The Animal Bones from Battlesbury Bowl

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Introduction: Methods of Recording and Quantification

All bones and teeth recovered from the excavations were examined and where possible identified to species and skeletal element using reference material from the comparative skeletal collection housed in the School of Conservation Sciences, Bournemouth University. Where appropriate, the following information was recorded for each fragment: context; element; anatomical zone; % completeness; fragmentation; surface condition; gnawing; fusion data; porosity; tooth ageing data; butchery marks; metrical data; other comments such as pathologies or association/articulation with other recorded fragments. The information was recorded onto a relational database (Microsoft Access) and cross-referenced with relevant contextual information such as date and feature type. Groups of four or more bones that belonged to the same skeleton (i.e. articulating bones or elements closely matched by size and age) were assigned an 'Associated Bone Group number'. In some instances several separate bone groups were recorded for the same individual, for example where there were several articulating element groups from different body areas but with no clear proof that they came from the same carcass. A summary form was also created for each context. This contained brief notes about preservation; a preservation grade (very good; good; moderate; poor; very poor); the approximate size of the assemblage (very small - <10 specimens; small – 11-49 specimens; medium 50-99 specimens; large – 100-499 specimens; very large - >500 specimens); a list of species represented ranked by order of frequency; notes about highlighted specimens and general comments about the assemblage; bone group number and brief details about these groups. This database, together with supporting charts, tables and photographs forms part of the site archive.

Methods of quantification employed for the Battlesbury faunal assemblage include the number of identified specimens (NISP), whole bone equivalents, the minimum number of individuals (MNI) and the minimum number of elements (MNE). These methods are described below and the various merits and disadvantages of these have been discussed elsewhere (Hambleton 1999:33-35). NISP is the method of quantification most commonly used in British Iron Age faunal studies and as such provides a means by which to compare Battlesbury with other Iron Age assemblages. The relative abundance of species in the Battlebury assemblage is discussed below with the emphasis on NISP counts but MNI and MNE calculations are also considered.

Fragment counts of all identified specimens (NISP) include dorsal ends of ribs, vertebral bodies, and fragments of long bone shaft and skull provided they could be securely identified to species. Specimens represented by several fragments that could be rejoined were recorded as a single unit and the fragmentation was noted. Minimum numbers of elements counts (MNE) were calculated for a suite of bone elements representing all areas of the skeleton. MNE was derived from the most common zone of a bone and corrected to account for the frequency of each bone in the skeleton. Up to nine zones were allocated for each anatomical element in a recording method adapted from Dobney and Rielly (1988). Where present, each of those zones was recorded, as were fragments represented only by "un-zoned" fragments. The MNE counts for each element were summed to provide an overall MNE count for each species. Overall minimum numbers of individuals (MNI) for each species were derived from the MNE of the most common element. Side of the body was not taken into account for the MNE and MNI counts.

The Size of the Assemblage

A total of 27,824 fragments of animal bone and teeth were recovered from 663 contexts during excavations at Battlesbury Bowl. The majority of the assemblage (22,485 fragments) was recovered by hand, while a further 5,339 fragments were retrieved from sieved environmental samples (Tables 1-2). From the hand-recovered assemblage, 9,316 fragments were identified to species, which represents 41% of the overall assemblage. The proportion of identified fragments (only 10%) was substantially lower among the sieved samples. In terms of number of identified fragments, Battlesbury's faunal assemblage is of a similar order of magnitude to Winnall Down (Maltby 1985a) and is one of the largest collections of Early and Middle Iron Age animal bones from Britain.

Phased features account for 90% of the bone material, with only 2,067 fragments coming from unphased contexts. Only 19 fragments of bone belonging to the Early Bronze Age were recovered and the rest of the assemblage came from Iron Age phases 1-4 ranging from Early to Middle Iron Age date.

Bone was recovered from a variety of feature types but by far the most common were pits, which yielded 82% of the faunal assemblage. A further 13% of bone fragments came from ditches, gullies and other linear features and 3% from postholes. Other bone-yielding feature types include ovens, hearths and slots.

The Battlesbury Bowl excavation area runs in a long narrow strip, within which features were grouped spatially into four main clusters running from South (feature group 1) to North (feature group 4). The southernmost cluster, feature group 1, yielded the largest proportion of the faunal assemblage (40%). Feature group 2 was the next most abundant area of the site and produced 27% of all faunal remains while 20% came from feature group 3. The northernmost cluster, feature group 4, produced only 13% of the total assemblage.

The above figures are based on both hand-collected and sieved totals. Table 3 provides a more detailed breakdown of hand-collected bones by phase, feature type and location. It can be seen that the majority of the bones in most phases came from 388 pit contexts. Indeed pits provided all the bones for Phases 1 and 4 and 99% of the bones for Phase 1-2 and Phase 3. Only in Phase 2 did assemblages from ditches figure significantly, 87 contexts providing 67% of the sample compared with only 33% from pits. The bias towards pit assemblages is unsurprising given the number of pits excavated. Unfortunately most of the 140 contexts from postholes that produced bones are unphased. However, their contribution to the overall assemblage is minimal.

The average number of bone fragments from contexts containing bone varies significantly between feature types. Overall, postholes produced only about four bones per context, ditch contexts 29 and pits 48. Of course, these figures do not take into account variations in volumes of soil excavated but excavation records also show that the weight of bones recovered tended to be greater in pits, although there is a great deal of variation. There is some evidence that the rate of deposition increased in the later phases. Average bones per bone-producing context ranges between 27 and 44 in the earlier assemblages but rises markedly to 75 bones per context in Phase 3 pits.

In terms of location, the size of the hand-collected assemblage decreases between feature group 1 and feature group 4 overall but this of course varies significantly between phases. The small number of bones from Early Bronze Age deposits are all from feature group (cluster) 4, whereas all the Phase 1 assemblage is from feature group 3. Bones assigned to Phase 1-2 were found in all four areas, with feature group 3 providing 40% of the bones, followed by feature group 2 (30%), feature group 1 (18%) and feature group 4 (12%). In

contrast, feature group 1 provided the majority of bones (74%) in Phase 2. These include most of the bones from ditches. Feature groups 3 and 4 produced 19% and 7% respectively of the remaining faunal sample from this phase. Bones assigned to Phase 2-3 mainly derive from feature groups 2 (48%), 1 (30%) and 3 (22%). The largest sample of bones (NISP =7,848) is from Phase 3 contexts. 39% of these are from feature group 1, 37% from feature group 2, 17% from feature group 4 and 7% from feature group 3. All the bones from Phase 4 were found in five pit contexts in feature group 1.

Species Representation - Introduction

The assemblage is dominated by domestic species. NISP counts show that domestic species (sheep/goat, cattle, pig, horse and dog) make up 94% of the hand-recovered assemblage (Table 1). The wild species, which make up the remaining 6%, include some larger species (red deer, roe deer, fox and badger) as well as a variety of wild birds, small rodents and amphibians. Within the hand-recovered domestic species assemblage, sheep/goat remains are the most abundant, followed by cattle, pig, horse and dog in order of abundance. This was true for all three methods of quantification used (Table 4).

There are slight differences in the percentages of the different domesticates depending on the quantification method used. NISP counts of fragmented assemblages have a tendency to under-represent sheep/goat, pig and other species of similar size in comparison with cattle and horse. This reflects the fact that cattle and horse bones tend to break into larger, more readily recovered and identified fragments while the bones of smaller species, when fragmented, are often less easily identified or missed during hand recovery. Sheep/goat and similarly sized mammal fragments are much better represented in the sieved sample (Table 2) than in the hand-recovered sample, which supports the suggestion that differential fragmentation and retrieval biased the hand-collected sample in favour of larger bones. Minimum Numbers counts (MNE and MNI) tend towards a slightly better representation of sheep/goat and similarly sized species in fragmented assemblages such as Battlesbury, as by including only non-repeatable elements in the counts some of the problems of differential fragmentation between species are reduced. The percentage of sheep/goat varies between 52% of the total number of domestic mammal identified (NISP) to 58% in the MNI calculations. Cattle percentages decrease correspondingly from 30% to 21% (Table 4). Perhaps surprisingly, the percentage of horse does not vary as greatly, providing 4% of the total using both NISP and MNI counts and 6% using MNE counts. This probably reflects the fact that horse bones tended to survive in a much more complete state than cattle, hence the bias in the NISP counts caused by fragmentation is not as marked.

As the different quantification methods used on the Battlebury material show broadly similar results, only one method of quantification (NISP) is used for further detailed analysis of species representation within the assemblage. NISP is the method of quantification most commonly used for other British Iron Age assemblages and as such enables greater comparability of the Battlesbury sample with other Iron Age sites (Hambleton 1999).

Given the large size of the Battlesbury assemblage, the exclusion of loose teeth and/or associated bone groups from the counts does not significantly alter the relative proportions of different species within the hand-recovered sample. Thus all NISP counts include loose teeth and associated bone groups. It has been noted in the discussion where the presence of associated bone groups may have overestimated the importance of a particular species in NISP counts in smaller sub-samples of the assemblage.

The Relative Abundance of Domestic Mammals

This section summarises the species representation and relative abundance of faunal remains of the five main domestic species from each phase of the site. Counts exclude bones in sieved samples. For each phase, a brief overall summary of species representation will be followed by observations about variations in species representation between different feature types (Table 5) and between different feature groups (Table 6).

Early Bronze Age
Only eight identified specimens were recovered from three pit contexts from feature group 4, six belong to sheep/goat and one each to cattle and pig.

Phase 1
Eleven Phase 1 pit contexts, all located in feature group 3, produced a total of 366 fragments, of which 116 (33%) were identified to domestic species. Of these, 44% belong to sheep/goat, 40% to cattle 16% to pig and 1% horse (Table 5). Only one pit (5054) contained more than 100 fragments (Table 7).

Phase 1-2
A total of 149 Phase 1-2 contexts yielded a total of 6,280 recovered fragments, 42% of which were identified to species. This included 2,592 specimens from domestic species and 36 from wild species. Sheep/goat (57%) dominated the Phase 1-2 assemblage, followed by cattle (26%), pig (13%), horse (3%) and dog (<1%).

The vast majority of Phase 1-2 bones came from pits, but small groups were also found in postholes. Unsurprisingly the pit assemblage displays exactly the same percentages of identified domestic species as for the complete Phase 1-2 sample. 142 contexts from 54 pits produced 6,262 fragments, including 19 large contexts which each contained over 100 fragments (Table 7). Sheep/goat were the predominant species in most of the large context assemblages. Counts of sheep/goat were enhanced in some features by the presence of partial sheep skeletons, for example, pit 4612. Several large, sheep/goat dominated assemblages also came from pit 4704. Details of the assemblages of several of these features can be found in the context analysis section.

Sheep/goat are generally the most abundant species followed by cattle and then pig across all areas of the site. However, in the assemblage from feature group 3, sheep/goat and cattle are fairly evenly represented (40% and 37% respectively). This is in contrast to feature groups 1, 2 and 4 where sheep/goat elements dominate, providing between 58% and 76% of the domestic mammal samples (Table 6). Pig remains are fairly poorly represented (<10%) in the more southerly areas of the site (feature groups 1 and 2) but are much better represented in feature groups 3 and 4 (19% and 16% respectively). Horse bones and teeth were found in small numbers in Phase 1-2 features in all areas of the site.

Phase 1-3
One posthole and two pit contexts from feature group 3, and a hearth from feature group 4 yielded a total of 32 fragments. Only pit contexts from feature group 3 produced identified specimens of the domestic mammals. Cattle (10 specimens), sheep/goat (8) and pig (2) were the only species identified.

Phase 2
A total of 141 Phase 2 contexts produced a total of 4,086 fragments, 44% of which were identified to species, including 1,794 domestic mammal specimens and 19 specimens from wild species. In the domestic mammal sample sheep/goat specimens (45%) slightly outnumber cattle (41%), with pig (9%), horse (3%) and dog (1%) also represented.

The Phase 2 assemblage derives from several different types of features (Tables 3 and 5). The largest assemblage was found in 87 ditch contexts (2,722 fragments). Eight ditch sections in

feature group 1, contained large assemblages of over 100 fragments (Table 7). Cattle are the most abundant species represented in three of these features, including ditch section 4105, which produced several cattle skulls and an articulated forelimb. In contrast, sheep/goat are the most abundant species in four large assemblages from ditches, in particular ditch 4024 where the sheep count is slightly inflated by the presence of a complete hind foot of a sheep. Within the overall Phase 2 ditch sample, 1,305 fragments were identified to domestic species. Cattle (46%) are marginally more abundant than sheep/goat (41%). Pig (8%), horse (4%) and dog (2%) are also present.

Fifty Phase 2 pit contexts produced a total of 1,348 fragments. Domestic species account for 481 of the identified specimens. In contrast to the contemporary ditches, sheep/goat (54%) are the most abundant species in Phase 2 pits, followed by cattle (31%). Pig fragments (12%) are also better represented in pits than in other features. Horse (3%) and dog (<1%) were also identified. Only 16 fragments were recovered from Phase 2 postholes, with sheep/goat (6 specimens), cattle (1) and pig (1) the only identified domesticates. Large assemblages came from five pit contexts (Table 7). Sheep/goat are by far the most abundant species from pits 4113 and 5688. The large numbers of fragments from pit 4836 are mainly those of unidentified small mammals, perhaps belonging to a minimum number of two partial rodent skeletons. The remaining two large assemblages are from pits 4968 and 5043. The latter is unusual in that it produced more cattle and pig bones than sheep. The higher incidence of pig can be explained by the recovery of a partial skeleton. Further details about this and other assemblages from this phase can be found in the contextual analysis section.

There are also some differences in the relative abundance of domestic species between groups of features from different areas of the site (Table 6). In feature group 1, cattle (44%) and sheep/goat (43%) remains were found in quite similar numbers, which contrasts with the Phase 1-2 assemblage from the same area, in which sheep/goat remains are considerably more abundant than those of cattle. This reflects the contribution of different feature types. In Phase 2, much of the faunal material from feature group 1 is derived from ditch fills, which generally contained a greater abundance of cattle than sheep/goat remains than did pits which provided the majority of the Phase 1-2 assemblage. The assemblage from feature group 3 includes material from pit 5043, discussed above, which contained more cattle than sheep/goat and also a high abundance of pig. The smaller assemblage from feature group 4 is derived from a pit and a posthole and is dominated by the remains of sheep/goat (69%) with far fewer cattle (20%) and pig (8%).

