raised on site. There is a dearth of foetal and neonatal remains and, whilst this may be an artifice of preservation, it could equally reflect the true situation. According to Hambleton (1999) absence of infant mortalities is common on nearly all Iron Age sites and it seems possible that it reflects a transhumance strategy, whereby lambing and calving took place when animals were grazing away from the settlement. That animals returned to the site over winter is perhaps indicated by the high sheep/goat mortality at Stage C (Figure 4). Hambleton interprets this 6-12 month peak as representing individuals that failed to survive their first winter, either as a result of natural fatality or through deliberate culling.

Horse husbandry may have followed slightly different trends to that of the other domesticates. Whilst most of the equid remains derived from fully adult animals, at least one subadult specimen was recovered, perhaps indicating that horses were reared on site. Few Iron Age sites have yielded juvenile horse remains, prompting the suggestion that, in this period, horses were not bred in captivity but that feral animals were rounded up and the best individuals retained whilst the others were released (Harcourt, 1979). Wilson & Allison (n.d) argued that while this may have been the case for sites in Wessex, the Thames Valley may have been a suitable environment for horse husbandry, however, it is noteworthy that no juvenile remains were recovered from the more extensive Iron Age settlement in neighbouring Longdole Field (Sykes n.d). Horses were apparently managed predominantly as riding animals. Wilson recorded no evidence to suggest that they were used for meat but, whilst the completeness of their remains may support this, the possibility that horse flesh was consumed should not be ruled out. It is possible that horses were also incorporated into expression of religious belief, their remains being ‘ritually’ deposited.
Placed deposits of articulating bone groups have been recorded for numerous Iron Age sites (Grant, 1991; Wilson 1992, 1999; Hill 1996) and evidence to suggest that similar structured deposition took place at Warrens Field is provided by the finds of the ‘head and hoof’ horse and cattle burials, from ditch 999 and pit 58 respectively. Similar sets of articulating remains have been recovered from Winnal Down (Maltby, 1985), Danebury (Grant 1984b) and Owslebury (Maltby n.d). Wilson (1992) argued that such deposits need not indicate ritual and may simply reflect differential disposal of food and butchery waste. Certainly the anatomical representation of deposits from contexts 999 and 58 is indicative of primary butchery waste, however, the superior condition of the bones suggests that they were treated differently to waste from day-to-day practices. Wilson & Allison (n.d) have suggested that the two sets of bones represent ‘hide burials’. That the cattle remains were recovered from a pit associated with structure 2 may indicate that they were placed as a foundation deposit, such as that recovered from Ashville, Abingdon, where a horse leg was found set into a post-hole (Wilson & Hamilton 1978, 125). In the absence of any associated finds (such as human bone, pottery or metalwork) or evidence to suggest that the remains were deposited according to a sequence (Hill, 1995 and 1996) the true significance of the articulating cattle and horse deposits cannot be stated conclusively.

Whilst evidence for ritual deposition is not clear, animal bones at Warrens Field do seem to have been discarded in a structured way. It was seen in Section 4 that whilst the roundhouse features were dominated by caprine bones, the enclosure ditches and linear boundaries contain higher frequencies of cattle, horse and dog. Similar intra-site patterning has been noted at various Iron Age sites, such as Winnall Down (Maltby 1985) and Mingies Ditch (Wilson 1993 and 1996) where it was suggested that preservation conditions were largely responsible for the observed variation. Maltby (1985, 99) argued that preservation was poorest in the ditches, where material was left exposed and, thus, rapidly fragmented: these deposits were characterised by low rates of identifiable remains and high frequencies of loose teeth. It was concluded that this type of environment would favour the survival of dense cattle and horse bones over the more fragile remains of caprines and pigs, hence their over-representation in these features. Maltby (1985:104) also suggested that the intra-site variation could be due to factors of carcass processing and disposal. At Warrens Field it seems likely that this is the case. For instance, the enclosure ditches actually contained the best preserved material – with the highest percentage of identifiable fragments and lowest percentage of loose teeth – suggesting that the larger food animals were butchered towards the edge of enclosure and their remains thrown directly into the ditch. By contrast, the structural deposits appear to be the least well preserved, with the lowest percentage of identifiables and highest percentage of loose teeth. It seems probable that this finer debris resulted from the meat processing and cooking that would have taken place within the roundhouse. Trampling may also have increased the fragmentation of the material within these occupation deposits. Remains from the linear boundaries are also characterised by poor rates of identification and high frequencies of loose teeth, perhaps indicating that the material had been subject to considerable re-working and re-deposition. That dogs are best represented within the linear boundary features could be evidence that the carcasses of non-food animals were discarded away from central areas of activity.

The animal bone assemblage from Warrens Field, whilst small, is not without interest. Taxa frequency and ageing data add to existing evidence for animal husbandry in the
upper Thames Valley. This, combined with the spatial patterning evidence, also provides an insight into how animals were utilised on site.

References cited

Centre for Human Environment and Ecology, Department of Archaeology, University of Southampton. n.d. Animal Bone Metrical Archive Project (ABMAP): draft report on the project phase for English Heritage.


3.3 THE ANIMAL REMAINS FROM THE LATE IRON AGE AND ROMAN SETTLEMENT AT LONGDOLES FIELD

Naomi Sykes

Introduction

Excavations at Longdoles Field, Claydon Pike, were undertaken by Oxford Archaeology from 1980 to 1983. Seven trenches (Trench 13, 17, 18, 19, 27, 29 and 30) covering an area of approximately 180 m x 100 m, revealed evidence for human activity spanning the Late Iron Age to Post-Roman period.

The earliest period of occupation (Phase 2) dates between AD25-125 and consists of a late Iron Age/early Roman settlement. Most of the evidence for this phase of activity was recovered from Trench 13, where several large enclosure ditches and a series of boundaries, gullies and pits were unearthed. A small number of ditches and gullies from Trenches 19 and 29 have also been dated to Phase 2.

During Phase 3 (AD 125 - early 4th century) the settlement appears to have been re-organised extensively. In Trench 13 this was manifest by the construction of a succession of aisled buildings, surrounded by rectilinear enclosures, fence lines and cobbled trackways. Similar restructuring was observed within Trench 29, whilst the area covered by Trench 19 appears to have taken on a religious function, with the construction of a double ditched rectangular enclosure, interpreted as a ‘temenos’. Expansion of the settlement during this period is indicated by Trench 17, which revealed a series of sub-rectangular enclosures associated with pits, gullies and a small rectangular building.

By Phase 4 (Early to late 4th/early 5th century), occupation appears to have been largely confined to Trench 13, where a small estate, centred upon a modest ‘cottage style’ villa, had formed. Whilst evidence for occupation became limited in Trenches 17 and 29, it continued in Trench 19, with the construction of a ditch and masonry wall. Towards the end of the 4th century a circular shrine and cobbled trackway was built to the east of the villa (Trench 27).

Animal bones were recovered, in varying quantities, from all phases and areas of the site. Recording and preliminary analysis of the assemblage was undertaken primarily by Bob Wilson, and he and Bruce Levitan produced a short, unpublished report on their findings. Other than this work, the information contained in the assemblage remained largely untapped, consequently it was decided to re-analyse Wilson’s original records and bring the report to publication.

The Upper Thames Valley is relatively well understood zooarchaeologically as assemblages have been studied from numerous Iron Age and Romano-British sites in the region. Indeed, the Longdoles Field assemblage is just one of several assemblages from the Cotswold Water Park area - others have been recovered from Warrens Field (Sykes n.d), Somerford Keynes and Whelford Bowmoor. Viewed against this backdrop the Longdoles Field assemblage has the potential to reveal a considerable amount of information, not only about the site and its development but also about its occupants, their lifestyles and belief systems. The sheer size of the area from which the animal bones were recovered provides the rare opportunity to undertake spatial analysis and examine rubbish disposal practices. In turn, this may inform on
settlement structure and in particular, help to highlight zones of domestic or industrial activity. Wilson realised the potential of this aspect of the assemblage and produced a publication (Wilson 1996) touching on the spatial patterning of the Longdoles Field material. This report draws together and develops his findings.

Beyond spatial patterning, the size and multi-period nature of the Longdoles Field assemblage allows temporal changes in animal economy, agricultural regime, site provisioning and diet to be examined at both a site and regional level. Furthermore, as the assemblage spans the Late Iron Age to Romano-British transition, it may be possible to determine changes attributable to ‘Romanisation’ – whether or not animal exploitation and diet changes as a result of Roman influences.