Phase 2-3
A sample of 1,379 fragments (35% identified to species) was recovered from 52 contexts. These include 455 specimens from domestic mammals and 30 from wild species. Amongst the domestic species, sheep/goat (56%) predominate, with cattle (30%), pig (10%), horse (3%) and dog (2%) also present.

Most (1,206) of the fragments come from pits (36 contexts). Five pits yielded assemblages of more than 100 fragments (Table 7), all of which contained predominantly sheep/goat remains. Inevitably domestic species percentages from pits are very similar to the overall Phase 2-3 figures (Table 5).

The majority of the Phase 2-3 assemblage came from features located in feature groups 1 and 2. Sheep/goat are predominant in the faunal remains from these areas and the relative abundance of domestic species in feature groups 1 and 2 is reflected in the overall composition of the phase 2-3 assemblage (Table 6). The phase 2-3 assemblage from feature group 3 differs from feature groups 1 and 2 by having a more equal representation of cattle and sheep/goat as well as a relatively high proportion of pig remains. This pattern of assemblage composition is similar to those observed from earlier phases within feature group 3.

Phase 3
In total, 7,848 fragments were recovered from 114 contexts (43% identified to species). These include 3,085 domestic mammal specimens and 298 specimens from wild species. A large number of the wild specimens consist of accumulations of frog and toad remains and the partial skeletons of raven and crow. The domestic mammal assemblage is again dominated by sheep/goat (52%), followed by cattle (27%), pig (10%), horse (7%) and dog (5%).

A total of 103 pit contexts provided the vast majority (7,751 fragments) of the Phase 3 assemblage. Relative percentages of domestic species are almost identical to the overall Phase 3 figures (Table 5). Ditches, including linear features and recuts, produced only very small samples. Large assemblages (>100 fragments) were recovered from 17 pits, the largest of which (pit 4641) contained 1,231 fragments (Table 7). Sheep/goat outnumbered cattle remains in all but two of these large assemblages. Cattle were the most abundant species found in pits 4796 and 4584. Horse bones are unusually well represented in pit 4796, being. the second most abundant species. Sheep/goat bones were especially abundant in pit 4486, partly due to the presence of complete and partial skeletons of at least six sheep. A partial skeleton of a dog was found in Pit 4423, which accounts for the unusually high percentage of dog bones found in Phase 3 pits. Both the sheep/goat and cattle counts from Pit 5358 are also inflated by the presence of associated bone groups. Further details of these groups are noted in the contextual analysis section.

The general pattern of sheep/goat elements outnumbering those of cattle was observed in feature groups 1, 2 and 4 (Table 6). There was generally quite a low abundance of pig bones found in these areas. However, horse remains are somewhat better represented in the assemblages from the southern end of the excavation area (9% in feature group 1, and 7% in feature group 2) than in the assemblages from the northern feature groups 3 and 4 (both 4%). As in previous phases, the assemblage from feature group 3 is different in having higher percentage of cattle and pig than in contemporary features. Although the sample is quite small, very unusually, sheep/goat only rank third behind cattle and pig in the overall counts from pits from this area.

Phase 4
A total of 390 fragments were recovered from five contexts from two pits in feature group 1. Of these, only 90 specimens (23%) were identified to species including 81 from domestic mammals and nine from wild species. Both pits (4272 and 4320) produced over 100 fragments and included more sheep/goat elements than other species amongst the identified material (Table 7). Overall, the sheep/goat percentage (56%) is similar to pit assemblages in most other phases and to assemblages of feature group 1. Cattle (30%), pig (7%), horse (6%) and dog (1%) are also represented in Phase 4 contexts (Tables 5-6).

Unphased
A total of 174 unphased contexts provided a further 2,067 fragments, of which 37% were identified to species. Domestic species account for 638 identified specimens compared with 130 bones from wild species. The majority of the wild specimens belong to frog and toad. Amongst the domestic specimens, sheep/goat (59%) predominate, followed by cattle (26%), pig (11%), horse (4%) and dog (<1%).

Pits provided the largest sample (1,172 fragments, from 39 contexts) in which sheep/goat elements (67%) are by far the most abundant. Cattle remains are substantially less abundant (22%), followed by pig (9%), horse (2%) and dog (<1%). Four large assemblages were recovered from unphased pits, in all of which sheep/goat elements dominated, although pit 4487 also contained a large number of frog and toad remains. The identified assemblage from context pit 4625 is comprised entirely of sheep/goat specimens, including an associated group

of bones from a sheep forelimb. A large number of unphased posthole contexts (115) contributed 492 fragments to the assemblage, although individual context samples were generally very small. Sheep/goat provided 55% of the identified domestic specimens, with cattle (24%), pig (13%), horse (8%) and dog (<1%) also represented. Small quantities of bone were also derived from unphased ditches and hearths (Table 5).

Sheep/goat elements are more abundant than cattle remains in all the feature groups. As in the phased material, pig remains are better represented in the assemblage from feature group 3 than in the assemblages from feature groups 1 and 2. In comparison with other areas of the site, pigs are also relatively more abundant in the assemblage from feature group 4, although the sample from this area is very small.

Intra-Assemblage Variation in Domestic Species Representation

The relative order of abundance of the domestic species remains consistent throughout all phases (with the exception of the Early Bronze Age and Iron Age Phase 1-3 samples, which are too small to be considered reliable, and thus excluded from this general discussion). Throughout all the Iron Age phases sheep/goat remains are the most commonly identified, followed in order of abundance by cattle, pig, horse and dog. It is often impossible to distinguish between sheep and goat bones in fragmentary archaeological assemblages. However, it was possible to identify a number of more complete specimens of metapodials, radius, ulna and femur (Prummel and Frisch 1986) and some deciduous mandibular teeth to species (Payne 1985). A total of 502 bones were identified as sheep, compared with only 36 of goat. It is therefore assumed that most of the remaining sheep/goat assemblage belonged mainly to sheep.

Although the ranking of the species in the assemblages remains consistent throughout the phases, some variation in the relative abundance of the different domestic species is clearly apparent within the hand-recovered assemblage when compared by phase, feature type and location. Sheep/goat constitute over half the domestic mammal bones in all but the samples from Phase 1 and Phase 2. and these are considerably more abundant than cattle remains, which make up less than a third of the assemblages from Phase1-2, Phase 2-3, Phase 3 and Phase 4. However, in Phase 1 and Phase 2, sheep/goat only narrowly outnumber cattle fragments. In the former case, the sample is limited to assemblages from feature group 3, which consistently produced higher percentages of cattle in later phases too. In Phase 2, to a certain degree, higher percentages of cattle can be explained by the fact that a much higher proportion of the assemblage is derived from ditches, whereas the majority of remains from other phases are from pits. General intra-site comparisons of species representation on other Iron Age and Romano-British rural sites in Wessex have shown that ditch deposits consistently produce more cattle bones and fewer sheep/goat bones (Maltby 1985a; 1995; 1996). The differences between these types of feature at Battlesbury is, however, less pronounced than, for example, at Winnall Down (Maltby 1985a). Reasons for the variations in sheep/goat and cattle abundance lie in a combination of taphonomic factors and variations in disposal practices.

In Phase 1 deposits, pig make up 16% of the domestic mammal assemblage but the proportion of pig decreases in each successive phase, contributing only 7% of the assemblage in Phase 3 and 6% in Phase 4. This might suggest a decline in the importance of pig throughout the Iron Age occupation of Battlesbury. However, it should be noted that the Phase 1 pig assemblage at Battlesbury is derived from feature group 3 pits only. This feature group consistently produced higher percentages of pigs in all the major phases. Indeed, if one compares the percentage of pig by phase within feature groups, there do not appear to be any significant variations. However, feature group 3 features (16-28%) consistently produced more pig than

feature groups 1-2 (5-9%). Feature group 4 also tended to produce higher percentages of pig remains than the two southern groups.

Horse remains are much more abundant in the Phase 3 and Phase 4 assemblages (7% and 6% respectively) than in earlier phases (<3%). The increase in horse remains in Phase 3 is particularly marked in feature groups 1 (9%) and 2 (7%), although the trend is also apparent to a lesser degree in the other feature groups (4%).

Dog remains are also slightly more abundant in the later phases but fluctuations in the percentage of dog bones is largely determined by the presence or absence of partial skeletons in the assemblages.

As noted above in relation to variations in cattle and sheep/goat, assemblages from different types of feature also display variation in the relative abundance of the different domestic species. In addition to pits, sheep/goat elements are generally also more abundant than those of cattle in postholes. In general, pig bones appear to be slightly more prevalent in pits and postholes than in ditches. Postholes appear to contain a higher proportion of horse remains than do pits and ditches, although the assemblage from postholes is quite small and may therefore be atypical. The higher presence of horse bones, in these otherwise unphased features, may of course imply that postholes with horse bones are slightly more likely to belong to Phase 3 than earlier phases.

Domestic Mammal bones in Sieved Samples:

The sieved assemblage is comprised mainly small unidentifiable fragments with only 10% of the 5,339 fragments identified to species (Table 2). The identified portion of the sieved assemblage, like the hand-recovered assemblage, is dominated by domestic species, which make up 90% of the identified remains. The remaining 10% of identified fragments belong to wild species, which are discussed below. As expected, the pattern of species abundance differs from the hand recovered assemblage, with the larger species (cattle and horse) contributing a much smaller proportion of the sieved assemblage. Overall, sheep/goat are the predominant species, contributing 78% of the identified assemblage, with pig (13%) also outnumbering cattle (7%). Dog remains are present in small numbers (2%) but there was a complete absence of horse remains amongst the sieved material.

Phase 1-2 sieved samples produced 967 fragments of which 118 were identified. The majority of this material came from pits located across all four feature groups. Domestic species dominate the assemblage, particularly sheep/goat (96 fragments) but also pig (13) and cattle (7).

The Phase 3 sieved samples produced 1,963 fragments of which 207 were identified to species. Again, sheep/goat are predominant (158 fragments), by far outnumbering pig (12), dog (8) and cattle (6).

Samples from Phase 1-3, Phase 2, Phase 2-3, Phase 4 and unphased features also produced small numbers of identified fragments but the assemblages are too small to merit further comment.

When sub-divided by feature type the identified sieved assemblages are generally too small to provide any useful information concerning relative abundance of species. Comparisons between the sieved material from different feature groups are also limited by the small size of the identified samples. However it is interesting to note that, as in the hand-recovered sample, pig is much better represented in the samples from feature group 3 than in the sieved material from other areas of the site.

The results of the sieving analysis again demonstrate that any calculations of species abundance based on hand-collected counts are likely to be biased towards cattle and horse and against sheep/goat, pig, dogs and smaller species.

Comparisons of Domestic Species Representation with other Iron Age Assemblages

Despite the problems caused by differential retrieval biases and variations in species abundance between different features and different areas of the site, it is still possible to make general comparisons with samples from other Iron Age sites. Comparisons with other hand-collected samples can be made on the (largely untested) assumption that standards of retrieval and taphonomic biases were similar between sites. In particular the relative abundance of the three most abundant species (cattle, sheep/goat and pig) can be compared with a large number of sites from Wessex and elsewhere. Across the whole Battlesbury Bowl site percentages of sheep/goat, cattle and pig are approximately 56%, 32% and 11% respectively. These fall centrally within the general range encountered on chalkland sites in Wessex, which usually are dominated by sheep/goat remains (40-70%), fewer cows (20-50%) and low percentages of pig (0-20%). Previous studies have indicated that sheep/goat percentages tend to be slightly higher on hillforts than on non-hillfort sites in Wessex (Hambleton 1999: 45-6, 55-6).

Comparisons of the Battlebury results with those from Danebury show that 61% sheep/goat, 24% cattle and 15% pig were found in the Early Iron Age assemblage. Equivalent figures of 61%, 20% and 18%, and 65%, 21% and 13% were obtained for the Middle and Middle-Late Iron Age assemblages (Hambleton 1999: 109-110 figures adapted from Grant 1984a and 1991a). Therefore, the species ranking is the same but slightly lower percentages of sheep/goat and pig bones were recovered from Battlesbury than in any of the assemblages at Danebury. In Wiltshire, analysis of Early Iron Age samples from Budbury produced figures of 47% sheep/goat, 43% cattle and 10% pig (Westley 1970). These figures are identical to the Battlesbury Phase 2 figures. However, it should be remembered that in this phase the nature of the Battlesbury assemblage is different from other phases, in that it is derived mainly from ditches rather than pits and produced higher percentages of cattle bones than in other phases.

Comparisons with the assemblage from the extensive Mid-Late Bronze Age midden deposit at Potterne are also relevant. There, the overall percentage of the three main species was 40% sheep/goat, pig 32% and cattle 27% (Locker 2000). The percentage of sheep/goat did gradually increase in the upper layers of the midden. In Zone 4, sheep contributed 54% of the sample, pig 31% and cattle only 15%. However, the differences in species percentages with those at Battlesbury are substantial, particularly with regard to the high percentages of pig bones at Potterne..

The high percentage of pigs represented at Potterne compared with the Early Iron Age percentages at both Budbury and Battlesbury may indicate a gradual decline in pig numbers in the region. It is also possible that there was a further decrease in pig by the Middle Iron Age at Battlesbury, if the lower percentages of pig bones are interpreted as resulting from chronological change rather than intra-site variability. A similar pattern of decreasing importance of pig through time has been observed at Danebury (Grant 1984a; 1991a), although rather later in the Iron Age. The decline in pig percentages is not uniform, however. Very low levels of pigs (<10%) were found in samples from Middle Bronze Age upland sites on the Marlborough Downs (Maltby 1992). By contrast, an Early-Middle Iron Age site at Groundwell Farm, Blunsdon St Andrew (Coy 1981) produced results closely comparable with Potterne including 35% pig, one of the highest percentages encountered on Iron Age sites in Wessex (Hambleton 1999: 45-6). If the decline in pigs can be equated with the opening up of the landscape for agriculture and sheep farming, we may be witnessing local variations in the clearance of woodland. However, other explanations are possible and clearly more samples

are required for comparison. In particular, the forthcoming results of the faunal analysis from the East Chisenbury midden will be very important to compare with the Battlesbury data, both in terms of general species representation and also in the nature of bone deposition.

Although horse bones are not very abundant at Battlesbury, there is evidence that they were deposited more commonly there in the Middle Iron Age. Domestic horses were brought to Britain around 2000BC but their bones are generally only found in very small numbers on Bronze Age sites. For example, they provide only 1% of the bones identified at Potterne (Locker 2000) and <4% on the Marlborough Down sites (Maltby 1992).

At Danebury, a similar increase in the abundance of horse in the later Iron Age periods was apparent in the material from the second phase of excavations (Grant 1991a), although no such pattern was found in the material from the earlier excavations (Grant 1984a). On current evidence it seems that horses became more commonly utilised for meat in the Middle Iron Age on some Wessex sites. Again, however, it would be useful to undertake a more comprehensive analysis of horse remains on sites of this period.

Wild Mammals

Wild mammal species are generally poorly represented at Battlesbury Bowl and not all of these contributed to the diet. Overall totals are given in Tables 1-2.

Red Deer (Cervus elaphus)
A total of 40 specimens of red deer were recovered, including a tooth from a sieved sample. Only three bones were identified, the rest being fragments of antler. Red deer are represented in small numbers in all the major phases and 16 antler fragments were also found in unphased contexts, mainly from cleaning layer 4381. Twenty-five antler fragments show evidence of being worked, usually in the form of saw marks. Two shed coronets were recovered, indicating antlers that had been collected and brought to the site for working. Several pits, for example pit 4707 (Phase 3), produced evidence for antler working sometimes in conjunction with evidence for the working of horns and bones.

The three red deer bones consist of a metacarpal (Phase 1-2), a second phalanx (Phase 1) and a cervical vertebra (Phase 2). There is therefore no evidence for the presence of red deer in Phase 3 other than antler fragments. No butchery marks were recorded on any of the bones.

Roe Deer (Capreolus capreolus)
Two antlers and six bones of roe deer were recorded, all in the hand-collected sample. The antlers were found in Phase 1-2 and Phase 2 pits. They are both worked and one of them has been shed. The other elements identified as roe deer are a maxilla (Phase 1-2), tibia (Phase 1-2), metacarpal (Phase 2), two metatarsals (Phase 2; Phase 3) and a metapodial fragment (Phase 2). The metatarsal from the Phase 2 pit also shows evidence of working. The maxilla has its permanent premolars just coming into wear and belonged to a sub-adult animal of about two years of age.

Fox (*Vulpes vulpis*)
Eleven bones of a partial adult fox skeleton was found in Phase 3 pit 5592 (ABG 12). Further details of this find are given in the contextual analysis section. A sieved sample from unphased pit 4219 produced a calcaneus of a fox.

Badger (*Meles meles*)
A tooth and radius of badger were identified in Phase 1-2 and Phase 3 pits respectively. The radius belonged to an immature animal. No evidence of butchery was noted.

Small Mammals
Over 300 rodent post-cranial bones were recorded but only small mammal maxillae and mandibles were identified to species. Including bones recovered from both hand-collected and sieved samples, 20 bones of short-tailed field vole were identified. Mice were represented by 25 bones, of which wood mouse (*Apodemus* sp.) and house mouse (*Mus musculus*) were identified in approximately equal numbers. No bones of larger rodents such as water vole and rat were recovered. No jaws of shrews were found.

Discussion
The paucity of finds of wild mammals is not unusual on Iron Age sites (Grant 1981b; Maltby 1996). The incidence of deer remains at Battlesbury, however, is particulary poor although it is clear that antlers were sometimes utilised for manufacturing purposes. There is no evidence that any of these wild mammals were eaten. There is no evidence that hares (*Lepus* sp.) were exploited. The small mammals were pitfall victims, indicating that some of the pits were left open for a period before being fully infilled.

Amphibians

Including bones from sieved samples, 305 bones of frog and toad were recorded. Specific identifications were restricted to the femur and tibio-fibula, which are significantly longer in frogs than in toads. On the basis of this, it would appear that slightly more frogs than toads were trapped in the lower parts of pits when they lay open. Most of the amphibian bones were found in Phase 3 features, partly reflecting the larger number of pits dated to this phase than others. A large proportion of the amphibian bones were retrieved from pit 4486, which produced 112 bones, including a toad skeleton and bones from at least six frogs.

Birds

Hand collection produced 135 identified bird bones. A single bone of a small passerine was found in sieved samples. Fourteen unidentified bird bones were also recorded, including six in sieved samples (Tables 1-2).

Corvid bones (59) from birds the size of rooks or crows were the most commonly identified in the assemblage. Most of the bones were a good match for crow (*Corvus corone*) in the modern collections compared. However, 43 of these bones were from one crow skeleton from Phase 3 pit 4707, which also produced three further crow-sized bones. A smaller ABG was found in Phase 3 pit 5358 (7 bones). The other six bones were found singly in contexts of all the main phases.

All but two of the 51 raven (*Corvus corax*) bones belonged to a skeleton found in three contexts of the Phase 3 pit 4584. A carpometacarpus was found in Phase 1-2 pit 5645 and a femur was recovered from Phase 3 pit 4560. No bones of smaller corvids such as jackdaw, magpie and jay were identified.

The radius and ulna of a common buzzard (*Buteo buteo*) were found in an unphased pit 5102 associated with a large number of porous bones of neonatal lambs. Five bones of birds of the thrush family (*Turdus* sp.) were found in Phase 1, 1-2 and 2 pits. The five smaller passerine bones were found in Phase 1-2, 2 and 3 deposits.

Only seven bones of ducks were identified. Five of them are a good match for mallard (*Anas platyrhynchos*). A radius and ulna possibly of the same bird were found in Phase 1-2 pit 5670. A second ulna came from Phase 2 ditch 4455. A tibiotarsus was recovered from Phase 2-3 pit

4667. Two wing bones of smaller duck species, the size of wigeon or pochard were found in Phase 2 pit 4113. The humerus and carpometacarpus are probably from the same bird.

Two bones of a wader species recovered from Phase 3 features are a good match for woodcock (*Scolopax rusticola*). A radius was found in pit 4641 and a femur was retrieved from pit 5358. Three bones of a second species of wader were also recovered. Although not identified to species, all three are of similar size to plover (*Pluvialis* sp.). Two bones were found in Phase 1-2 pits, a humerus in pit 4305 and a femur in pit 4955. A radius was found in Phase 3 pit 4641. A humerus from a wader the size of water rail (*Rallus aquaticus*) was found in Phase 1-2 pit 5004.

The distal portion of a tibiotarsus of a crane (*Grus grus*) was recovered from Phase 3 pit 4707. This bone displayed clear evidence of butchery and working (see butchery section for details) and represents either an offcut from boneworking or an object itself. Its discovery adds Battlesbury to the small list of British Iron Age sites where crane has been identified. Most of the previous finds have been from coastal sites or sites located near wetlands (e.g. Haddenham in the Fens, Glastonbury and Meare in Somerset). However, other Wiltshire Iron Age sites have also produced bones of this species (Gussage All Saints, Groundwell Farm, Woodbury - Boisseau and Yalden 1997). A single crane bones was identified at Potterne (Locker 2000: 109). To date, crane bones have not been found on hillfort sites and its absence from the enormous samples from Danebury indicates its rarity on upland sites. It is likely that this bone was brought from some distance.

Apart from the crane, the bird assemblage from Battlesbury is unspectacular. There is no direct evidence that any of the birds were eaten. The only butchery mark was found on the crane tarsometatarsus and this bone seems more likely to be an imported object or raw material for boneworking. Most of the crows and raven bones were found in ABGs. These species and buzzards are likely to have been roosting in the vicinity wherever suitable stands of trees were available and would have been attracted to areas where both rubbish deposits were accumulating in middens and where animals were dying or being slaughtered. This does not explain why they occasionally ended up in pits, however. They could merely be carcasses of birds killed in the vicinity. Special deposition cannot be ruled out, however, although the fact that the carcasses seem to have been disturbed may indicate they are secondary rather than primary depositions. Corvid bones are also the most common species found at Danebury (Coy 1984; Serjeantson 1991) and Owslebury (Maltby 1987).

The most likely species that could have contributed occasionally to the diet are the ducks and waders, all of which probably were captured some distance from the site. Notably absent are bones of domestic fowl or goose. Poultry seemingly were not kept by the inhabitants of this settlement.

Fish

There are no fish bones represented at Battlesbury even in the sieved samples. Fish do not appear to have been exploited to any great extent on inland sites in Wessex during the Iron Age. Similarly, only three fiah bones were recorded in the very large sample from the Later Bronze Age midden at Potterne (Locker 2000: 108).

Preservation

Information concerning the state of preservation was recorded at both context and individual bone level. For each hand-recovered context, general observations were made concerning the overall state of preservation taking into account degree of fragmentation and erosion, as well

as other taphonomic indicators such as burning and gnawing. Contexts were assigned to one of five grades of preservation ranging from ‘good’ to ‘poor’, and additional ‘mixed’ category was used where there were striking contrasts in the state of bone preservation within a context. Overall the Battlesbury assemblage exhibits quite good preservation with by far the majority of contexts classed as moderate (47%), quite good (24%) or good (2%). There were very few examples of poorly preserved assemblages; only 1% of the contexts are classed as ‘poor’ all of which are unphased.

There is very little difference in the preservation of assemblages between the major phase groups. Contexts from Phases 1-2, 2 and 2-3 all exhibit a similar range of preservation to that described for the overall assemblage. By comparison, Phase 3 contexts appear to be somewhat better preserved, with Phase 3 being the only phase group to have a higher percentage of contexts with ‘quite good’ preservation (43%) than ‘moderate’ preservation (35%). Phase 3 also has a greater proportion of ‘good’ contexts than other phase groups. This reflects the fact that the majority of associated bone groups (ABGs) were recovered from Phase 3 features. There is slight spatial variation in the state of preservation across the site. Feature groups 1 and 3 both have a slightly higher percentage of contexts classed as ‘moderate’ or ‘quite poor’ than feature group 2, which has a higher proportion of ‘quite good’ and ‘good’ contexts. Overall, feature group 4 contains the highest proportion of contexts with ‘good’ preservation, which relates to there being a high proportion of Phase 3 contexts present in this feature group. There is little significant difference in the quality of contextual preservation between pits and ditches; pits exhibit marginally higher proportions of moderate to well preserved contexts than ditches, which may partly reflect the fact that more ABGs came from pits than ditches.

For those hand-recovered fragments identified to species, certain preservation details were recorded for each individual bone. These include presence or absence of gnawing, surface erosion, burning and the degree of completeness of each fragment (i.e. what percentage of the complete skeletal element was represented by the fragment). The percentage of fragments affected by gnawing, burning and erosion were calculated for each of the domestic species (Table 8). Overall the level of canine attrition is fairly low, with only 16% of domestic species fragments showing signs of having been gnawed. The bones of the large species (cattle and horse) appear to have been more commonly exposed to dogs as they show a higher percentage of gnawed fragments than do the smaller species. It is possible that the lower degree of gnawing among the smaller species may reflect a greater rapidity of deposition, with the bones being left accessible to dogs for a much shorter period of time than cattle and horse. This is particularly apparent with dogs, which were less affected by gnawing and more commonly present as fairly undisturbed complete or partial skeletons than other species. The degree of gnawing may also be a factor of the type of features in which these species were most abundant. It is also possible that the higher incidence of gnawing evident on the large mammal bones indicates that they had a better chance of at least partial survival than the bones of immature sheep and pig, which may have been completely destoyed more often. There are also a number of small bones of sheep and pig that have been damaged by stomach acids, indicating that some elements were digested.

The overall percentage of eroded fragments is low among the identified domestic species (7%), reflecting the relatively good preservation of the Battlesbury faunal assemblage. The dog assemblage appears substantially less eroded than those of the other domestic species, which would also be consistent with greater rapidity of deposition and shorter periods of exposure to the elements. Sheep/goat remains also exhibit slightly lower levels of erosion than cattle, horse and pig. Very few fragments show signs of having been burnt (only 2% of domestic species). Burning is more common among sheep/goat elements than other species, which is not unusual for a British Iron Age site. The sheep/goat sample also includes the only incidences (7 fragments) of calcined bone, all other burnt fragments were charred black having been subjected to lower temperatures.

The level of fragmentation among the identified domestic species assemblage was assessed using two methods. The percentage of loose teeth within the identified assemblage (Table 9) has been used effectively as an index of fragmentation on other Iron Age sites from the region, with higher percentages of loose teeth indicative of greater levels of fragmentation and poorer preservation (Maltby 1985a). In addition, the average percentage completeness of the major limb bones (humerus, radius, femur, tibia and metapodials) was also calculated. The overall percentage of loose teeth (17%) is not particularly high, supporting the observation that the Battlesbury assemblage is generally quite well preserved. The proportion of loose teeth is fairly consistent (16-19%) among all the domestic species, with the exception of dog (8%). There is more variability between species observed in the percentages of loose teeth seen in different feature types. Only the pits and ditches yielded sufficient remains to warrant more detailed comment. Overall the results from the pits and ditches are fairly similar but the percentage of loose teeth among cattle was higher in the pits than in the ditches, while the opposite was true for sheep/goat and pigs. Horse includes a very high proportion of loose teeth (44%) in the ditch assemblage compared to the pit assemblage (14%), but this is largely accounted for by the abundance of fragmentary cranial material in an otherwise fairly small assemblage of horse bones from the ditches, and does not necessarily indicate a greater degree of fragmentation among the postcranial remains when compared to other species.