Methods

Wilson began recording the Longdoles Field assemblage in 1985. In 2002, Oxford Archaeology transferred Wilson’s hand-written records to a computer database. The data were then re-analysed and re-tabulated by CAAA (Centre for Applied Archaeological Analyses, University of Southampton) during 2003. These circumstances, where the specialist responsible for writing the report did not record the assemblage, are far from ideal. For example, Wilson’s recording stratagem – such as the criteria he used to differentiate frog and toad, sheep and goat, or horse from donkey – are not always clear. Many of Wilson’s methodologies can, however, be ascertained. It would appear that all identifiable specimens, from all elements including skull, rib, vertebrae, tarsal and carpal fragments, were recorded to species, with no material being placed in sheep- or cattle-size categories. These data have been used to calculate the basic NISP (Number of Identified Specimens) totals, with complete and partial skeletons being counted as single specimens.

Since Wilson did not employ a ‘zones’ system of recording (for instance Serjeantson, 1996), indices of fragmentation are difficult to ascertain, making calculations of the MNE (Minimum Number of Elements) and MNI (Minimum Number Individuals) problematic. During the re-analysis, MNE figures were based on counts of fused and unfused epiphyses, and bones that had been recorded as ‘complete’. The MNI was calculated from the most common element according to the MNE, taking sides into consideration. Fortunately, mandibles - the only elements that Wilson sided consistently – were in almost all cases the best represented element.

For the main domesticates, dental wear was originally recorded using Payne’s (1973) method for sheep/goat and Grant’s (1982) technique for pig. The data for cattle mandibles appear to have been recorded using a hybrid of these two strategies. During re-analysis, all the records for dental eruption and wear were converted to Grants system; the results are provided in Appendix I. Mandibles, loose deciduous and adult forth premolars, and third molars were placed into age groups following the criteria provided by Payne (1973) for sheep/goat, Legge (1992) for cattle and Maltby (1993) and Hambledon (1999) for pig. Wilson did not take crown-height measurements for equid teeth and does not mention how he used dentition to estimated horse/donkey age. Epiphyseal fusion for all the main domesticates was interpreted using Sisson and Grossman’s (Getty, 1975) timings for epiphyseal closure.

Wilson sexed cattle and caprines pelves on the basis of their morphology but no other sexing criteria for any other animals appear to have been employed as a standard.
Measurements seem to have been taken following the criteria of von den Dreisch (1976) and the raw data are provided in Appendix II. Where possible, wither heights have been calculated using the factors presented in Driesch and Boessneck (1974). Data accumulated by the Animal Bone Metrical Archive Project (Centre for Human Ecology and Environment 1995) were used for comparison.

Wilson did not record gnawing marks but did note whether identifiable specimens (unidentifiable material was not considered) were burnt. He made copious illustration of butchery marks for cattle and caprine bones but the resulting diagrams have proved difficult to interpret, for instance it is seldom possible to differentiate cut, chop or shaving marks from his illustrations. Nevertheless, the butchery information he provided has, where possible, been converted into a digital format using Lauwerier’s (1988) coding system - the data are tabulated in Appendix III.

**The Assemblage**

A total of 35,531 bone fragments was recovered from Longdole Field. The majority of this material was retrieved from Trench 13 (67.7%), Trench 17 (16%) and 19 (9.6%) with the other areas producing much smaller quantities of animal bone (Table 1).

Overall, the assemblage derived largely from ditches (59%), pits (18%), gullies (7%) and wells (5%), with the remaining 11% coming from a variety of minor feature types. Table 1 shows, however, that this general pattern masks significant variation between the different phases and trenches. For example, the Phase 2 material from Trench 13 came predominantly from ditches (73%) whereas the Phase 4 animal bones from the same trench were recovered from a much wider range of feature types, with just 43% deriving from ditch deposits. Such differences complicate inter-area and inter-period comparisons, as it has been shown repeatedly that bone disposal and survival vary dramatically between feature types (Maltby, 1985; Wilson, 1996). In order to compensate for these factors, comparisons between the different areas and phases of the site are based predominantly on the ditch, pit, gully and well assemblages.

**Taphonomy**

Wilson made few notes on the condition of the assemblage and thus rates of fragmentation and preservation are uncertain. However, the comparatively small number of measurable specimens (Appendix II) and the fact that sizeable numbers of loose teeth were recovered from all areas and phases of the site (Table 2), suggests that the material was in a fragmentary state. Credence is perhaps added to this suggestion by the generally low percentage of identifiable material: on average just 31% of specimens were identifiable to taxa. An indication of bone preservation is also provided by the proportion of loose teeth: due to their robusticity, teeth will preserve even when mandibular and maxillary bone has been destroyed. Table 2 demonstrates that loose teeth tend to be well represented in assemblages with low percentages of identifiable fragments, such as those from Trenches 27 and 30. It seems likely that the material from these trenches had been subject to considerable redeposition, whereas
that from Trenches 13, 17 and 29 may have undergone less movement, hence the higher percentage of identifiable fragments and lower frequency of loose teeth.

Whilst Wilson recorded no data concerning gnawing, dogs are consistently represented in the Longdoles field assemblages, suggesting that the material is likely to have been effected by canid consumption. This idea is supported by the anatomical frequency data: Figure 1 shows the similarity of the body part representation for the Longdoles sheep/goats to Brain’s (1967) data for a carnivore-ravaged caprine assemblage. On this basis it may be assumed that dogs had access to, either through scavenging or being deliberately fed, the Longdoles field bones.

Table 3 presents the frequency of burnt bones, by trench, phase and taxa. As Wilson considered only identifiable fragments, the actual level of burnt material is probably much higher than the table suggests. Nevertheless, the data indicate an interesting pattern, that sheep/goat bones account for nearly all (84%) of the burnt material. Why this should be the case is uncertain but it seem likely that the inter-taxa variation in burning may reflect cookery techniques, perhaps with lamb and mutton being roasted whilst pork and beef were boiled.

Inter-taxa variation is also indicated by the butchery data. Although Wilson did not record marks in a quantifiable manner, it is clear that cattle bones had a much higher incidence of butchery marks than those of other animals.

**Taxa Represented**

Composition of the assemblage is shown, by trench and phase, in Table 4. Since most of the remains were retrieved by hand and systematic sieving was not carried out, it is likely that small bones from mammals, birds and, in particular, fish are under-represented. Like most hand-collected assemblages from England, the remains of domestic mammals dominate the Longdoles field assemblage, on average accounting for 94% of the identifiable fragments. Wild mammals are represented sporadically, being scarce in Trenches 17 and 19, and totally absent in Trenches 18, 27, 29 and 30. They are most numerous in Trench 13 where they become increasingly abundant in the later Phases (3, 3/4 and 4).

**Cattle, Caprines and Pigs**

In all areas and phases of the site, cattle and caprines are the dominant taxa according to the NISP count. Pigs are less numerous but their remains are represented in most areas and phases of the site. Only two goat specimens - a pair of horn cores from a Phase 3/4 pit in Trench 19 - were positively identified. This suggests that goats were not common at Late Iron Age and Roman Longdoles field, a situation paralleled on most other sites of these periods (Maltby 1985, 101; King 1991, 16). No articulated cattle or pig remains were noted but four sheep skeletons were recorded. Of these, three were from Phase 3 contexts (gully 1281, ditch 1330 and pit 1373) in Trench 17, and the fourth was from a Phase 3/4 context in Trench 13. An articulating section of vertebral column was also recovered from a Phase 3/4 ditch (number 667) in Trench 17.
**Equids**

Equid remains are present in the assemblages from most areas and phases of the site, usually being as numerous as those of pig, often more so. In most cases equid bones and teeth were found distributed, in no great concentrations, amongst the remains of other animals. Despite this, they seem to have been treated differently from the other main domesticates. For example, a much higher percentage of horse bones (8%) were complete compared to those of cattle (3.5%) and sheep/goat (0.2%), indicating that horse flesh was not processed to the same extent as beef and mutton. Indeed, this may suggest that horse meat did not make a significant contribution to the diet, an idea perhaps supported by the articulated horse hindlimb, which appears to have been discarded fully-fleshed in a Phase 4 ditch in trench 29, context number 2804.

Wilson identified two donkey (*Equus asinus*) specimens from Trench 13 – a complete metacarpal from a Phase 2 gully (context 532) and a femoral fragment from a Phase 4 pit (1989). Confirmation of the metacarpal’s identifications has been made through metrical analysis: Figure 2 demonstrates that it is too small to be a horse, falling instead within the distribution of modern donkeys (Davis, 1976). It, therefore, seems highly likely that the femur was also correctly identified.

**Dog**

Dogs are represented in most of the trenches, although not in all phases. Their remains are seldom found in concentration, but are more regularly recovered in low density, mixed with fragments from other domestic animals. Exceptions to this situation are the two skeletons found in the Phase 3 assemblages: a partial skeleton was recovered from ditch 620 in Trench 13, and a complete specimen was found buried in its own pit (context number 1231) in Trench 17.