The fragment completeness of the major limb bones varies significantly between species (Table 10), and at Battlesbury this analysis has proved to be somewhat more effective than comparing loose teeth percentages as a means of illustrating the different levels of fragmentation observed for different species. Cattle, sheep/goat and pig did not differ significantly in terms of avarage fragment completeness among the major limb bones, suggesting that levels of fragmentation were not too dissimilar between these species. Horse limb bones were generally observed to be fairly complete, in contrast to the other large species, cattle, which appeared to be more commonly represented by smaller less complete limb bone fragments. This observation is confirmed by the assessment of average fragment completeness, which is much greater for horse (41%) than for cattle (28%). The results suggest that horse bones were less likely to have been broken open for marrow than cattle bones. This pattern is consistent throughout all the main phase groups. Dog bones are on average considerably more complete than the limb bones of all other domestic species, which again reflects their tendency to be present as partial skeletons at Battlesbury.

Generally the bone surface preservation is good with relatively low numbers of eroded fragments, however the level of fragmentation varies considerably between contexts (and sometimes also within contexts). This variation in fragmentation is primarily a reflection of the depositional history of the bones. Where contexts contain a greater proportion of fairly complete bones, the bone assemblages appear consistent with having resulted from relatively short-term depositional events after which the bones did not remain exposed for long periods. Most commonly these types of context are found near the bases of pits and often contain Associated Bone Groups (ABGs) of four or more bones belonging to a single individual. The more heavily fragmented faunal assemblages may represent more gradual accumulation of material left exposed and incorporated into feature fills over longer periods. Some of the more fragmented material may also represent material that has been redeposited. All of this information contributes to a greater understanding of the site formation processes and may be effectively combined with other specialist analyses to produce detailed depositional histories for several of the pits and ditch sections.

Body part representation

It is possible to recognise the effects of taphonomic biases on the assemblage by comparing the composition of the main domestic species assemblages in terms of skeletal element

abundance (i.e. the parts of the body represented). A minimum number of elements (MNE) count (corrected for natural skeletal abundance) was calculated for the main skeletal elements of the domestic species (Table 11). All the main elements are represented for sheep, cattle, pig and horse. Certain of the smaller bones, are absent from the dog assemblage but this is likely to be a result of the small size of the dog sample. The sheep/goat remains display an abundance of mandibles, radii and tibiae compared to other elements, which reflects the robustness and therefore greater survivability of these elements in a heavily fragmented assemblage. Similar dominance of these bones in sheep/goat samples is common on Iron Age sites, for example Winnall Down (Maltby 1985a). The dog remains, which are of similar size and robustness to sheep/goat also display a similar pattern of element representation. In the smaller species (sheep/goat, pig and dog) there is also a tendency for the smaller elements to be poorly represented. Low abundance of such small bones may reflect an excavation retrieval bias, but may also be a reflection of a large amount of redeposited material. The larger species (cattle and horse) tend to show a more even representation of skeletal elements.

There is little evidence of any significant variation in the pattern of body part represention between phases for any of the domestic species. When compared by feature type, the pattern of body part representation for each of the domestic species is broadly similar in pits and ditches. The patterns of body part representation in the postholes do tend to be different to those seen in the pits and ditches. However, this is most likely to be the result of small sample bias. Variations in body part representation within and between species at site level reveal broad patterns, which tend to be indicative of the overall state of preservation of the assemblage. There is no evidence that dressed carcasses or joints of meat were commonly imported to the site. Indeed, the impression is that the vast majority of the animals represented at were slaughtered or died of other causes in the vicinity. Variations in body part frequencies are largely due to the subsequent taphonomic decay of the carcasses of these animals, resulting from butchery processes, cooking, gnawing and erosion. Probable cultural selection and deposition of particular body parts, such as the accumulation of cattle and horse skulls from the Phase 2 ditch context 4101, is more effectively investigated by examining body part representation at feature or context level.

Ageing Methods

Mandibular tooth eruption and wear was recorded for sheep/goat, cattle and pig following Grant's (1982) system, and the age profiles analysed following the methods of Grant (1982), Hambleton (1999) and Payne (1973). Ageing data from complete mandibular tooth rows was supplemented by additional estimated mandibular wear stage (MWS) values from some incomplete jaws. As a result, MWS values are available from 149 sheep/goat, 29 cattle and 27 pig mandibles. Epiphyseal fusion data provides additional ageing information to supplement the toothwear analyses. Following the known ages of fusion given by Silver (1969), epiphyses were grouped as early, middle and late fusing epiphyses. By establishing what proportion of each of these three groups were fused or unfused within the assemblage (Table 12), it was possible to gain a further impression of mortality patterns of the different species within the assemblage.

The overall pattern of mortality based on tooth eruption and wear data and epiphyseal fusion counts is discussed below for each species. For some species the sample size was large enough to allow investigation of possible intra-site variation in the age composition of the assemblage. Where appropriate, mortality patterns from different phases and feature type are discussed below for each species.

Sheep/Goat

Sheep/goat mandibles (Fig. 1) include a high percentage of young individuals present in the assemblage, with approximately 50% having died in their first year. Within this 0-12 month age class, although a range of ages are represented, there are apparent peaks of mortality among the very young neonatal animals (c.0-2 months old) and slightly older lambs and kids (c.6-8 months old), which may suggest seasonal hiatuses of mortality. The abundance of foetal/neonatal individuals may largely result from several pit deposits in which foetal or neonatal individuals are particularly abundant, often with both right and left sides of the mandible present. There is surprisingly little evidence for exploitation of older juveniles aged between c.1½ -3 years (prime meat stock). Thereafter there is a fairly steady, rate of attrition of animals being killed in their 3rd – 6th years, with almost no individuals surviving beyond six years of age. The fusion data (Table 12), for the most part, supports the conclusions drawn from the toothwear data. At least a third of early fusing sheep elements were recovered unfused, or just fusing, representing individuals that died under one year of age. Approximately two thirds of the middle fusing epiphyses are also unfused, also suggesting that a high proportion of individuals were killed immature (below c.2 years of age). Less than a third of the later fusing epiphyses are unfused, supporting the conclusion that only a small proportion of sheep/goat survived into adulthood. Compared to the mandibles, the post-cranial fusion data does not show such a heavy concentration of very young individuals, but it should be remembered that fusion counts often have an inherent bias towards older individuals given the lower survivability of porous unfused bone relative to the denser, fused epiphyses.

The sheep/goat assemblage is sufficiently large to enable some intra-site analysis of mandible age data from the pits and ditches (Fig. 2). It is also possible to compare the mortality profiles from Phases 1-2, 2, 2-3 and 3 (Fig. 3). The majority of aged mandibles (127) came from pits. Unsurprisingly the pattern of mortality in the sample from the pits is equivalent to that described above for the entire Battlesbury sheep/goat assemblage. Only 19 mandibles from ditch contexts are available for ageing, which is too small to be able to draw any firm conclusions concerning mortality patterns. However, the ditch samples clearly differ from the pit assemblage in that they do not contain any very young neonatal individuals. Sheep/goat mandibles from individuals dying in their 1st, 2nd, and 3rd years are present but generally the ditch sample reflects the same lack of emphasis on older juveniles as seen in the pits. The ageing evidence from each of the main phase groups is discussed in detail below.

Phase 1-2

A total of 43 sheep/goat mandibles from Phase 1-2 provided ageing information. The phase 1-2 assemblage tends to reflect the mortality pattern described above for the overall assemblage; i.e. high mortality in the 1st year and comparatively little exploitation of older juveniles, with the majority of adult deaths occurring between three and six years of age. The Phase 1-2 assemblage includes some individuals where the deciduous 4th premolar (dp4) had not fully erupted, indicating perinatal deaths either of newborn lambs or stillborn foetuses carried to term. This clearly shows that the site was occupied during the lambing season, which is generally assumed to have occurred in the Spring (March to April) during the Iron Age of Southern Britain (Hamilton 2000). Particularly prevalent in the Phase 1-2 assemblage are mortalities of young infants of around 2-3 months old, which probably represent late spring/early summer deaths.

After the initial high losses in the spring, there appears to be a gap in the mortality profile corresponding to the high summer months; this could suggest that mortality was very low at this time of year during the Phase 1-2 occupation of Battlesbury, and/or that the focus of sheep husbandry activity occurred away from the site during the summer. This apparent lack of summer deaths could correspond to the movement of flocks away from the settlement onto summer pastures (Hamilton 2000). Evidence of mortalities resume among the c.6-10 month age group, corresponding to autumn deaths, after which there is an absence of individuals of c.10-15 months old which suggests a clear gap in mortality of sheep/goat during their first

winter and very early spring of their second year. This lack of winter mortality in the Phase 1-2 period could suggest that the focus of sheep rearing activity occurred elsewhere during the winter months, and possibly even that the site was unoccupied or only sparsely populated during the winter. Alternatively, the lack of first winter deaths in the assemblage could testify to an effective autumn cull strategy whereby those individuals unlikely to survive the winter were weeded out, and population numbers were sufficiently lowered that the burden of over-wintering animals, such as the provision of winter fodder, was reduced to a manageable level.

Much of the Phase 1-2 material was recovered from three pits. Pit 4612 yielded seven aged mandibles, including at least two possible matched pairs. The mandibles suggest four individuals of the following ages; a neonate (0 months), a young infant (c.2-3 months old), an individual with the 2nd permanent molar (M2) in very early wear (c.15-16 months), and an adult of around 4 years of age. This combination of ages would not be incompatible with a period of deposition covering spring to early summer. Pit 4704 yielded 9 mandibles, which included at least one matched pair. The majority of mandibles were from infants and neonates ranging from 0 to 3 or 4 months old (spring through to early summer deaths) and two older individuals which appear to have died in the autumn of their 1st and 2nd years respectively. Pit 5670 yielded 6 mandibles, four of which were spring deaths, similarly aged at c.2 months old with dp4 just in wear. The remaining two mandibles from pit 5670 were of individuals with the 1st molar (M1) in early wear and probably represent autumn deaths. The season of death represented by remains from pits 4704 and 5670 are broader than that suggested for pit 4612. It should be remembered however that the season of death need not necessarily directly indicate season of deposition as remains may have been initially deposited elsewhere before finally being deposited in the pit sometime after the animal died. Where the remains are those of well preserved and largely complete skeletons or associated bone groups, as is the case with the remains from pits 4612 and 4704, it is reasonable to assume that season of death and deposition were broadly concurrent.

Phase 2

The 30 sheep/goat mandibles recovered from Phase 2 contexts include young individuals that died in their 1st year, with some additional evidence of mortality in the 2nd year and older animals that died between three to six years old. There is apparently less emphasis on neonatal and infant spring deaths than is seen in the phase 1-2 assemblage. Most of these very young individuals come from pit 5688, which yielded four individuals with dp4 in very early wear as well as one adult of about three years old. This might suggest that the phenomenon of pits containing accumulations of neonates seen in the earlier phase carried on into Phase 2. Another apparent continuity is the absence of mid-late summer deaths of animals in their 1st year, followed by autumn mortalities. Unlike the earlier phase however, some winter deaths are evident among the yearlings. Ditch section 4105 provided a collection of six mandibles, which includes two possible matched pairs. Represented in this group were individuals that died towards the end of their 1st year, and in their 2nd, 3rd, and 4th years. Two thirds of the assemblage comes from ditch fills, which may also partly account for the variations in mortality seen between this sample and the earlier assemblage, which was recovered almost entirely from pits.

Phase 2-3

Phase 2-3 deposits contained only a very small sample of 14 mandibles, which is of very limited use in establishing a mortality pattern for this phase group. However, some general observations can be made. No very young neonatal/foetal remains were recovered although individuals of c.2-4 months old are present. There are other remains from individuals below one year old, although the sample is too small to comment on seasonality. In common with other periods is the lack of older juveniles in the assemblage, with a concentration of adult remains between three and six years old. The majority of Phase 2-3 remains come from pit 4606, which yielded nine mandibles. Pit 4606 contained the mandibles of one juvenile of

approximately 2-3 months and another of c.6-8 months, although the majority of mandibles belonged to adults of between three and six years old (including two matched pairs).

Phase 3

Phase 3 provided 53 mandibles with ageing data. The general pattern of high 1st year mortality combined with an emphasis of adults between three and six years old is apparent in the sample. However, older juveniles of between one and three years old are represented in the sample as are a small number of older adults greater than six years old. There are mandibles representing deaths of animals in all seasons throughout the first year suggesting some level of year round occupation and activity at the site. Some evidence of seasonal activity is indicated by peaks in spring mortality, represented by the foetal/neonatal remains of individuals with their dp4 erupting or only just in wear, as well as individuals of c.3-4 months with M1 erupting (late spring/early summer). Mandibles representing individuals that died in the summer of their first year are present, but in low numbers, while there is a striking peak of mandibles with M1 in fairly early stages of wear which would correspond to the autumn months. Winter deaths of yearlings are also evident among the Phase 3 mandibles, but in comparatively low numbers, which might suggest that a deliberate autumn cull of sheep in their first year might have successfully avoided heavier winter losses of yearlings.

Two pits in particular produced relatively large groups of mandibles. A single context from pit 4486 (context 4507) contained the remains of at least six sheep, including two almost complete skeletons plus additional fragments representing three very young perinatal lambs (either newborn lambs or stillborn foetuses close to term). Pit 4486 produced a total of nine mandibles (including three matched pairs from the young lambs). The mandibles from context 4507 clearly represent the spring deaths and deposition of three very young lambs and one older individual of around four years old. The two mandibles from other contexts in pit 4486 include a young individual of about three months old and an older animal approaching three years of age. Pit 5592 contained seven aged mandibles, including two young specimens representing animals that died in the late spring/early summer of their first year, plus a further two mandibles from animals that died in the same season of their second year. The other mandibles from pit 5592 belong to older juveniles that died in their second and third years. Pit 5592 produced the majority of older juveniles represented in the phase 3 sample.