**Cat**

Felid remains were recovered from Trench 13, where they were found in all phases except 2/3, and Trench 17, where a single specimen was found in a Phase 3/4 context. Metrical analysis, using the comparative data provided by Teichert (1978), suggests that wild (*Felis silverstris*), as well as domestic (*Felis catus*), cats are represented within the assemblage: Figure 3 shows that the humerus recovered from a Phase 4 pit (1989) in Trench 13 fits the size range of the wild rather than domestic specimens. It seems likely that the other cat remains retrieved from this context were from the same individual, although this cannot be confirmed as none of the specimens were measurable.

**Cervids**

Red deer (*Cervus elaphus*) is the only cervid species present in the Phase 2 material from Trench 13, where it is represented exclusively by antler fragments. Post-cranial specimens were identified in the Phase 3 assemblages from both Trench 13 and 17, although antler still predominates in the Trench 13 material (Table 4). Antler is the only red deer specimen from Phase 3/4 of Trench 17, whilst the Phase 4 assemblage from Trench 13 produced a single radius fragment.
Although less numerous than red deer, roe deer (*Capreolus capreolus*) is represented by a higher ratio of post-cranial bones, with specimens other than antler being present in the Phase 3 material from both Trench 13 and 19. An antler fragment was, however, the only roe deer specimen recovered from the Phase 4 assemblage from Trench 13.

**Hare**

Recovered exclusively from Trench 13, hare (*Lepus* spp.) are one of the best represented wild mammals in the Phase 3 assemblage. Five of the nine identified specimens came from well 766 and probably represent a single individual. A further two derived from post-hole 2269, with the remaining specimens coming from contexts 663 and 1988.

**Other Wild Mammals**

A small number of bones and teeth from badger (*Meles meles*), fox (*Vulpes vulpes*), Polecat (*Mustela putorius*) and weasel (*Mustela nivalis*) were also identified in the Longdoles field assemblage. One badger bone was found in the Phase 4 assemblage from Trench 19, and two fox specimens were noted in the Phase 3/4 material from Trench 17. All the remaining specimens, including one fox and two badger bones, were recovered from Trench 13. A single weasel humerus was found in a Phase 2 gully, and an articulating polecat skull and pair of mandibles was recovered from a Phase 3/4 well (context 502).

In addition to these species, Trench 13 also produced the remains of several small mammals: field vole (*Microtus arvalis*), water vole (*Arvicola* spp.), mole (*Talpa europaea*) and unspecified ‘rodent’ were all identified. Rather than representing animals caught deliberately by humans it seems likely that these individuals represent natural fatalities.

**Birds**

Both domestic and wild bird species were identified in the assemblages from all phases of Trench 13, with smaller numbers being present in the Trench 17 and 19 material. Domestic fowl are the dominant taxon throughout, followed by domestic goose and domestic duck. Wild birds are present in lower frequencies, each species seldom being represented by more than one specimen. Many of the wild birds, such as the Teal (*Anas crecca*), Coot (*Fulica atra*), Swan (*Cygnus sp*), Crane (*Gruidae*), Grey Heron (*Ardea cinerea*), Dunlin (*Calidris alpina*) and Snipe (*Gallinago gallinago*), are those that would be expected to inhabit the wetland environment surrounding Longdoles field.

In terms of both frequency and taxa range, there is a general increase in bird representation from the earlier to the later periods. In Trench 13, for example, seven bird species account for 1.3% of the identifiable remains from Phase 2, whereas in Phase 3 twelve bird species are represented and their remains constitute 4% of the assemblage. By Phase 4, birds make up 4.2% of the total assemblage and 15 species are represented.
Trench 13 produced two partial bird skeletons: that of a domestic fowl was recovered from a Phase 3 posthole (context 1773) and a female buzzard skeleton was found in Phase 4 gully (835).

**Amphibians**

Trench 13 produced a sizeable number of frog (Rana temporaria) bones, particularly from Phase 2, 3, 3/4 and 4 contexts. A further two frog bones were found in the Phase 3/4 assemblage from Trench 17. Toad (Bufo bufo) is represented by a single specimen, recovered from a Phase 4 robber trench (1578) in Trench 13. Most of the amphibian remains were found in deposits from deep contexts, such as ditch 892 and wells 502 and 766, suggesting that the individuals concerned fell into these features where they died unable to escape.

**Fish**

Just four fish bones were recovered during the Longdoles field excavations, the low frequency probably reflecting lack of sampling rather than actual absence. All four bones were from eel (Anguilla anguilla) and were recovered from the Phase 3 well (context 766) in Trench 13.

**Relative Frequency of the main domesticates (cattle, caprines, pig and horse)**

Numerous researches (notably Maltby 1985 and Wilson 1996) have demonstrated that species representation can be influenced heavily by context type. For instance, it is often noted that the remains of larger mammals, such as cattle and horse, are better represented in peripheral boundary ditches, whereas sheep/goat and pig bones are more numerous in pits close to central zones of activity. The causal factors of these patterns have been linked to inter-taxa variation in bone preservation, butchery and disposal practices. In order to ascertain whether or not the Longdoles Field assemblage was affected by similar biasing factors, it is necessary to consider the results by feature type before the data are combined. By so doing, sample sizes are reduced greatly: only four trenches – numbers 13, 17, 19 and 29 – are able to contribute to the data-set and just four feature types – ditches, gullies, pits and wells – are represented by assemblages large enough (over 100 identifiable specimens) to warrant comparison. The data for these context types are provided, by phase and trench, in Tables 5a-5d.

Comparison between the different phases, trenches and feature types demonstrates a high degree of variability and it is difficult to see any obvious context-related patterning. For instance, the Phase 2 features all demonstrate similar taxa ratios, with cattle dominating each of the deposit types. Here there is some indication that cattle are better represented in ditches, and caprines more abundant in the pits but these trends are not seen in either the Phase 3 or 4 contexts from Trench 13, where cattle greatly outnumber sheep/goat in both the ditch and pit deposits. By contrast, the Phase 3 and 3/4 ditch deposits from Trench 17 show sheep/goat, rather than cattle, to be the dominant taxon. Pig and horse remains are in all cases less frequent than those of cattle and caprines but there is no clear evidence indicating that they are
consistently under- or over-represented in any particular feature type. Indeed, the general impression provided by Tables 5a-d is that no context type is characterised by a particular assemblage. Even the burial of the animal skeletons does not seem to have been restricted to specific contexts – the Phase 3 sheep skeletons from Trench 13 were recovered from a ditch, a gully and a pit (Wilson & Levitan n.d). As such, it might be conjectured that rubbish disposal at the Longdolles Field settlements was less structured than has been seen on other similarly dated sites, such as Winnall Down (Maltby 1985) and Owslebury (Maltby, n.d). Wilson & Levitan (n.d.) suggested that, rather than having functional significance or being perceived as specialised dumping grounds, the different features were used indiscriminantly, with rubbish being discarded in the most convenient place at the time. If this were the case, it reduces the problems of combining the data from different context types, in fact, such aggregation may actually provide results more representative of the overall situation.

Table 6 presents the cumulative cattle, sheep/goat, pig and horse frequencies for the main trenches, by phase. In all cases cattle and caprines are the dominant taxa but it can be seen that the variation in their representation is as great between trenches as it is between the different feature types. Most notable is the comparatively high frequency of sheep/goat (59%) in the Phase 3 contexts of Trench 17. Why this area should have produced so many more sheep/goat remains is uncertain, although it may be significant that all of the Phase 3 sheep skeletons were recovered from it, perhaps indicating a specialised activity or disposal area. Again, this does not form part of a consistent temporal trend, since the Phase 3/4 material from the same trench is dominated by cattle remains (57%). Trenches 19 and 29 seem to demonstrate opposing shifts, whereby caprines are better represented in the later (Phase 4) than earlier (Phase 3) periods. Only Trench 13 demonstrates consistent inter-period shifts in taxa representation.

Figures 4a and 4b show the inter-phase variation in cattle, sheep/goat and pig representation in terms of NISP and MNI – horse are not considered here as it was demonstrated earlier (Taphonomy) that the remains of this species seem to have been treated differently to those from the other main domesticates. Comparison between the two graphs shows that ranking of the different taxa is dependent largely on quantification technique: fragment counts show cattle to be the best represented animal but sheep/goat become dominant when minimum numbers are considered. This disparity between the two sets of results highlights the issues of fragmentation and preservation set out in the previous section on Taphonomy. For example, it was noted that cattle bones demonstrated the highest frequency of butchery marks, suggesting that their remains had been more heavily processed, and thus fragmented, than the bones of other domesticates. As such, it might be assumed that cattle frequencies are artificially inflated when considered in terms of NISP. By contrast, it seems likely that the sheep/goat and pig NISPs are reduced due to the susceptibility of their bones to destruction: both taxa have lower bone density than cattle, this is especially the case for pigs since most individuals tend to be culled at a young age before their bones are fully ossified. In this case the MNI counts are perhaps a better reflection of the true species representation, Figure 4b indicating that both caprines and pig are more numerous than Figure 4a suggests.

Regardless of quantification method, the data show the same overall trends. Although there are no dramatic inter-period shifts in taxa representation, both graphs (in particular Figure 4b) indicate a slight but consistent increase in cattle, at the expense of sheep/goat and pig.
Ageing

Whilst little dramatic inter-period variation in taxa representation was noted above, dental and, to a lesser extent, epiphyseal fusion data indicate some marked shifts in herd and flock age structure.

Cattle

Sample sizes were insufficient for cattle ageing to be considered by trench and the data have, therefore, been combined to provide a general overview of inter-period change. Epiphyseal fusion evidence (Table 7) shows no clear patterns, although there is a suggestion that the average age of slaughter fell slightly between the earlier and later phases: 74% of Phase 2 and Phase 3 animals survived beyond 3-4 years but this figure had dropped to 65% by Phase 4. Foetal and neonatal cattle bones are also better represented in the later periods, being absent in the Phase 2 assemblage (Table 8). The principle caveat of epiphyseal fusion data is that the porous, unfused bones of immature animals are more vulnerable to taphonomic destruction, and their epiphyses less likely to be recovered, than those of adults. Considering the evidence for taphonomic alteration (see Taphonomy above) it seems likely that juvenile bones are under-represented within the Longdoles Field assemblage. Since teeth are more robust than bone, the dental ageing data should be viewed as the more accurate indicator of herd structure.

The dentition-based cull-patterns (Figure 5) demonstrate a trend opposite to that suggested by the epiphyseal fusion, indicating a gradual but clear increase in cattle age. Data for Phase 2 show that over 50% of the herd were slaughtered by Stage 5 (approximately 15-26 months of age). By Phase 3, however, the number of animals culled at this point had dropped to 35%, with another 6% drop by Phase 4. During these later phases, a much higher proportion of animals survived beyond Stage 6 (2-3 years): 45% of the herd in Phase 3 and 55% in Phase 4, compared with just 34% in Phase 2.

Caprines

In contrast to the cattle data, sample sizes for sheep/goat ageing are large enough that differences between the Phase 3 cull-patterns for Trenches 13, 17 and 29 can be discerned. It is clear from Figure 6 that the caprines represented in Trenches 17 and 29 are generally older than the individuals from Trench 13: according to the graph, 51% of animals from Trench 13 had been culled by Stage E (2-3 years), whereas 68% of the Trench 17, and 75% of the Trench 29, individuals survived past this point. Whilst it could be argued that this variation is an artifice of small sample size – the Trench 29 patterns being based on just 16 mandibles – epiphyseal fusion data supports the dental evidence. Table 9 indicates that 67% of the Trench 17 and 29 sheep/goat survived beyond 2.5-3 years, compared to just 32% of those from Trench 13. This suggests that the variation between the different areas may be an accurate reflection of the actual situation. In view of this, it would be unwise to combine the samples from the various areas, especially for considering inter-period change, since the resulting cull-patterns would be skewed depending upon which trench contributed the largest number of mandibles. Instead, inter-period variation in age structure is
examined only for Trench 13, as this was the only area to provide large samples of mandibles for each phase.

Figure 7 demonstrates that inter-phase differences between the cull-patterns are not as marked as those for cattle. Nevertheless, some variation is apparent. For instance, there is an increase in average sheep/goat age between the earlier and later phases: whereas 66% of Phase 2 individuals survived past Stage D (1-2 years), this figures rises to 75% for Phase 3 and 80% for Phase 4. Again these dentition-based cull-patterns correlate well with those derived from epiphyseal fusion data, Table 10 showing that the Phase 2 caprines were, on the whole, slaughtered considerably younger than those in Phase 3 and Phase 4.

**Pig**

Few ageable pig specimens were retrieved from the Longdoles field assemblage, making it necessary to combine the data from the different trenches. Even with this aggregation, however, sample sizes remain low when the results are considered by phase. Figure 8 shows the dentition-based cull-patterns, with epiphyseal fusion data being presented in Table 11. No correlation exists between the different ageing methods. For instance, the dental data suggest the Phase 4 pigs to have been slaughtered at a younger average age than those from Phase 3, whereas the reverse is indicated by the epiphyseal fusion evidence. Patterns of inter-period variation are, therefore, difficult to discern. Perhaps the only statement that can be made with certainty is that, regardless of phase, most animals were killed young, with the majority being culled before they were fully mature: according to Figure 8 very few individuals survived past Stage 6 (21-27 months). Table 8 shows that a foetal pig skull was recovered from the Phase 2 assemblage, with both the Phase 3/4 and Phase 4 material producing neonatal remains.

**Equids**

Both the epiphyseal fusion (Table 12) and dental evidence (Table 13) indicate that, in all phases, most equids survived for several years. Sample sizes are small, even when the data from all trenches are combined, but it is possible to detect some inter-period change, namely the appearance of younger animals in the late phases. Table 12 demonstrates that all the individuals represented in Phase 2 were older than 3-3.5 years, and the only ageable mandible from this phase came from an individual aged between 11-16 years. All the mandibles from Phase 3 derived from animals said to be over 5 years of age, a situation supported by the epiphyseal fusion. By Phase 4, however, the remains of several juveniles are represented: according to Table 12 14% of animals were dead by the age of 18-24 months. One mandible from an individual aged approximately 12-18 months was recovered from pit 2721, this was found in association with a distally unfused radius and tibia. The partially articulated hindlimb of another 18 month old animal was represented in ditch 2804: this specimen’s tibia was distally unfused but the distal metatarsal was fused. In addition to these, a two foetal specimens – a tibia and a pelvis – were recovered from ditch 501.
Sexing

The results of Wilson’s work on cattle and sheep/goat pelves are provided, by phase, in Table 14.

**Cattle**

Whilst the number of specimens providing evidence is small, the data suggest a temporal trend towards an increased maintenance of male animals. For instance, all of the sexed pelves from Phase 2 derived from females but this figure falls steadily through time. Metrical analysis of the metatarsal, an element shown to display considerable sexual dimorphism (Albarella 1997:38; Thomas 1988) provides a similar picture of changing sex ratios. Figure 9 shows a bivariate plot (breadth of distal against depth of distal) which forms two separate clusters, labelled tentatively as male and female. It can be seen that all but one (90%) of the Phase 2 metacarpals fall within the smaller group, supporting the idea that most of the animals from this phase were females. By contrast, the percentage of Phase 3 (36%) and 4 (30%) specimens plotting within this group is much reduced, suggesting that emphasis did, indeed, gradually shift towards the management of male animals.

**Caprines**

The evidence provided by the sheep/goat pelves is perhaps less reliable than that for cattle since the sample size is even smaller. Certainly no clear temporal trends are apparent, although there may be some indication of a shift away from the management of rams and whethers: whereas 25% of the Phase 2 pelves are from males, by Phase 4 they account for just 14% of the sexed specimens.

**Body Part Patterns**

Distribution of cattle, caprine, pig and horse skeletal elements is shown (in terms of MNE), by trench, phase and feature type, in Tables 15-18a-d. Since inter-feature variation in the data is difficult to discern and because sample sizes are often small, aggregated results for each phase are provided in Tables 19-22, with the data presented graphically in Figures 10-13.

**Cattle**

In each phase of the site cattle are represented by all body parts. Mandibles and denser longbone portions, notably the distal tibia, distal humerus and proximal radius, are particularly abundant, with portions of lower bone density, such as the proximal tibia, proximal humerus, ulna and distal radius being less well represented. This skeletal patterning would appear to be related to differential preservation, rather than the impact of human activity. Scarcity of the smaller elements, in particular the atlas, axis, astragalus, calcaneum and first phalanx, may be accounted for by the lack of on-site sieving.
Whilst the body part patterns are similar for each phase, there are some distinct inter-period differences. Perhaps most obvious is the increase in scapula representation, which rises from 31% MNI in Phase 2 to over 80% in Phases 3 and 4. Since cattle scapulae are generally more susceptible to destruction than the distal humerus (Brain 1967; Lyman 1994) their abundance in the latter two assemblages suggests that their presence is related to anthropogenic factors. Interestingly, although scapula representation appears consistent in Phases 3 and 4, when the data are considered by feature type it becomes clear that their distribution within the two assemblages is dissimilar. Tables 15a shows that whereas the Phase 3 scapulae were evenly distributed among a range of feature types, the Phase 4 specimens were absent or poorly represented in all feature types except the enclosure ditches and pits. Indeed, of the twenty-eight scapulae recovered from pits, twenty-two came from a single feature, number 1989. Table 23 provides the skeletal representation data for this feature and it is clear that mandibles and, in particular scapulae, are significantly over-represented compared to the other body parts. If this assemblage accumulated over time, it would suggest a degree of structured rubbish deposition, however, it may equally represent a single carcass processing event (see carcass processing).