The general mortality pattern for sheep/goat is almost identical to those observed for the Middle Iron Age assemblages from Balksbury Camp (Maltby 1985b) and Old Down Farm (Maltby 1981). Both assemblages exhibit the same pattern of high 1st year mortality and relatively low 2nd and 3rd year mortality evident at Battlesbury. Maltby (1985b) suggests a variety of possible explanations for this pattern of mortality: The emphasis on very young individuals (less than 1 year old) and adults (above 3 years old) may be indicative of a system aimed primarily at exploiting sheep for milk. Another suggestion (*ibid.*) is that of a relatively inefficient system in which only the breeding stock was retained past the 1st year. Alternatively, this emphasis on yearlings may represent a deliberate cull of animals either to avoid the necessity of providing fodder for the overwintering a large population, or to pre-empt loss of condition over the first winter (Maltby 1985b; Hambleton 1999). Certainly the generally low incidence of 1st year winter deaths evident in the Battlesbury assemblage may attest to the effectiveness of such a strategy. The Battlesbury sheep/goat mortality profile also shares some similarities with all of the Iron Age phases at Danebury (Grant 1984a; 1991a) and may reflect exploitation of sheep for both primary and secondary products, but with a particular emphasis on yearlings. However, the Battlesbury assemblage differs from Danebury most significantly in the extent to which older juveniles (c.1 ½ - 2 years) are represented in the assemblage. In contrast to the Danebury assemblage, there appears to have been little or no exploitation of this 'prime meat' age group, perhaps suggesting a greater emphasis at Battlesbury on the importance of secondary products such as milk and wool.

There are subtle differences in the mortality profiles of sheep/goat seen in the different phases of activity at Battlesbury, but the broad overall pattern of exploitation remains similar throughout all periods. When subdivided by phase it was apparent that certain periods appeared to show quite pronounced peaks and troughs of mortality that could be interpreted as periodic, possibly seasonal culls. However, many of these peaks can be accounted for by a series of individual features, particularly pits, which contained well preserved samples of similarly aged individuals (often with both sides of the mandibles present), which could serve to artificially inflate the importance of these age classes in the overall assemblage profile.

Cattle

The cattle mandible assemblage (Fig. 4) is smaller than the sheep assemblage, comprising only 29 aged mandibles, and as such may be less reliable. Nonetheless it is still possible to recognise a marked similarity to the age profile of cattle observed from other Iron Age sites in the region. Well over a third of the cattle mandibles represent individuals that died before c.18 months, with the remaining mandibles comprising mostly adult individuals some of which were kept into late adulthood. As with the sheep, this is suggestive of a mixed husbandry strategy but with the possibly of emphasis on the use of cattle for dairying or other secondary products (Hambleton 1999). Within the Battlesbury cattle assemblage the proportion of younger animals less than c.18 months old is lower than seen at Balksbury, although the high proportion of mature adults is a feature of both assemblages (Maltby 1985b). The Battlesbury cattle share a very similar mortality profile to those from the Late Iron Age at Danebury (Grant 1984a; 1991a). The fusion data (Table 12) suggests a slightly different pattern. The early and middle fusing groups do contain unfused material indicative of the exploitation of young animals, but not in such high proportions as suggested by the mandibular toothwear data, and particularly not for the very young (<18 months) age group. Conversely, although the fusion data for the later fusing epiphyses suggests that some individuals did survive to adulthood, the proportion of animals surviving beyond four years of age appears lower than suggested by the mandibles. The proportion of young (but not extremely young) individuals suggested by the fusion data is more suggestive of an emphasis on primary products (i.e. meat) than secondary products (i.e. dairying), but could still be interpreted as indicative of a mixed husbandry strategy.

The mandible assemblage for cattle is too small to provide a reliable indication of mortality profiles when subdivided by phase, although the patterns in the samples from phases 1-2, 2 and 3 do appear broadly similar (Fig. 5). When examining the mandible age profile from different feature types the samples are again small and should be treated with caution. However, it does appear that the ditches contained only the remains of very young (less than 18 months) and adult individuals, while the pits yielded the remains of older juveniles (18-30 months) as well as the remains of younger juveniles and adults (Fig. 6). There are insufficient numbers to provide any reliable estimate of seasonal activity relating to cattle husbandry except to say that in contrast to the sheep/goat assemblage there is little evidence of high neonatal mortality but that deaths occurred throughout all seasons in the first year.

Pig

The pig mandibles from Battlesbury (Fig.7) are all those of young animals killed before the end of their 3rd year, which is entirely consistent with the exploitation of pigs for meat seen at other Iron age sites from the region (Hambleton 1999). The fusion data (Table 12) supports the conclusions drawn from the mandibular toothwear data; the later fusing epiphyses suggest none of the pigs in the Battlesbury assemblage survived to adulthood (i.e. beyond 3½ years). There are neonates present in the sample indicating that pigs were reared on or near the site, and most probably indicate spring deaths (Hamilton 2000). As with the sheep/goat mandibles

there appear to be some quite pronounced peaks and gaps in the mortality profile which could be indicative of seasonal concentrations of deaths. Among the pigs that died in their first year there appear to have been deaths throughout the spring, summer, with perhaps slightly more deaths in the autumn. There is also an apparent lack of individuals within the c.7-14 months age class which suggests a lack of winter mortalities. The subsequent peaks and gaps in the older age classes are likely to correspond to a similar seasonal cycle. It is possible that the autumn culling strategy suggested for the sheep/goat was also employed on the pig population. The pig mandible sample is too small to draw reliable conclusions concerning mortality patterns when the assemblage is subdivided by phase or feature type.

Horse

It was possible to provide age estimations for 19 individuals, based on the state of tooth eruption and wear and dental crown height measurements (Levine 1982) from an assemblage of mandible and maxillary tooth rows and loose teeth. The majority of the aged assemblage comprised adult individuals, although a small number of juveniles were also represented, including one neonatal individual. The epiphyseal fusion data (Table 12) and additional observations of porous juvenile and possibly neonatal fragments in the post-cranial assemblage also support this pattern of mortality. Among the 19 individuals aged using dental data, 15 were noted as being 'adult'. The adults represented are mostly very mature individuals (nine individuals aged between 8-11 years, and two individuals aged 12-14 years), with a much smaller incidence of younger adults (one aged c.4 years, and two aged 6-8 years). The juveniles present included three individuals with mixed deciduous and permanent dentition that died aged c.9-18 months, c.2 years and c.2-3 years respectively. One neonate with an unerupted dp4 was also present.

The five aged individuals from Phase 1-2 were all adults of 8-11 years, while a further three adults with ages of between 6 and 12 years were recovered from Phase 2 contexts. Most of the aged sample (11 mandibles) came from Phase 3 and, in addition to seven adults, included all four of the identified juvenile individuals. The horse assemblage is too small to provide a reliable indication of mortality when subdivided by feature type or phase, however it is possible that the Phase 3 ageing data, together with the overall increase in the relative abundance of horse at the site during this phase, might represent a move towards a more involved horse husbandry strategy. The age structure of the horse population in Phase 3 supports the suggestion that the Iron Age inhabitants of Battlesbury became more involved in the rounding up and breaking of young horses in addition to their previous exploitation of older animals. The presence of a neonatal horse in the phase 3 assemblage may even indicate that horses were being bred at the site although, based on a single neonatal mandible, this suggestion is at best tentative. This is in contrast to the model of horses being rounded up from semi-feral populations and subsequently trained which has been suggested for other Wessex Iron Age sites such as Gussage-all-Saints (Harcourt 1979), Danebury (Grant 1984a; 1991a) and the sites within the Danebury environs (Hamilton 2000).

Dog

A range of ages is represented in the dog assemblage. All the mandibles and maxillae recorded with extant cheek teeth belonged to adults wiith permanent dentition in wear. The epiphyseal fusion data indicate the presence of both juvenile and adult individuals in the assemblage, while additional observations of very porous bones indicates the presence of neonatal and possibly even foetal material in the assemblage. The majority of obseravtions of unfused epiphyses correspond to the very porous foetal/neonatal bones mentioned, thus the assemblage appears to consist mainly of very young puppies or fully adult individuals. The evidence from Battlesbury is that a breeding population of dogs was kept on the site. It is speculated (Harcout 1979, Grant 1991a) that British Iron Age dogs may have fulfilled a

variety of functions as working (herding, guarding and hunting) animals or even as pets. Dogs appear to have been kept in small numbers on the majority of Iron Age sites from the region and puppies and older animals were probably culled as and when necessary to keep the population at a manageable level. The Battlesbury data are not at odds with any of these suggested patterns of dog exploitation.

Other large mammal species

There is little ageing information available for the wild mammal species represented in the Battlesbury assemblage. Unsurprisingly there is no evidence, in the form of neonatal bones, for breeding wild species in on or around the site. All fox epiphyses were fused, the majority of the assemblage coming from a single skeleton of and adult from a phase 3 pit (pit 5592). Of the two badger fragments recovered, one belonged to a relatively young individual and was a radius with the proximal end just fusing and the distal epiphysis still unfused. Red deer produced only a small number of long bone epiphyses, all of which were fused. A single young adult roe deer was represented by a maxilla with the permenant premolars erupting or just in wear. What little available ageing evidence there is for wild mammals is consistent with occasional hunting or chance accumulations of these species.

Conclusions

The mortality profiles evidenced from the available toothwear data for sheep/goat, cattle and pig are by no means atypical for Iron Age Wessex (Hambleton 1999) and have parallels with animal husbandry strategies seen at other Iron Age sites such as Balksbury Camp (Maltby 1985b). The presence of young and neonatal horse in the assemblage might suggest a strategy of breeding and close rearing which is unusual for the Iron Age in this region. The high levels of sheep/goat neonatal mortality may be accounted for by several fairly short-term, possibly seasonal, accumulations of very young individuals, and need not necessarily reflect high background levels of neonatal deaths. This highlights a problem that affects the whole of the assemblage, namely that interpretations of husbandry strategy based on mortality patterns rely on the assumption that the assemblage provides a representative sample of Iron Age mortalities at Battlesbury. It is possible that rather than representing a gradual background accumulation of material representing year-round mortality, the mortality profile from the Battlesbury deposits represents more intermittent periodic, possibly seasonal, accumulations of material which are not representative of the overall kill-off strategy employed by the Iron Age farmers. By concentrating on individual features and contexts and combing detailed analysis of ageing data, particularly of sheep, with other strands of environmental evidence such as plant remains and soil micromorphology, there is perhaps the potential to shed more light on the issue of the periodic nature of deposition in the Battlesbury assemblage, and the consequent effect this might have on interpreting animal husbandry strategies.

Metrical and Morphological Data of Domestic Species

Measurements were taken wherever possible and a total of 664 of the specimens provided metrical data. This small number reflects the damage to bones caused particularly by gnawing, which has destroyed the measurable articular surfaces of many bones. In addition, the sheep/goat and pig samples include a lot of young animals, whose unfused bones could not be measured. The individual measurements are stored in archive. This section provides a summary of the information, concentrating mainly on the data for the major domestic species. Comparisons of measurements from different phases failed to reveal any significant variations between the samples. Therefore data from all phases will be considered together. Comparisons are made where possible with data from Danebury (Grant 1984a) and the Iron Age assemblage from Owslebury, Hampshire (Maltby 1987).

Sheep/Goat
Unsurprisingly, given their abundance in the assemblage, sheep/goat elements provided the most information about stature. Only a handful of the 313 specimens measured were definitely from goat, whereas a substantial number were definitely from sheep. It is assumed that the vast majority of the remaining specimens measured are also from sheep. Bones specifically identified as goat are not included in the summary of metrical data presented.

Table 13 provides summary statistics for the most common measurements taken on sheep bones. The results indicate that the sheep at Battlesbury are typically small and slender, comparable with sheep found elsewhere in Iron Age Britain. The average size and variability of the sheep at Battlesbury is very similar to the result obtained from Danebury. Mean breadth measurements are almost identical on a number of limb bones. If anything, the sheep at Battlesbury may have been on average slightly taller (and therefore more slender) than those at Danebury but the differences are marginal given the small size of the Battlesbury sample. Comparisons of breadth and length measurements with those from the Middle and Late Iron Age specimens from Owslebury show that the Battlesbury sheep were on average slightly smaller.

The analysis of skulls revealed no evidence for hornless sheep. A total of 83 sheep horn cores were found attached or detached from the skull. None of the 73 sheep frontals recovered were from hornless specimens. Horned sheep were also found almost to the exclusion of hornless specimens at Danebury until the latest Iron Age phase (Grant 1984a: 505). No hornless specimens were found at Owslebury in deposits earlier than the late Romano-British period (Maltby 1987). Both male and female horn cores are represented at Battlesbury, although the majority of the older specimens belonged to ewes.

Cattle
A total of 192 cattle bones were measured and a summary of the most common measurements are shown in Table 14. The cattle are also of the typically small type found on many Iron Age sites in Britain. Withers height estimates show that the smallest stood just under a metre at the shoulder. Average withers height estimates are remarkably close to those obtained from Danebury. Comparisons of individual measurements show minor variations between the means of the Battlesbury results and those from Danebury and Owslebury but not in any consistent direction. Breadth measurements of cattle limb bones can display a significant amount of sexual dimorphism, which can affect the mean measurements. If a sample includes a high percentage of female specimens, mean sizes will be lower than in samples with more larger specimens from males. Unfortunately, there are relatively few complete metacarpals to determine sex, although the impression is that male and female cattle are represented in fairly equal numbers.

Three hornless cattle skulls are represented but the majority, as at Danebury are from short-horned cattle.

Other Domestic Species
Few measurements were taken on pig bones because of their general immaturity. None of the 43 bones measured fell into the ranges of the larger wild boar and it is assumed that all the pigs represented are domestic. Seven radii have a mean proximal breadth measurement of 27.1mm (sd – 1.9mm), slightly larger than from the larger and more reliable sample from Danebury (26mm – Grant 1984a: 516).

Only two complete limb bones of dog were measured. These produced shoulder height estimates using Harcourt's (1974) conversion factors of 404 and 465mm and represent medium-sized dogs.

The horse assemblage includes 76 measured bones, a higher proportion than for the other major domestic species because horse limb bones tended not to be as fragmented. The most common measurements taken are summarised in Table 15. They reveal that the horses at Battlesbury were the size of medium to large ponies, generally of comparable size to those at Danebury and Owslebury. However, apart from Danebury, the sample sizes are small and this limits the value if inter-site comparisons.