**Caprines**

There is little inter-period variation in the distribution of caprine body parts. In each phase mandibles are vastly over-represented with the distal tibia and distal humerus being the next most abundant elements. All other bone portions, especially those with low structural density (such as the proximal humerus and proximal tibia), are present in small frequencies. It was noted in the section on taphonomy that the body part patterns for the Longdoles field caprines resemble closely those from assemblages that have been ravaged by carnivores. Certainly the data suggest that density-based differential preservation is the strongest factor influencing the caprine skeletal representation, masking any human-introduced biases.

**Pig**

As with the caprine assemblage, the pig body part patterns for all phases are dominated by mandibles, with post-cranial bones being less well represented. This is particularly true of the Phase 2 material which, although having the greatest MNI of any of the phases, contains the least number of appendicular bones. Such skeletal patterning is common for hand-collected pig assemblages and is generally linked to differential recovery and preservation: the small size of many pig elements means they are often missed during excavation and, whilst pig mandibles are particularly robust, their long-bones (often being unfused) are susceptible to destruction. Data for the Phase 3 and, to a lesser extent, Phase 4 material indicate that bones of the forelimb are better represented than those from the hind. Again this pattern is common for pig assemblages and most probably reflects the greater structural density of the scapula, humerus and radius compared to the pelvis, femur and tibia.

**Equid**

Figures 13a-c show that the skeletal representation for the Longdoles Field equids is substantially different to that for the other main domesticates. Whilst all parts of the
body are represented, metapodia and hind-limb elements are present in higher frequencies than those of the forelimb. This pattern is consistent for all phases, although less clear for Phase 3, due to small sample size. It seems unlikely that the variation can be attributed to differential preservation, since the distal humerus is less well represented than the tibia, despite being of higher structural density. Factors of identification could, perhaps, be responsible for the observed trend: mandibles, femora, tibiae, astragali and metapodia being slightly easier to identify than the humerus and radius. Certainly representation of the highly identifiable metapodia is not skewed in favour of the hind-limb, the data showing the metacarpal to be represented in equal, or even greater, frequencies to the metatarsal.

Although differential identification may explain the skeletal patterning, there exists the possibility that the data reflects the true circumstances, that bones of the hind-limb were represented in higher frequencies than those of the forelimb. Such a situation may have arisen either by the export or import of particular body parts or as a result of selective disposal strategy, with bones of the hind-limb being discarded in contexts more likely to ensure preservation. Evidence to support the latter argument is perhaps provided by the partially articulated horse hind-limb that had been placed in the Phase 4 ditch, number 2804 (see articulated remains below).

**Articulated Remains**

Several sets of articulating remains were recovered from Longdoles field. Although most of the main domesticates were represented by at least one partial skeleton, no articulating remains of cattle or pig were noted.

**Sheep burials**

Anatomical frequencies and, where available, epiphyseal fusion data for the four sheep skeletons and set of articulating vertebrae are presented in Table 24. None of the skeletons were complete, suggesting that portions of the carcasses were either retained or deposited elsewhere. It is conceivable that the small vertebrae from the lamb skeleton could simply have been missed during excavation but it seems unlikely that the same is true of the other skeletons. If the animals represent natural fatalities whose flesh was not considered fit to eat, it would seem pragmatic that useful parts of the body, such as the skin, were removed. Certainly this would explain the skeletal representation for skeleton 699, which was missing both its head and foot bones, elements that are often detached with the skin. The skeletons from both context 1281 and 1373, however, were both missing meat-bearing parts of their body; both lack the upper forelimb, and the hindlimb was absent from skeleton 1281. If these carcass portions were removed for consumption, it is surprising that the remainder of the skeleton was dumped without apparent utilisation. Such a situation may indicate ritual activity but it seems equally possible that the remains were scavenged or utilised for feeding domestic dogs. If the burials do represent sacrificial animals, the rituals involved were not specific to animals of a particular age since the Longdoles Field individuals cover a wide age range: on the basis of the epiphyseal fusion data the lamb was no older than 10 months, the specimen from context 1281 was between 1 and 2 years, whilst the individual from context 1373 was at least 3.5 years of age.
Dog burials
Table 25 provides the anatomical representation for the two sets of articulating dog remains. Those from context 620 were found scattered throughout the ditch and were mixed in with the remains from other domestic animals but the individual represented in context 1231 was entirely complete, having been placed in a specially dug pit. Both dogs were adult and that from context 1231 provided three measureable bones, whose size suggested it was of medium build with a wither-height of 44-45 cm. A considerable number of dog bones were recovered from Longdoles field but most were found disarticulated and scattered in a variety of contexts. Why the skeleton from context 1231 should differ from this pattern is unclear but it seems possible that the animal was a pet, hence the care taken in its burial.

Horse
Context 2804, a Phase 4 ditch, produced the only articulated horse remains, which consisted of a lower left limb that seems to have been buried fully fleshed (Table 26). This specimen was not placed in isolation, being mixed in with remains from other animals.

Birds
Anatomical representation data for the partial domestic fowl and buzzard skeleton are provided in Table 27. Again the significance of these remains is difficult to ascertain.

Carcass processing
The general impression provided by the Longdoles Field material is that the assemblages are composed not only of food refuse but also of waste from slaughter and primary butchery, as well as bone, horn and antler working. Although Wilson’s butchery mark records do not permit detailed studies of these activities, they are sufficient for methods of cattle and caprine carcass reduction to be considered. Some comments concerning the processing of other animals can also be made. Due to the limited sample size and the nature of the records, no significant inter-period variation in butchery patterns was apparent and the data from all phases and areas of the site have, therefore, been combined.

Cattle and Caprines
Cattle carcasses appear to have been more heavily utilised than those of any other animal but many sheep/goat bones also display cut and chop marks. No evidence for slaughter method was apparent but there were some traces pertaining to the preparation of the carcass. In particular, several skulls and metapodia demonstrated cut marks indicative of skinning.

According to Wilson’s diagrams, cattle and caprine heads appear to have been detached from the rest of the carcass by chopping between the axis and 3rd cervical
vertebra. Most of the vertebrae posterior to this point had their transverse processes removed, suggesting that carcasses were split into sides by chopping either side of the centrum. The vertebral column itself then seems to have been cut into smaller lengths, several centra having either their anterior or posterior articulations removed. If these butchery patterns are viewed in conjunction with those for ribs (many of which had been cut into smaller units), they suggest that chops, or rib-steak, were commonly prepared.

Evidence for disarticulation of the appendicular skeleton is scarce but it would seem, from the number of butchery marks on the articular surfaces, that divisions were made between joints with few specimens having their diaphysis chopped through.

Rather than deriving from disarticulation, most of the butchery marks seem to have been made during meat processing and consumption. For instance, the majority of marks on the humeri, radii, femora and tibiae consisted of shavings and nicks (Figure 14). Lauwerier (1988) interpreted these as filleting marks, created either when joints of meat were de-boned or when the cooked flesh was cut away from the bone. Perhaps the most convincing evidence for meat processing was exhibited by the caprine and, in particular, cattle scapulae, which appear to have been butchered in a standardised way (Figure 15). Most had their glenoid cavities trimmed and their spine either chopped or removed. In addition, many scapulae exhibited a series of cut or shaving marks on the medial surface of the blade. Such butchery patterns for cattle scapulae have been observed on numerous Roman sites, both in Britain and on the continent (Grant 1987). Large numbers were recovered from Lincoln city (Dobney et al. 1995) where it has been suggested that they represent the cold smoking and/or brining of shoulder joints, the trimming of the bones allowing the preservatives to penetrate the muscle. The shaving marks are thought to have been produced when meat, which had become firmly attached as a result of the curing process, was cut away from the bone (Lauwerier 1988, 156).

Products other than meat, such as fat, grease and marrow, must also have been targeted during carcass processing. Some of the bones, notably the metapodia, had been split longitudinally, presumably to facilitate marrow extraction. A considerable number of sheep/goat skulls had also been cleaved in two, most probably to gain access to the fatty brains.

Small-scale craft-working seems to have been taking place on-site. Several horn-cores exhibited marks suggesting the removal of the horn sheath, and two sheep/goat metatarsi had been used as raw materials: one, from a Phase 3 pit (2390) had been turned into a knife handle and the other, from a Phase 3 post-hole (558) had a hole drilled through its proximal articular facet. Examples of the latter specimen are uncommon but have been reported from Danebury (Cunliffe & Poole 1991, 359) and Wilcote (Hamshaw-Thomas 1993, 176), where it was suggested that they represented the early stages of bone handle manufacture.