Pathological and other abnormalities

Bone and tooth abnormalities of pathological or other origin were recorded for 119 specimens from the Battlesbury hand-recovered assemblage. All but ones of the abnormal specimens belonged to domestic mammals. One bird pathology was noted; a corvid femur with extensive new bone formation around the distal end, which is of unknown cause but is not uncommon among older birds (Baker & Brothwell 1980). Pathological specimens were noted from sheep/goat, cattle, pig, horse and dog. The appearance, location and type of pathology was described for each specimen and recorded in the main faunal database. A summary of the main types of pathological and other abnormalities follows below.

Following the method of analysis undertaken by Brothwell (1996) in his summary of the pathological specimens from Danebury, an attempt was made to assign each abnormal specimen into one or more broad classes of pathology. The number or incidences of each type of pathology was then counted for each species (Table 16). The sample is too small to be able to generate detailed conclusions, however some interesting patterns were noted within the assemblage. Arthropathies (joint pathologies) are by far the most common type of abnormality and are particularly prevalent among the cattle sample compared to other species. The types or arthropathies observed among the cattle population include changes commonly interpreted as being indicative of arthritis (splaying/extension of articular surfaces, bony exostoses and eburnation). These changes in cattle were most often observed on the metapodials, phalanges, scapula (glenoid), pelvis and femur. Similar, although generally less severe, examples of arthritic changes were noted on the phalanges, tarsals and radii of sheep/goat in small numbers. Given the higher proportion of older individuals among the cattle assemblage, it is unsurprising that the incidence of joint disease is higher among cattle than in the sheep/goat population where juveniles are more prevalent. It is also possible that some cattle were used for traction, which may account for some of the stress-related pathology. One of the incidences of joint disease noted for dog had clearly developed as a consequence of a traumatic fracture of a metatarsal.

Oral pathologies also appear common, although it should be noted that this blanket term covers a range of very different types of abnormality of various aetiologies. Examples of oral pathologies include alveolar resorption and ante-mortem tooth loss indicative of periodontal disease. This accounted for at least eight of the sheep/goat specimens, but only one of the cattle specimens. Other oral abnormalities include irregular wear resulting from malocclusion of teeth, although it was not always possible to determine whether such malocclusion was due to loss of opposing teeth or misalignment of the dentition. All incidences of oral abnormalities in pigs relate to dental over-crowding, which is a common problem seen in archaeological pig populations (Baker & Brothwell 1980). Seven of the cattle specimens display either congenital absence of the 2nd permanent premolar (P2) or congenital abnormalities of the 3rd permanent molar (M3), including absent, reduced or incompletely attached 3rd cusps. Examples of this type of congenital abnormality have been observed on other British Iron Age sites. These types of dental congenital absences and abnormalities may be associated with a degree of in-breeding in populations and tend to be more commonly reported from Iron Age and Roman sites than for the Medieval period (Hambleton & Stallibrass 2000).

A pair of horse mandibles from a ten-year old male from posthole 4524 displays evidence of grooves on both of the 2nd premolars on both lingual and buccal aspects. Such abnormal wear can best be explained as damage inflicted by the long term repeated use of a bit. As such, these specimens provide strong evidence that at least some of the horses represented had been used for riding.

Other, non-oral, congenital traits in the assemblage were all observed on cattle bones. These include three examples of lumbar vertebrae with enlarged nutrient foramina, which have been categorised as a non-inherited congenital defect and have been reported from a number of archaeological sites (Baker and Brothwell 1980). Two cattle skulls, both from the large collection of skulls from the Phase 2 ditch (feature 4105), exhibited perforations and thinning of the bone in the parietal region. This is another abnormality commonly reported from archaeological assemblages but of uncertain aetiology. The debate as to the cause of these holes in cattle occipitals is effectively summarised by O'Connor (2000:108), who concludes they are either congenital/developmental anomalies or the result of mechanical strain resulting from cattle being yoked by their horns. Also of unclear origin is the depression near the base of one of the sheep horn cores from Battlesbury, although a study by Albarella has suggested this type of defect may be associated with calcium depletion, particularly in old females (Albarella 1995).

The majority of specimens described as infection are cases of osteomyelitis where there is evidence of extensive bone remodelling and the presence of drainage holes. One cattle radius displayed extensive pathalogical changes associated with osteomyelitis, while another cattle specimen showed evidence of infection of the skull after polling. There are also examples of periostitis among the cattle and horse remains. One pathological specimen which it has not been possible to clearly classify, is the mandible of a dog which exhibits considerable porous new bone formation on the lingual and underside rear tooth row, with some resorption of the P4 and M1 sockets. This could result from infection but in addition to these changes the lingual porous area has a pronounced indent with a small shiny fragment of bone or tooth on a central protruding pillar. This may represent infection associated with the intrusion of a foreign body, or possibly some form of neoplastic change.

Overall the incidence of pathology in the sample is fairly low and there is nothing to suggest the health of the Battlesbury animals was significantly better or worse than at other contemporary sites from the region, such as Danebury. The levels of periodontal disease in sheep/goat appear to be substantially lower than at Danebury (Grant 1991a), but Hamilton (2000) has observed that the levels of periodontal disease at Danebury are higher than at many of its surrounding sites, so Battlesbury is not unusual in this respect. The number of arthropathies among the cattle population is largely a reflection of the age profile rather than an indication of especially poor health.

Contextual Analysis of Animal Bones

The previous sections have examined the overall nature of the animal bone assemblage. They have shown the main trends in species representation through time and between feature types and areas. The types of bone represented for each species have also been noted for these sub-divisions. This allows for general statements to be made about deposition and preservation but does not examine the nature of deposition at feature or context level. This section will address this issue in depth.

One aspect of the Battlesbury assemblage which merits particular discussion is the nature of several deposits of associated bone groups (ABGs) consisting of skeletal elements belonging to the same individual. There are numerous examples of such groups from Battlesbury ranging from

accumulations of several almost complete skeletons, single complete or partial skeletons, and smaller sections of domestic species carcasses such as limbs, feet or groups of vertebrae.

The presence of ABGs, particularly when the bones are found in anatomical articulation, have provoked considerable interest when found in pits, ditch terminals postholes and other discrete areas on Iron Age sites. There is continuing debate as to whether such bone groups may be interpreted as 'special' or 'structured' events, perhaps the result of ritual, sacrificial or propitiatory deposits, or whether they are merely more prosaic deposits of rubbish that are unusual only in the fact of their undisturbed and intact survival (Grant 1984b; 1991b; Cunliffe 1992; Hill 1995; Wilson 1992; 1996; 1999). Detailed study of the ABGs from Battlesbury at context and feature level has considerable potential to further this debate.

The discussion of 'special' animal deposits does not confine itself to ABGs. Single or multiple accumulations of skulls are also often considered in the archaeological literature to be of special significance, particularly if found in significant locations on a site or if having the appearance of having been deliberately 'placed' in a specific position and location (Grant 1984b; Wilson 1999). Several of the pits at Battlesbury contained groups of one or more cattle or horse skulls, and there was a much larger group of at least seven cattle and three horse skulls deposited in context 4101 from the Phase 2 ditch section (4105), which will also be discussed in this section.

This analysis will describe in detail all the ABGs and relatively complete skulls recorded in the Battlesbury assemblage. This will be done in phase and feature number order. The associated faunal assemblages in the same features as the ABGs and skulls will also be briefly described. Any major deviations from the average body part representation of the principal species will be noted (the average percentage is given in *italics*). For the sake of balance, this section will also examine some of the other larger assemblages that did not contain ABGs or complete skulls, in order to assess whether assemblages associated with ABGs are significantly different from other assemblages.

Phase 1-2

Feature: 4162 *Type:* Pit *Section:* South *Feature Group:* 1
Contexts in feature with bones: 4202 4203 4163

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	19	80	10						240	349
% identified	19	81	10							

Discussion
This pit did not contain clearly associated groups of bones, although there are a relatively large number of porous bones of neonatal and juvenile lambs and calves, some of which may have belonged to the same animal. For example, context 4203 includes a fragmented juvenile sheep skull, metacarpal and metatarsal, which may have belonged to the same lamb. Apart from an unusually high percentage of sheep/goat tibia (20% *10%*), the assemblage is typical of a well-preserved pit assemblage dominated by sheep/goat elements.

Feature: 4221 *Type:* Pit *Section:* South *Feature Group:* 1
Contexts with ABG: 4222
Animal Bone Group No(s) 2
Other contexts in feature with bones: 4252 4253 4254 4256

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context	15	23	3						48	89
Bones in other contexts	7	10	1					1	25	44

Bones in feature	22	33	4		1	73	133
% identified	37	56	7		2		
% identified exc. ABGs	41	52	7		2		

Description of ABG(s)
ABG 2 consists of both pelves, the sacrum and two lumbar vertebrae of an adult, probably female, sheep. The group was recorded as articulated by the excavators. No gnawing or butchery marks were observed.

Discussion
ABG 2 was accompanied in context 4222 by a similar group consisting of the sacrum and two lumbar vertebrae of an adult sheep/goat. Again no butchery marks were noted. Three cattle cervical vertebrae were also probably articulated. Four frontal fragments of young calves (one with knife cuts) were found in the same context, along with a worked sheep/goat tibia. A sawn horn core of a ram was found in context 4254. The pit was only half-sectioned, which could mean that further associated bones may have been deposited but on the available evidence, it is more likely that the small groups of associated bones are from butchered carcasses associated with other more fragmented carcass processing debris.

Feature: 4470 *Type:*Pit *Section:* South (Group B) *Feature Group:* 2
Context with skull: 4483
Other contexts in feature with bones: 4467 4468 4469

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4483	8	7	2						41	58
Bones in other contexts		4							11	15
Bones in feature	8	11	2						52	73

Description of Skull
A fragmentary cattle skull (Object No.3132) was found in context 4483. Most of the posterior of the skull was found but there are no zygomatics, nasals or maxillae and only the base of one horn core survived. Several fine incisions were found on the top of the frontal and near the base of the horn core.

Discussion
The cattle skull has similarities with those from ditch 4105 in that careful cleaning has been carried out on the top of the skull, probably more than was necessary for routine skinning. This specimen does, however, possess the occipital condyles and the brain case probably was not exposed. It is possible, however, that the cleaned skull was displayed prior to deposition. There are relatively few other identified bones in this feature but context 4483 also produced a complete cattle metatarsal still articulated with two of the lower tarsals (Object No.3133). A complete tibia (Object No.3134) was also found. It belonged to a sub-adult animal (proximal epiphysis unfused; distal fused) and could have belonged to the same carcass as the metatarsal and tarsals. A large portion of a cattle pelvis was also found nearby. Further bones of this animal may have lain in the unexcavated half of the pit.

Feature: 4612 *Type:* Pit *Section:* South (Group D) *Feature Group:* 2
Contexts with ABG: 4613 4697
Animal Bone Group No(s) 115 117
Other contexts in feature with bones: 4821

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4613	25	178	11	13	4			1	212	444

Bones in context 4697	4	68	1				112	185
Bones in other contexts	3	5	2				3	13
Bones in feature	32	251	14	13	4	1	327	642
% identified	10	80	4	4	1	<1		
% identified exc. ABGs	15	69	7	6	2	<1		

Description of ABG(s)
ABG 115 is a fairly complete lamb skeleton (Object No.3168) recovered from context 4613. A hundred bones of the skeleton are represented, with only a few of smallest bones and some epiphyses missing. Tooth eruption data (dp4 just in wear; M1 unerupted) suggest the lamb was about two to three months old. Knife cuts were observed on the left astragalus and across the occipital condyles.

ABG 117 in context 4697 consists of seven sheep/goat unfused vertebrae (three lumbar, three cervical, one thoracic). These are all fairly complete and appear to be from the same animal. The three lumbar vertebrae have knife cuts on the lateral process, indicating removal of the flanks. Several other sheep/goat bones in this context may be from this skeleton but it is difficult to be certain.

Discussion
ABG 115 belongs to a lamb killed during the late spring or early summer. The body was skinned, beheaded and possibly partially dismembered but then deposited as a complete carcass in the pit. ABG 117 consists of a partially preserved segment of secondary butchery waste, which involved the disposal of vertebrae after the meat from the flanks had been removed.

Context 4613 also produced small groups of horse foot bones including two right metatarsals. Most of the cattle fragments in this context were cranial elements or loose teeth and sheep/goat cranial elements are also well represented. The four dog bones could have belonged to the same adult animal. Context 4697 included lot of sheep/goat mandibles and part of a sheep skull. Three complete sheep right radii were all at the same stage of development, with the proximal epiphysis fairly recently fused.. A goat distal humerus and proximal ulna were also found. A worked bone offcut was also retrieved (Object No. 3865). The impression gained is that a lot of the bones belonged to animals that died in the later spring or early summer and were deposited shortly afterwards after processing.

Feature: 4704 *Type:* Pit *Section:*South (Group D) *Feature Group:* 2
Contexts in feature with bones: 4706 4750 4735 4778 4801 4802 4817 4882

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4778	12	48	3						74	137
Bones in context 4817	15	85	7						132	239
Bones in other contexts	14	67	3						148	232
Bones in feature	41	200	13						354	608
% identified	16	79	5							

Discussion
The assemblage from pit 4704 is well preserved and dominated by sheep/goat elements. Only cattle and pig apart from sheep/goat were identified. No large ABGs are assigned to this assemblage but a number of associated bones are present. The largest assemblage from context 4817 is dominated by sheep/goat bones, including several complete limb bones and an unusually high number of phalanges and other small bones. At least four sheep/goats are represented including a number of porous bones of lambs that probably died or were slaughetered in the late spring or early summer. A few large cattle bones are present including most of a mandible (Object No.3233) with knife cuts, and an almost complete, albeit slightly gnawed, humerus (Object No.3258). A cattle ulna shaft has

been sharpened and polished to form a gouge (Object No.3232). Butchery marks were recorded on several other bones of sheep/goat and cattle. Bones of mice were recovered in a sieved sample.