**Pig**

Only one butchered pig bone was recorded for the Longdoles assemblage, an atlas displaying a chop mark from where the head had been separated from the rest of the carcass. Whilst pig bones seldom show as many cut and chop marks as those from cattle and caprines, a single specimen seem unfeasibly low, and it is likely that the
scarcity of butchery information is due to recording strategy rather than actual absence.

**Horse**

It is unclear whether horse meat was eaten regularly by the inhabitants of Roman Britain but the presence of butchery marks is often cited as positive evidence for its consumption. Of the 677 horse specimens recovered from Longdoles Field, only five were recorded as showing evidence for butchery. Two Phase 4 metacarpals – one from cellar 1969 and the other from pit 1989 – had been split longitudinally, suggesting that they may have been processed for marrow. However, the remaining three specimens – a first phalanx and a tibia from Phase 2 ditches (775 and 525 respectively), and a metatarsal from a Phase 4 ditch (2804) – displayed only light cut marks, indicative of skinning rather than butchery or meat consumption. Indeed, the latter specimen formed part of the articulated hind-limb, which seems not to have been stripped of meat before being placed in the ground (see articulated remains).

**Other animals**

Butchery marks were observed on the bones of several other taxa. Again, most of the marks seem to be the product of skinning rather than meat consumption. For example, fine cut marks were noted on a dog tibia from pit 2526; a cat ulna from ditch 1855 displayed similar cuts, and a polecat skull and set of mandibles, recovered from a Phase 3/4 well, showed characteristic skinning marks. The only other specimen demonstrating butchery was a hare vertebra from the phase 3 well, number 766, but this can probably be linked to meat removal.

**Size of the Livestock**

Few bones were complete and therefore the metrical data set consists predominantly of proximal and distal breadth measurements. There were, however, sufficient greatest length measurements to calculate wither heights for cattle, caprines and horses.

**Cattle**

Inter-phase variations in the distal breadth measurements of cattle humeri, metacarpals, radii and tibiae are shown in Figures 16, 17, 18 and 19, respectively. All indicate similar trends, demonstrating a significant size increase between the Phase 2 and 3 specimens. Figure 16 also suggests an increase between Phases 3/4 and 4, although this is not borne out by the wither height evidence, which is probably the most accurate indication of size change. Figure 20 mirrors the patterns displayed by the distal breadth graphs, suggesting that between Phase 2 and 3 cattle wither heights increased by approximately 10 cm, after which point they remained static. By comparison with cattle from contemporary sites in southern Britain, the Longdoles field animals appear to have been of average size, however, Figures 21 and 22 suggest that they may have been slightly smaller than cattle from other sites in the region.
**Caprines**

Fewer measurements were available for sheep/goat but those for the distal tibia and humerus are presented in Figures 23 and 24, with inter-phase variation in wither heights shown in Figure 25. Trends in size change are less clear than for cattle but, again, the graphs do indicate a slight increase between the earlier (Phase 2) and later (Phases 3, 3/4 and 4) periods. Presence of some particularly large individuals in the Phase 3/4 assemblage may have artificially increased the figures for this phase but, on average, wither heights seem to have risen by almost 1 cm. Comparison of the Longdoles field specimens with data from other 1st century (Figure 26) and later Romano-British (Figure 27) sites suggest that similar size increases occurred throughout the region. It is also clear that the Longdoles field caprines were of average size for the period and area.

**Horse**

Detailed metrical analysis was not possible for the equid remains but Figure 28 presents the wither height data for this animal. Despite being the least clear of any of the graphs, size change between Phase 2 and Phases 3, 3/4 and 4 is apparent. It would seem that horse wither heights increased by about 3cm, a much smaller rise than was seen for cattle.

**Pig**

No wither heights could be calculated for pigs since the high kill-off of immature animals meant that no complete long bones were recovered. Indeed, few measurements of any kind could be taken for this animal. On the basis of the distal humerus measurements (Appendix II), it seems that the Longdoles field pigs were of comparable size to those from contemporary site in southern Britain.

**Pathology**

Without first-hand examination of the assemblage, it is difficult to interpret Wilson’s records pertaining to palaeopathology. Nevertheless, it is clear that some pathological specimens were recovered from the Longdoles Field assemblage, the incidence of fine pathology perhaps being reduced by the preservation conditions. Most frequently noted were the lesions in equids, five specimens showing evidence of either trauma or arthropathies: A tibia with a well-healed fracture was recorded for context 525; two metacarpals demonstrating ‘ringbone’ were recovered from contexts 559 and 675; a fused calcaneum and astragalus were found in context 1577; and context 501 produced a metatarsal with osteophyte at its proximal end. It seems likely that most of these lesions resulted from the stress of being ridden. The fracture must have had another cause but the fact that it was well-healed suggests that the animal was given considerable attention to help it recover.

A small number of cattle metapodia were recorded as pathological on the basis of their splayed medial condyles. Extended condyles are a common occurrence for archaeological cattle metapodia and are frequently cited as evidence for ploughing (Dobney et al. 1995). In the absence of associated arthropathies, however, it is wiser...
to view the Longdoles field specimens as displaying age-related growth rather than a condition that might be linked to traction.

Two sheep/goat specimens were identified as pathological: a mandible from context 813 was noted as having periodontal disease and a metatarsal from context 1367 displayed a healed fracture.

**Spatial Patterning and Rubbish Disposal**

Studies of taxa frequency and skeletal representation have demonstrated that the Longdoles field assemblage shows no significant variation in bone distribution between feature-types. Wilson (Wilson & Levitan n.d; Wilson 1996) undertook a study of spatial patterning based on the overlying residual material but, since these deposits were contaminated and need bear no relation to the underlying layers, his results should be viewed with caution. Several of the trends he noted are, however, mirrored by the securely-dated bones. Patterns are best demonstrated by bird, and to a lesser extent, pig representation. The fragility of their remains means that they are well represented only in well preserved, primary deposits. By contrast, assemblages containing no or few bird and pig bones are generally characterised by fragmented assemblages with a low identifiable component. These deposits usually contain high frequencies of cattle remains, in particular skull, teeth and mandible fragments.

**Trench 13**

The general homogeneity of the assemblage from Phase 2 meant that spatial variation is difficult to ascertain but clearer patterns are shown by the Phase 3 material. Data for the major contexts from this phase are provided in Table 28 where the relationship between rates of identification and frequencies of bird, pig and cattle remains are presented. There is a clear inverse correlation between cattle representation and the frequencies of birds, pigs and identification: as percentages of the former increase, those of the latter fall. Having established this relationship, it is interesting to see what it suggests about the spatial patterning in Trench 13. Birds are found in greatest concentrations in Buildings 1 and 7, and in the features (particularly 1595, 766 and 1988) just to the east of these structures. That birds are found in such high frequencies in this area indicates a relationship with domestic buildings and suggest that this was the central zone of activity within the trench. By contrast, few of the main linear boundaries contain sizeable numbers of birds. Instead their assemblages are characterised by greater quantities of fragmented cattle remains, perhaps suggesting poor preservation due to considerable re-working and re-deposition. These boundary assemblages would appear to represent the peripheries of the activity zones.

If it is accepted that the presence/absence of bird bones reflects the presence/absence of domestic activity, there are several finer patterns that deserve comment. First is the fact that all of the bird bones from building 1 came from the northern half of the structure, being recovered only from post-holes 2269, 2138, 2267, 2135 and 2318. This may suggest that this area of the building had a different function to the southern half. It also seems significant that no bird bones were recovered from building 3, indeed all animal bones were scarce, suggesting that, whilst this structure was similar in plan to building 1, the two clearly had different functions. Building 3 has been
interpreted as a barn and this evidence would seem to support this claim. Scarcity of bird bones in building 2 could also indicate a non-domestic function, the structure perhaps being used as a craft work-shop.

Similar, albeit less clear, patterning is apparent for the Phase 4 material from this Trench (Table 28). Again, features containing the highest frequencies of birds are those associated with the domestic structures, buildings 8 and 9, whilst the enclosure ditches containing much lower numbers of avian remains.

Other than these patterns, the data provide little evidence to highlight systems of rubbish disposal or indicate areas of specialised activity, such as slaughter or butchery. However, two assemblages – those from the Phase 3 well 766 and Phase 4 pit 1989 – did stand out as being markedly different from the general deposits: the taxa representation data for the assemblages are provided in Table 29 and Figure 29. Whereas most of the features from Longdones field were represented by a limited number of taxa, both 766 and 1989 were set apart by the diversity of animals represented within them. For instance, the taxa contained in well 766 include five of the site’s nine hare bones, one of the two roe deer specimens, all of site’s fish bones plus the remains of domestic fowl, coot and dunlin. The frequency of pigs is also higher than in most other contexts. It can only be assumed that this assemblage represents primary domestic refuse, perhaps the remains of a single high-status meal. Certainly the material from this context is in sharp contrast to that from Pit 1989.