The assemblage in context 4778 was generally very similar to context 4817. Sheep/goat elements dominate with a minimum number of six animals represented by mandibles. These all belong to young lambs of about two to four months of age and include two pairs or jaws. Two older sheep/goats are represented by tibiae. Several of the porous bones could be from same lambs. There is a group of three articulating cattle carpals, one with knife cuts. Most of the other cattle elements are loose teeth.

The nature of the smaller assemblages from other contexts is similar, particularly the one from context 4802. Three associated unfused sheep/goat cervical vertebrae were found in context 4750. An associated astragalus and tibia from a neonatal calf were retrieved from context 4882. The preservation of the sheep/goat bones is very good with much fewer loose teeth than average (6% *17%*) and higher than average numbers of small bones such as the tarsals (7% *4%*) and phalanges (11% *6%*). There are a lot of porous bones of lambs. On the basis of the tooth eruption evidence, most, if not all, of these died in the spring or early summer. The homogeneous nature of the assemblages also implies that the dumping episodes found in contexts 4778, 4817, 4802 and 4882 may have occurred over a short period of time, perhaps representing the residues from the slaughter, butchery and consumption of animals in the spring. Mandibles of two sheep that probably died in the autumn are, however also present.

Feature: 4751 *Type:* Pit *Section:* South *Feature Group:* 1
Contexts with skull 4317
Other contexts in feature with bones: 4318

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	6	15	3	8	1			5	81	119

Description of skull
Context 4317 produced a very fragmented horse skull (Object No.3071) consisting of both sides of the parietal, frontal, zygomatic and maxilla. All the molars are present and in wear, indicating that the skull belonged to an adult. There is no evidence of butchery.

Discussion
The skull is too badly damaged and the associated assemblage too small to determine whether this was a significantly placed deposit or the casual disposal of carcass waste.

Feature: 4993 *Type:* Pit *Section:* South *Feature Group:* 3
Context with skulls 4995
Other contexts in feature with bones: 4994 4996

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4995	14	14	10						38	76
Bones in other contexts	26	34	14			1			102	177
Bones in feature	40	48	24			1			140	253
% identified	35	42	21			<1				

Description of skulls
Context 4995 produced two partial skulls. A cattle skull (Object No.3276) consists of the posterior half of both sides of the skull. It displays a chop mark or snagged knife cut across the ventral aspect of the occipital and slight gnawing on the frontal. The occipital condyles have been broken off. A

sheep skull (Object No.3278) comprises both frontals and horn core base. No evidence of butchery or gnawing was noted on this specimen.

Discussion
The sheep skull is probably best regarded as an element of processing waste. The same may apply to the cattle skull, which has been decapitated but shows no evidence of careful cleaning. The associated assemblage has higher percentages of pig elements than usual but no horse. A badger tooth was recovered from context 4996.

Feature: 5154 *Type:* Pit *Section:* South *Feature Group:* 3
Contexts with ABG: 5153
Animal Bone Group No(s) 103
Other contexts in feature with bones: 5199 5200

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	23	6	4	3					49	85

Description of ABG
ABG 103 consists of the fragmentary remains of six cattle thoracic vertebrae. The bones are unfused and a number of rib shafts in the same context could belong to the same skeleton. There is no evidence of butchery but at least three of the vertebrae have been damaged by gnawing.

Discussion
This group may be a small segment of butchery waste, although there is no positive support for such an interpretation. Other bones of the skeleton may lie in the unexcavated half of the pit. Scavengers have disturbed the skeleton at some stage. There is a fairly small sample of associated bones, which also mainly belong to cattle.

Feature: 5670 *Type:* Pit *Section:*North *Feature Group:* 4
Contexts in feature with bones: 5671 5672 5713 5714 5715 5716

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 5671	32	82	20	3	1				160	298
Bones in context 5713	25	70	11	1			1		188	296
Bones in other contexts	19	28	18	2	1		1		79	148
Bones in feature	76	180	49	6	2		2		427	742
% identified	24	57	16	2	<1		<1			

Discussion
There are no ABGs assigned to this group, although there are several fairly complete limb bones of cattle deposited together in context 5713 (Object No.3404). None of these are definitely from the same skeleton and at least two right radii and ulnae are present. A right pelvis, femur and tibia could be from the same animal and it is certainly feasible that most of these bones are from the limbs of one or two carcasses, which have been butchered although not broken open for marrow. However, in this and other contexts, sheep/goat bones as usual dominate the assemblage. A lot of porous bones and three mandibles of lambs aged about three months old suggests that the assemblage in context 5671 includes animals that died in the early summer. A radius and ulna of a mallard were found in contexts 5713 and 5714 and could belong to the same bird. A worked horse lateral metatarsal was found in context 5671 (Object No.3391).

Phase 2

Feature: 4023 *Type*: Ditch *Section*: South *Feature Group*: 1
Contexts with ABG: 4024
Animal Bone Group No(s) 110
Other contexts in feature with bones: 4055 4085 4086 4087 4088

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4024	29	50	5	2					112	198
Bones in other contexts	16	15	1	1					20	53
Bones in feature	45	65	5	3					132	251
% identified	38	55	5	3						
% identified exc. ABGs	41	50	6	3						

Description of ABG 110
Context 4024 produced ten bones of the right hind foot of an adult sheep, comprised of the centroquartal, metatarsal, all six phalanges and a distal sesamoid. There is no evidence of butchery or gnawing on any of the bones.

Discussion
The ABG is likely to have been deposited as a unit and may have been associated with the skin removed with the foot bones after initial processing of the carcass. Other bones in the feature include a higher than the average number (31% *18%*) of sheep/goat cranial elements (excluding bones in the ABG), including four frontals and three horncores in context 4024. One of the frontals has been split open to remove the brain. One of the horn cores belonged to a female goat but the remainder belonged to sheep. These may also have been waste accumulated from initial skinning and segmentation. The cattle bones also include slightly higher percentages of cranial fragments than average (29% *23%*).

Feature: 4079 *Type*: Ditch *Section*: South (Group 4043) *Feature Group*: 1
Contexts with ABG: 4255 4270
Animal Bone Group No(s) 113 114
Other contexts in feature with bones 4292

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4255	8								9	17
Bones in context 4270	21	1							1	23
Bones in other contexts	1									1
Bones in feature	30	1							10	41
% identified	97	3								
% identified exc. ABGs	94	6								

Description of ABG(s)
ABG 113 in context 4255 consists of three fairly complete cattle thoracic vertebrae and the dorsal portion of a rib. Slight gnawing damage is recorded on the ventral aspect of one of the vertebrae. There is no evidence of butchery. The epiphyses of the vertebral bodies and the ribs are all unfused.

ABG 114 in context 4270 consists of at least ten thoracic vertebrae and five rib heads. A lumbar vertebra may also belong to this group. Slight gnawing damage has occurred near one of the rib heads. All the epiphyses of the bones are fused. There is no evidence of butchery on these bones. However, the lumbar vertebra has been chopped through in a cranio-caudal direction on the lateral aspect of the body.

Discussion
The feature has produced segments of two sections of cattle vertebrae with associated rib heads. Although butchery marks were not observed on any of the bones definitely belonging to these

groups, the butchery of the lumbar vertebra in 4270 is consistent with the removal of the flanks of the animal. The presence of only the dorsal ends of the ribs also implies that these probably represent butchered segments of cattle vertebrae deposited as waste after the meat from the rib cages was removed. The slight gnawing damage implies that dogs had access to the bones before or after disposal of the sections in the ditch. All but one of the small number of other bones identified in this feature are also of cattle.

Feature: 4080 *Type:* Ditch *Section:* South *Feature Group:* 1
Contexts in feature with bones: 5139 5140 5141 5142 5143 5146 5147 5148

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	75	91	14	6		2			239	427
% identified	40	48	7	3		1				

Discussion
This ditch section did not produce any ABGs and represents a fairly typical assemblage from such a context, with sheep/goat elements the best represented but cattle better represented than in many pits. Poorer preservation of sheep/goat elements is indicated by the relatively high proportion of loose teeth (30% *17%*) recovered. The only bones of wild species consist of metapodial fragments of roe deer.

Feature: 4090 *Type*: Ditch *Section*: South (Group 4043) *Feature Group*: 1
Contexts in feature with bones: 4091 4111 4112 4120 4123 4170 4204 4210

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4091	5	14	1	1	3	1			23	48
Bones in context 4111	17	13	3		3				46	82
Bones in context 4112	11	2							16	29
Bones in context 4120	8	10		1	1				22	42
Bones in context 4170	16	9	1	3					41	70
Bones in other contexts	19	11	1						35	66
Bones in feature	76	59	6	5	7	1			183	337
% identified	49	38	4	3	5	1				

Discussion
Although no ABGs were assigned to this assemblage, there are several small groups of bone that are probably all associated. Context 4091 produced the right humerus, radius and ulna of an adult dog. Two of the bones have been gnawed, indicating accessibility to other dogs prior to burial. A red deer cervical vertebra was found in the same context along with a worked offcut of a large mammal bone. Relatively few cattle bones were found in this context compared with the rest of the feature. Context 4111 contains a pair of mandibles of an adult dog, possibly the same one as in context 4091. Context 4120 produced the tibia of a neonatal puppy and a group of five adult sheep/goat bones consisting of a pair of pelves and sacral, lumbar and thoracic vertebrae, possibly of the same animal.

Three contexts produced small groups of associated cattle bones. Context 4112 includes three thoracic vertebrae and two ribs of an adult animal (the epiphyses are just fused). Context 4204 produced parts of two cattle sacra, one of which probably joined a large portion of pelvis. Context 4170 includes five substantial portions of pelvis from at least three cattle, of which one may be associated with a proximal femur and sacrum.

Although no butchery marks were identified on any of these groups, most of them may have come from butchered carcasses, of which segments were deposited in the ditch. The cattle assemblage as

a whole has unusually high percentages of pelvis (11% *4%*) and vertebrae and ribs (32% *8%*). Similarly, the sheep/goat sample includes higher percentages of vertebrae and ribs than usual (19% *10%*), suggesting that this area of the ditch was chosen for the disposal of secondary butchery waste of both species.

Feature: 4105 *Type*: Ditch *Section*: South (Group 4043) *Feature Group*: 1
Contexts with ABG: 4101
Animal Bone Group No(s) 118 plus cattle and horse skulls
Other contexts in feature with bones:

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4101	47	12	4	7					13	83
Bones in other contexts	80	71	17	8	1				124	301
Bones in feature	127	83	21	15	1				137	384
% identified	50	35	9	6	<1					
% identified exc. ABGs	48	36	9	6	<1					

Description of skulls and ABG
Context 4101 produced a remarkable group of cattle and horse skulls. These deserve individual descriptions.

Cattle skull 1 (Object No.3055): this consists of the slightly fragmented remains of most of both sides of the temporal, parietal and frontal. Also present are parts of the sphenoid, the top of the occipital and one of the zygomatics. The occipital condyles are missing and the brain case is exposed. There is no evidence for the maxillae. There are no horn cores and there are knife cuts on the back of the frontal at the base of both horn cores, indicating that the horns were probably removed.

Cattle skull 2 (Object No.3029): this is a more complete skull consisting of the top of the occipital and both sides of the parietal, frontal, temporal, zygomatic and maxillae. Both horn cores are attached. The occipital condyles and most of the sphenoid area are missing, as are the nasals and premaxillae. Slight gnawing damage is evident on the front of the maxillae and there are no surviving teeth. Vertical incisions are visible on the front of the right maxilla and on the left frontal, located just posterior to frontal sinus.

Cattle skull 3 (Object No.3056): this consists just of the top of the skull, consisting of both sides of the frontals and parietals. The brain case is again exposed and the back of the skull, horn cores and maxillae are not present. There is no evidence of gnawing but there are a number of fine incisions on the right frontal both in front of, and on the lateral aspect of, the frontal sinus.

Cattle skull 4 (Object No.3057): the surviving areas of this skull consist of both maxillae, frontals and zygomatics, and the left temporal, parietal and horn core base. Most of right side of the skull therefore is missing and there is evidence of gnawing on the edge of the right frontal. There is no occipital or sphenoid bones and the brain case is exposed. No teeth survive in either maxilla, which also bears evidence of slight gnawing. Four fine incisions are visible on the top of the left frontal.

Cattle skull 5 (Object [part of]No.3032): this skull survives in a very fragmented state, with the left parietal, frontal and fragments of the horn core and sphenoid bones the only parts surviving. No butchery or gnawing marks were observed.

Cattle skull 6 (Object [part of] No.3058): again only the left parietal and frontal of this specimen survives. There are no horn cores or maxillae and the brain case is exposed. The skull has a slightly shiny surface appearance, perhaps indicative of weathering.

Cattle skull 7 (Object No.3054): this is a more complete skull with both sides of the temporal, parietal and frontal surviving intact along with the right zygomatic. Once again the occipital and sphenoid are missing and the brain case is exposed. The bases of both horn cores survive. Their round cross-section suggests the skull probably belonged to a cow. There are several dark linear marks around the horn cores, which have been interpreted as damage from canid gnawing when the horn sheath was still attached. Both maxillae are present, although the premaxillae are missing. There are some slight gnawing marks on the right maxilla. All the teeth are still in their sockets and are fully erupted and in wear.

Cattle maxilla 1 (Object [part of] No.3030): both sides of the maxilla and the palatine survive intact but there are no teeth in the sockets. There are at least eight horizontal cuts above the premolars and two oblique cuts knife on the right maxilla. There are also some horizontal cuts on the left maxilla. It is possible that this specimen belongs to one of the less complete skulls described above.

Horse skull 1 (Object [part of] No.3030): this is a very fragmentary specimen but both sides of the occipital condyles, temporals, parietals and fronta1s survive as well as the right zgyomatic and maxilla, which also shows evidence of slight gnawing. There are no bones from the sphenoid area, however, suggesting the brain case was exposed. No teeth are embedded in the jaws but there is an alveolus for a canine tooth, indicating the skull probably belonged to a male. No butchery marks were observed.

Horse skull 2 (Object No.3031): this is the most complete of the horse skulls with both sides of the occipital condyles, temporals, parietals, fronta1s, zygomatics and maxillae present. Again the inferior part of the skull around the sphenoid region is missing. Slight gnawing is visible on the maxilla. Only three teeth survive in their sockets (both canines and the left second premolar), indicating the skull belonged to an adult male. No butchery marks were observed.

Horse maxilla 1: (Object [part of] No.3032): a third horse is represented by a pair of maxillae probably of a male (canine alveolus present) but none of the teeth are associated with the jaws.

ABG 118 was found along with the skulls in context 4101. This consists of 15 bones from the left forelimb of cow (Object No.3059), consisting of the radius, ulna, metacarpal, all six carpals and all the phalanges. It is clear from the site plans that these were articulated. A humerus found separately fits perfectly with the radius and ulna and may well belong to the same animal. Less convincingly, a left scapula may also be from the same skeleton. The group belongs to a sub-adult, as the distal radius is unfused, and the proximal humerus and ulna are fusing. The distal metacarpal is fused. This could suggest it belonged to an animal aged between three and four years old. Knife cuts are present on the anterior, medial and posterior aspects of both first phalanges indicating skinning. There is slight gnawing damage to one of the third phalanges and both ends of the humerus, which could explain why it became separated.

Cattle skull (Object No.3117) in context 4450: this is relatively complete, although the occipital is absent. Most maxillary teeth are present and indicate the animal was adult. Several groups of knife cuts were observed; on the frontal near the absent horn core, beneath the right zygomatic and on the left maxilla. A substantial portion of a cattle pelvis was found nearby.

Dog skull (Object No.3082) in context 4099: this fairly complete albeit fragmented specimen belonged to an adult, although none of the teeth survived.

Discussion

There is little doubt that this must be regarded as a “special deposit” of some nature. Substantial parts of at least seven cattle and three horse skulls were deposited in close proximity in context 4101. A similar specimen was found in context 4450. Several of these skulls display fine knife cuts indicating careful removal of the surrounding tissue, and most of the skulls have post-mortem tooth loss from the maxillae, but the loose teeth were not recovered. This combination of taphonomic

markers could support the suggestion that these skulls (or at least those of the cattle) have been carefully cleaned and left exposed for some time, perhaps as objects of display, before they were finally deposited in the ditch. It is possible that the ditch was the depository of skulls that had been collected and perhaps displayed over a period of time. This would explain why some of the specimens appear to be less decayed than others. The slight gnawing damage to these and the extremities of ABG 118 could also indicate that there was not a lot of fresh meat available on them. Some of the clustered incisions indicate that the skulls were more carefully cleaned than would be required during routine skinning and filletting. Another feature of the skulls is the fact that none of them are in fact complete. None of the cattle skulls have surviving occipital condyles and several lack the sphenoid bones. Similarly, the horse skulls do not have the sphenoid area present. This has resulted in the brain case being exposed from underneath. The brain may have been removed as part of the act of preparation of the skulls for display, and/or used for food or in some ritual manner itself. The resulting cavity left underneath the skull would also allow the skull to the inserted on top of a pole or hung flat against a wall. They may then have served as some form of (symbolic) markers before they were eventually deposited in ditch 4105. This can of course be regarded as a ritual deposit. However, it could be argued that the major ritual or symbolic use of the skulls was in their display or "life" prior to burial, which can either be seen as the final act of the ritual process or its abandonment. The minor gnawing damage probably occurred after deposition in the ditch.

ABG 118 is an example of a more common type of ABG consisting of a group of articulated limb bones deposited after skinning but not further processed and subsequently slightly disturbed by dogs.

The other bones from ditch section 4105 have similarities with those in assemblages elsewhere on the site, although cattle elements are the most commonly represented, which contrasts with the assemblages from most features. The dog skull with no surviving teeth in context 4099 has similarities with the cattle and horse skulls and may also not have been immediately deposited in the ditch after death. A cattle zygomatic from context 4100 has six vertical incisions indicating careful removal and cleaning, reminiscent of the butchery on the more complete cattle skulls in this feature.

Feature: 4113 *Type:* Pit Se*ction:* South *Feature Group:* 1
Contexts with skull: 4127
Other contexts in feature with bones: 4114 4414 4439

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4127	7	29	2				2		65	105
Bones in other contexts	7	41	2	2	1	3			76	132
Bones in feature	14	70	4	2	1	3	2		141	237
% identified	15	73	4	2	1	3	2			

Description of skull
A cattle skull (Object No.3802) was recovered from context 4127. Both sides of the posterior of the skull survive including the occipital, frontal and sphenoid areas. Slight charring damage was noted on the occipital condyles and the right orbit. No butchery or gnawing marks were observed.

Discussion
There is no clear evidence that this skull was a carefully placed deposit. It is associated with an assemblage dominated by sheep/goat bones, which includes an unusually high percentage of vertebrae and ribs (25% *10%*). These include five cervical vertebrae in context 4114, which may have belonged to one animal, possibly an adult goat. One of these vertebrae bears transverse chop marks where the neck has been segmented. Two wing bones of a medium-sized duck were found in the same context as the skull. Bones of two species of rodents were also found.

Feature: 4118 *Type:* Ditch *Section:* South *Feature Group:* 1
Contexts with ABG: 4119
Animal Bone Group No(s) 111

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	5	11	5	1	6				23	51

Description of ABG
ABG 111 consists of a rib, two thoracic and two lumbar vertebrae of an adult dog. No evidence of butchery or gnawing was found.

Discussion
There are no unusual features in the rest of the small assemblage from this context.

Feature: 5043 *Type:* Pit *Section:* South *Feature Group:* 3
Contexts with ABG: 5137
Animal Bone Group No(s) 101 102
Other contexts in feature with bones: 5044 5135 5136 5464

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 5137	16	11	36	2		4		3	58	130
Bones in other contexts	83	55	32	7		2			202	381
Bones in feature	99	66	68	9		6		3	260	511
% identified	39	26	27	4		2		1		
% identified exc. ABGs	45	30	17	4		3		1		

Description of ABG(s)
A total of 31 bones from a young pig were recovered from context 5137. ABG 101 consists of virtually all the bones of the right forelimb including small foot bones (Object No.3282). All epiphyses are unfused but the bones are not very porous, indicating the limb belonged to a pig probably over six months but less than a year old. Gnawing marks were observed on the ulna and humerus.

ABG 102 probably belongs to same skeleton and consists of both pelves and three lumbar vertebrae, all of which are unfused. Slight gnawing was observed on the pelvis. No butchery marks were observed on any of the bones.

Discussion
This is one of the few examples of an ABG of pig bones from the excavations. The pit was fully excavated which means that only the right forelimb and bones from the lumbar region survive. Slight gnawing damage implies that scavengers at some stage disturbed the skeleton. It is impossible to be certain whether this occurred before or after deposition, although the former is more likely. The lack of butchery may imply that these bones were deliberately placed without processing but again other explanations are possible. A fairly complete, although fragmented horse skull (Object No.3342) was found in the same context. Tooth ageing suggests it belonged to an adult of about 9-10 years old. The lack of canines indicates that it was from a mare. The presence of house mouse and amphibian bones suggests that this layer remained open for a time.

The pit assemblage generally produced a higher proportion of cattle bones than usual, particularly in contexts 5044 and 5135. Pig, although ranked third behind sheep/goat is also quite well represented even when the bones in the ABGs are excluded. Pig bones generally are better represented in feature group 3 than elsewhere on the site. The composition of the elements represented in the assemblages of the major species are fairly typical of the assemblage from

Battlesbury as a whole. Two small portions of sheep skull show evidence of being split open. Metatarsals of a sheep and roe deer probably have been worked.

Feature: 5688 *Type:* Pit *Section:* North *Feature Group:* 2
Contexts in feature with bones: 5689 5749 5807 5849

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	22	68	8	3					191	292
% identified	22	67	8	3						

Discussion
There are no ABGs in this pit and only one small portion of fragmentary horse skull, which consists of part of the maxilla and zygomatic (Object No.3419) from context 5849. None of the teeth survive and there is no evidence of butchery. The same context produced substantial parts of cattle mandible, radius, pelvis (2), femur and metatarsal. Butchery marks were noted on two of these bones and slight gnawing damage on four. This is the only context in the pit where cattle outnumber sheep/goat bones and may indicate deliberate deposition of selected large bones from at least two cattle. Sheep/goat elements dominate the rest of the assemblage, which contains no bones of wild mammals or birds. Mandibles of two sheep and one goat in context 5689 belonged to young animals of less than three months of age, suggesting this context contained bones of animals that died in the spring or early summer.

Phase 2-3

Feature: 4606 *Type:* Pit *Section:* South (Group D) *Feature Group:* 2
Context with skulls: 4633 (4710)
Other contexts in feature with bones: 4607 4636 4653

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4633	17	37	3	5	5				115	182
Bones in other contexts	15	37	3	2					138	195
Bones in feature	32	74	6	7	5				253	377
% identified	26	60	5	6	4					

Description of skulls
A cattle skull (Object Nos.3159) was found in contexts 4633 and 4710. Context 4633 produced both sides of the frontal, the base of a horn core, the sphenoid area and the right side of the parietal and temporal. Context 4710 produced parts of the left temporal and sphenoid. The occipital and maxillae of this skull were not recovered in this half-sectioned pit. Not all the skull sutures are fused, indicating that the skull belonged to an immature animal. About ten short knife marks were observed near the centre of the frontal level with the eye socket.

An adult dog skull (Object No.3170) was also found in context 4633. The skull survived largely intact and most of the teeth are present in the maxilla. No evidence for butchery or gnawing was observed.

Discussion
The butchery marks on the cattle skull indicate careful cleaning of the flesh. Disturbance before or after disposal in the pit has fragmented the skull and it is uncertain whether all parts of it were recovered. The lack of the occipital area and the evidence for careful cleaning are characteristics also found in the cattle skulls from ditch 4105, which could imply the skull was not immediately buried after defleshing. The dog skull does not have these traits and may have been buried more quickly. Associated bones in context 4633 include four other dog

bones, perhaps from the same animal as the skull, a second phalanx of a neonatal horse and at least five sheep/goat mandibles. Indeed, in the pit as a whole, cranial elements of sheep/goat (35% *18%)* are unusually well represented. Context 4653 produced the right parietal and frontal of another cattle skull, also with several knife cuts on the frontal. Two bone objects were also found in this context: a sawn sheep/goat tibia and a worked sheep/goat metatarsal (Object No.3840).

Feature: 4667 *Type:* Pit *Section:* South (Group D) *Feature Group:* 2
Contexts with skull: 4674
Other contexts in feature with bones: 4670 4673

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4674	2	8		2					14	26
Bones in other contexts	6	19	5				1		53	84
Bones in feature	8	27	5	2			1		67	110

Description of skull
A sheep skull was found in context 4674. It consists of the right frontal, parietal, zygomatic, temporal and horn core base of an adult ewe. The skull has been split down the centre to expose the brain.

Discussion
The skull can be regarded as butchery waste with the skull being deposited after the brain was removed. Sheep/goat elements dominate the associated assemblage. The only unusual occurrence is that of a mallard tibiotarsus in context 4670, along with a complete cattle metacarpal.

Phase 3

Feature: 4223 *Type:* Pit *Section:* South (Group A) *Feature Group:* 1
Contexts in feature with bones: 4185 4251 4345 4398 4488

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	17	53	3	1	2			5	201	282
% identified	21	65	4	1	2			6		

Discussion
This feature is chosen because of the discovery of a human skull in context 4345. The presence of amphibian bones in a sieved sample from the same context and in context 4488 suggests that the pit may have lain open for a short period of time. Apart from that, the animal bone assemblage from the pit does not show any unusual characteristics apart perhaps from a cluster of seven sheep/goat mandible fragments from at least three animals in context 4185.

Feature: 4330 *Type:* Pit *Section:* South *Feature Group:* 1
Contexts with ABG: 4331 4397
Animal Bone Group No(s) 112

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	13	28	2	1	12				39	95
% identified	23	50	4	2	21					
% identified exc. ABGs										

Description of ABG

Nine bones of an adult dog were found in contexts 4331 and 4397. The proximal end of the left radius, two metacarpals and two pathological vertebrae (cervical and thoracic) were found in context 4331. The radius has a modern break, which joins the distal end in context 4397. Context 4397 also contained the right radius, which has a healed fracture. A fragmentary scapula and metacarpal probably also belong to this skeleton. A sieved sample includes further fragments from the same individual including a fifth metacarpal also with a healed fracture. No evidence of gnawing or butchery marks were noted

Discussion
The partial skeleton of the dog consists of parts of the left forelimb and associated vertebrae, which although not articulated, probably did belong to the same animal, judging by their size and pathological condition. The dog probably survived to quite old age having recovered from fractures of the lower forelimb. A pair of humeri of a neonatal puppy were recovered from context 4331. The front portion of a domestic boar mandible (Object No.3082) was found in the same context. The pit was completely excavated, which confirms that only a partial skeleton of the dog is present. Either only selected portions were deposited, or more probably, the skeleton was disturbed when it was included in material that was redeposited in the pit.

Feature: 4332 *Type:* Pit *Section:*South *Feature Group:* 1
Context with skull: 4336
Other contexts in feature with bones: 4333 4334 4335 4383 4385 4430 4571

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4336	5	5	3	3					18	34
Bones in context 4333	15	8	2	1					37	63
Bones in context 4334	3	3	1	10					22	39
Bones in context 4385	14	40	6	10	1			1	89	161
Bones in other contexts	11	9	3	4	1			4	20	52
Bones in feature	48	65	15	28	2			5	186	349
% identified	29	40	9	17	1			3		

Description of skull
A skull of a foal (Object No.3070) was found in context 4336. The remains are very fragmented but most parts of both sides of the skull are present apart from the occipital. Teeth from both maxillae are represented but only the deciduous teeth and the first molar are fully erupted. No evidence for butchery or gnawing was found.

Discussion
This is one of the Phase 3 pits with a higher than average representation of horse bones, although as usual sheep then cattle form the bulk of the identified assemblage. Evidence for immature horses are rare on Iron