Whilst pit 1989 also contained a considerable range of species, many were non-food animals: horse, dog and wild cat – animals thought to have been subject to dietary taboos in this period – all being represented. By contrast, pig, sheep/goat and bird bones were present only in low numbers. Cattle was by far the best represented taxon, accounting for 71% of the material from this context. Even more interesting was the skeletal frequency data for this animal: it was noted in Section 9.1 that mandibles and, in particular, scapulae were vastly over-represented. Such a taxa range and body part distribution is suggestive of specialised activities – the abundance of horse and presence of dog and cat remains could be explained in terms of skinning, whereas the large number of cattle scapulae points to specialised carcass processing (see articulated remains).

**Trench 17**

No spatial patterns were apparent for Trench 17, partly due to the poor stratigraphy and small sample sizes for the individual features. Table 4 demonstrates that very few bird bones were recovered from this trench, perhaps reinforcing the idea that the area was industrial rather than domestic in nature. Certainly the character of the assemblage is very different to that from Trench 13, one of the more striking differences being the concentration of articulated remains in Trench 17: three of the four sheep skeletons and the complete dog skeleton were recovered from this trench. Why these animals should have been buried in this area is far from certain but if the individuals represent natural fatalities, rather than sacrificial animals, it might be expected that they would have been buried away from the central area of occupation.
**Trench 19**

Sample sizes were again small, with spatial patterning being difficult to discern. The two enclosure ditches, number 18 and 19, provide the best indication of where activities were centred. The assemblage from Enclosure 19 contained a greater, although still low, percentage of identifiable fragments and a wider taxa range than that from Enclosure 18 (Table 28), suggesting that the refuse accumulating in the ditches came from within, rather than outside, the temenos. Despite the probable religious function of the enclosure, none of the deposits from this Trench appear overtly ritual, although the roe deer skull from Enclosure 19 may represent a placed deposit.

**Trenches 18, 27, 29 and 30**

Evidence for specialised activity was not apparent for any of the remaining trenches, the sample sizes for each being too low to reveal any spatial variation. The assemblages from both Trench 27 and 30 yielded the lowest percentages of identifiable material (10% and 8% respectively) and those fragments that were identifiable consisted predominantly of teeth. This suggests that, rather than representing primary refuse, the material from these trenches had been subject to considerable re-deposition. Artefacts from Trench 27 suggest the area to have been a circular shrine, however, animals do not appear to have been incorporated into religious rituals that might have been carried out: there were no finds comparable to the pig burial found at the shrine at Bancroft, Buckinghamshire (Williams and Zeepvat 1994, 109).

**Discussion**

One of the questions most commonly asked of zooarchaeological material from this period is that of ‘Romanization’, in particular whether the animal bones reflect the socio-economic changes that are thought to have accompanied the Conquest (for instance Grant 1989; Dobney, 2001). The Longdoles field assemblage, spanning the late Iron Age to late Romano-British period, is well placed to allow consideration of this subject. Certainly the material suggests that many of the factors influencing the assemblage's composition altered from the earlier (Phase 2) to later (Phases 3 to 4) periods but whether these were related to the Romanizing process or resulted from shifts in settlement structure, function or status is less easy to determine. At the most basic zooarchaeological level it would seem that, despite the dramatic structural re-organisation of the settlement, the site’s function did not change significantly over time: skeletal representation and ageing data, in particular the presence of foetal and neonatal animals, suggest that, regardless of phase, the Longdoles field settlements were self-sufficient production centres, where animals were raised and consumed on site.

Relative frequencies of the main domesticates also show little inter-period variation. In all phases cattle and caprines dominate the assemblage with pigs being present in low frequencies. The high ratio of cattle to sheep/goat in the Phase 2 assemblage is perhaps surprising, since Iron Age sites, especially those located on chalk and limestone, are usually characterised by a dominance of caprines. Researchers such as
Grant (1984) and Hambleton (1999) have, however, noted that sites along the Upper Thames Valley do not demonstrate an emphasis on sheep/goat. This observation is reinforced by the assemblage from Warrens field (Sykes n.d) which, according to the NISP count, demonstrates a preponderance of cattle, perhaps suggesting that the valley environment was better suited to cattle husbandry. Regional specialisation in cattle farming could explain the marginal increase in their frequency between the earlier (Phase 2) and later (Phases 3 and 4) periods (Figures 4a and 4b). Alternatively, this slight rise in cattle may correspond to the widespread increase in cattle representation that has been noted across post-conquest Britain (King 1978). King (1991, 17) has suggested that this shift in taxa representation is a feature of the Romanization process, reflecting the consumption practices of the invading population and subsequent dietary emulation by the local people. Certainly cattle tend to be better represented in ‘Romanized’ and central place sites (in some cases their bones account for more than 90% of the domestic assemblage), whereas caprine-dominated are more typical of ‘native’ or rural settlements. Since the Longdoles field assemblage does not contain cattle bones in the frequency typical of a Romanised site, the settlement can be classified as ‘native’, the low frequencies of pig bones adding credence to this suggestion: according to King (1991), pork made an important contribution to the Roman diet, with pig bones accounting for up to 50% of the main domesticates from Romanizes sites.

Subsequent to King’s analysis, Hamshaw-Thomas (2000) reviewed the variations in taxa frequency and suggested that, rather than reflecting dietary preferences, the shifts in cattle, caprine and pig ratios could be linked to more complex patterns of economic change. This theory is upheld by the Longdoles field assemblage, which indicates that systems of animal management did, indeed, alter between the earlier and later phases. In Phase 2, for example, large numbers of cattle were slaughtered before 15-26 months of age, suggesting a concentration on meat production. Under such a regime it would be expected that most of the individuals slaughtered by this point were surplus bullocks; a idea supported by the sexing information, which indicates a dearth of adult males and a preponderance of females (Table 14 and Figure 9). Subsequent to Phase 2, the situation appears to have shifted, with cattle, in particular male individuals, being kept to considerably older ages. Similar inter-period changes in cattle sex structure have been noted at other rural sites, such as Barton Court Farm (Wilson 1986) and Owslebury (Maltby n.d). Maltby (1994, 91; 1998, 426) has linked this to simultaneous but opposing shifts observed on urban sites: Romano-British towns such as Exeter (Maltby 1979), Kingscote (Maltby, 1998) and Winchester (Maltby 1994) have been shown to contain a preponderance of female cattle. He argues that inter-site variation in sex structure may reflect the provisioning system, whereby oxen and bulls were retained on the rural sites whilst cows were deliberately selected to be sent for slaughter within the towns. If this is the case, it would suggest that the post-conquest period witnessed an increase in commercialisation, with the development of urban markets and the standardisation of rural-urban provisioning systems.

The move towards the maintenance of adult males at Longdoles field may explain the size increase that occurred between Phases 2 and 3 (Section 12.1), although the fact that the whole size range was affected suggests that the observed increase was due to genotypic change, rather than a shift in sex structure. Presence of larger cattle in the Romano-British period is well documented, both in Britain and across the continent (Maltby 1981; Luff 1982; Teichert 1984; Thomas 1989). Many researchers, for example Maltby (1981), have argued that the observed size change can be linked to
the importation of new continental stock, whereas others, such as Armitage (1980) ascribe the shift to the upgrading of existing Iron Age animals.

Viewed in conjunction, the evidence for a shift in cattle age, sex and size hints at change in animal management beyond that of simple site provisioning or animal breeding. Why such a shift should have occurred cannot be stated conclusively but may reflect the widespread agricultural intensification that occurred during the Romano-British period. Population expansion following the Conquest increased the demand for food, causing greater areas of land to be taken into arable production (Dark 2000:82). Need for traction would have seen more cattle used as plough animals, hence the rise in cattle frequency, and desire for strong individuals may have dictated the decision to retain male animals on rural sites. It may also have encouraged the selective breeding for, or importation of, the larger individuals noted in the Phase 3 and 4 assemblages. Changes in landscape, with wooded areas being turned over to ploughland, may also explain the observed decline in the frequencies of pig - an animal suited to woodland foraging.

Sheep/goat frequencies appear to have remained fairly static throughout the period under consideration but slight temporal changes in their age-structure are apparent. In all phases the majority of individuals were kept beyond 2 years, suggesting that they were utilised as much for their secondary products (milk, manure and wool) as for their meat. Under an intensifying agricultural regime, increased requirements for wool and, more particularly, manure may explain the rise in sheep/goat age that occurred between the earlier (Phase 2) and later (Phases 3 and 4) periods; with animals being maintained for these products for several years before being fattened up for the table. Artefactual evidence from Longdoles field indicates that weaving was taking place on site and it seems possible that desire to improve wool yields may have encouraged selective breeding. It is known that wool quality improved during the Romano-British period (Ryder 1983) and if the animals producing these finer fleeces were larger than the Iron Age stock this could account for the observed increase in caprine size.

Although there is still considerable debate about whether the larger livestock of the Romano-British period were selectively bred from native animals or imported from the continent, presence of donkey bones suggests that the Longdoles field assemblage contains some imported animals. Breeding populations of donkeys are not thought to have been established in Britain until the Medieval period (Dent, 1978), therefore, all the specimens pre-dating this period can be viewed as imports. Donkeys have been recorded on numerous continental sites dating to the La Tène and Roman period (Luff, 1982) but they are not well documented in the British zooarchaeological record: whilst hundreds of Romano-British sites have been excavated, just four – Newstead Fort (Ewart 1911, 371), Frocester Court, Gloucester (Noddle 1979), Wilcote, Oxfordshire (Hamshaw-Thomas, 1993) and Hunt’s House, Southwark (Bendrey, 1999) – have claimed the presence of donkey remains. These individuals were, most probably, imported for use as pack animals.

As is the case with most rural Romano-British settlements, horses are well represented at Longdoles Field. Although their remains were generally found incorporated with domestic waste, there is little evidence to suggest that horse meat was eaten regularly: few specimens demonstrate butchery marks and most bones were recovered complete, even articulated, suggesting that horse carcasses were treated differently to those of the main food animals. Indeed, it has been suggested that consumption of horseflesh was tabooed during the Romano-British period (Simoons,
Most horses were maintained to adulthood, indicating that their main function was as providers of transport and perhaps traction; certainly the few pathological specimens were suggestive of riding-related conditions. By the later phases, however, a growing number of sub-adult animals were represented in the assemblage, with two foetal bones being recovered from a Phase 4 ditch. This inter-period variation in horse age is well recognised. Few Iron Age assemblages contain the remains of juvenile animals, which lead Harcourt (1979) to conclude that horses were not reared at settlements but rather that feral animals were periodically rounded up and trained. Immature individuals are, however, more commonly represented in Romano-British assemblages - examples having been noted at Owslebury (Maltby n.d), Wantage (Maltby 1996) and Agar’s Plough (Sykes n.d) - implying that, by this period, horses were being bred on site. It seems likely that this move towards on-site husbandry would have facilitated selective breeding, which may explain the increase in horse wither height noted between Phase 2 and Phases 3 and 4.

As with horses, dogs do not appear to have been consumed at Longdoles field, the number of articulating remains suggesting that there may have been a taboo against the consumption of their flesh. Instead, their main use would probably have been as guard dogs or for herding livestock.

Livestock at Longdoles field were not used only during their life, their bones, horns and skins all being utilised as raw materials after their death. Several bone objects were recovered from the site and one specimen - a drilled sheep/goat metatarsal - represents a discarded attempt at making a handle, suggesting that small scale bone working was taking place on site. Antler may also have been used for tool production, certainly in Phase 2 it is the only cervid element represented, indicating that shed antlers were collected for purposes of bone working. Bones from all the main domesticates, including horse and dog, displayed some evidence of skinning marks, and in the later phases (3/4 and 4) wild animals also seem to have been exploited for their fur. Other than an increase in the exploitation of wild animal skins, there is little obvious inter-period variation in the use of animal bones and hides. Differences in butchery patterns are also difficult to discern, although in the later phases there are perhaps greater numbers of cattle scapulae exhibiting the characteristic marks that can be linked to the curing of beef shoulders (Section 11.1). Many of these scapulae came from a Phase 4 pit (number 1989), their concentration suggesting that they may have been deposited on a single occasion, having perhaps been accumulated by a specialist trader. According to Dobney et al. (1995, 26), in urban settings cured beef would have been sold off the bone by specialist butchers. Whilst a different situation might be expected on a rural site, there is evidence to suggest that salt was taken in quantity from Droitwich to Claydon Pike (Miles & Palmer 1983) and it seems possible that shoulders were processed at the Longdoles Field settlement before being transported to nearby towns for sale. Once the meat had been sold off the bone, the scapulae may then have been brought back to the settlement for disposal. Maltby (1994), however, has argued that such specialist activities rarely took place on rural sites. If this is the case, the scapulae would have to be seen as representing pre-butchered joints of meat that were imported to the Longdoles Field settlement. Certainly such an explanation would account for the over-representation of cattle scapulae in both the Phase 3 and 4 assemblages (Section 9.1). With the exception of these scapulae, anatomical representation data for the main domesticates provides no evidence to suggest that certain elements or cuts of meat were either imported or exported from the site. If
trade in livestock was taking place, animals were most probably moved on-the-hoof. There is no indication that the situation changed from the earlier to the later phases.

It is often argued that discrete deposits of animal bones, in particular articulated limbs, skeletons and skulls, represent ritual activity. Whilst this case has been argued convincingly for the Iron Age (Grant 1991; Hill, 1995 and 1996; Wilson 1999), the Romano-British evidence is often less compelling. Several sets of articulated remains were recovered from Longdoles Field but in the absence of a clearly ritual context, it remains uncertain whether these animals represent symbolic or functional (for example the burial of natural mortalities) deposits. The articulating horse limb from context 2804 is perhaps the most promising example of ritual deposition, since similar examples have been found on several nearby Romano-British sites. For instance Wilson & Allison (1990, 96) identified five cases of articulating horse legs at Watkins Farm, and another example was noted at Frocester Court (Noddle 1979, 243). Furthermore, the body-part evidence for the Longdoles field horses (Table 13 and Figure 22) suggests that deposition of hind limbs may have been practised more regularly than was recognised during the recording process. It is possible that the bird skeletons recovered at Longdoles field also represent ritual deposits. Domestic fowl were commonly incorporated into Romano-British ceremonies and a similar instance of a fowl skeleton being placed in a post-hole was found at Wavendon Gate, Milton Keynes (Dobney 2001). The buzzard skeleton may also represent ritual activity, although Bramwell (1986) interpreted the female buzzard skeleton recovered from Barton Court Farm as a pest that had been trapped in defence of the settlement’s poultry.

Perhaps one of the more interesting temporal shifts exhibited by the Longdoles Field assemblage is that relating to the representation of the less abundant species. Domestic birds increase significantly after Phase 2, the same being true of wild birds, game mammals and fish (Figure 30). In any pastoral society, hunting, fowling and fishing are forms of social action, and it seems possible that the sudden increase in the frequency of game animals reflects a rise in the site’s social-economic status. Interestingly, this change does not coincide with the construction of the villa, which seems to have had little bearing on animal exploitation. Instead, the settlement reorganisation in Phase 3 seem to have been of greater significance. It seems possible that from Phase 3 onwards the sites occupants were more divorced from the agricultural processes and thus were able to expend greater amounts of time in leisure activities such as hunting. Another possible explanation for the broadened species range is that it reflects a change in attitudes towards domestic birds and wild animals. It may be no coincidence that Julius Caesar, in his De Bello Gallico (V.12.6), wrote bemused that the people of Britannia did not eat chickens, geese or hares but kept them for sport. Certainly these groups of animals are scarce on all Iron Age sites from southern Britain but appear more regularly within Romano-British assemblages. This has tempted some researchers to suggest that, in the Iron Age, there may have been cultural taboos against wild species but that the Romans popularised their consumption (King 1991, 16).

The range of wild animals represented in the Longdoles field assemblage informs not only about hunting practices and dietary change but also provides an insight into the types of environment surrounding the settlement. Presence of woodland is implied by the deer, fox, badger and polecat remains, with the amphibians, waterfowl and wetland birds indicating proximity to riverine conditions. It seems likely that the four eel bones came from animals caught, by trapping, in nearby marshy areas.
When all the evidence from the Longdoles field assemblage is considered in conjunction, it suggests that a significant socio-economic transition occurred between the Late Iron Age (Phase 2) and the Romano-British (Phases 3 and 4) periods. Not only does the animal economy appear to have changed, with fluctuation in the frequency, age, sex and size of the animals exploited, but wider human-animal relationships in general seem to have shifted. Most apparent of these is the uptake of hunting and the consumption of domestic birds and game animals. The origins of these shifts are likely to be multi-causal rather than based on a single factor but it seems probable that, to some extent, the changes can be linked to the process of Romanisation.

References cited


Centre for Human Environment and Ecology, Department of Archaeology, University of Southampton. n.d. Animal Bone Metrical Archive Project (ABMAP): draft report on the project phase for English Heritage.


Dobney, K. 2001 A place at the table: the role of vertebrate zooarchaeology within a Roman research agenda for Britain. In S. James and Millet, M. Britons and Romans: advancing the research agenda CBA Research Report 125 pp 36-45.


Sykes, N. J. n.d. The Late Prehistoric and Romano-British Animal bones from Lot’s Hole, Marsh Lane East site 1, Lake End Road and Agar’s Plough. Unpublished report to Oxford Archaeology.


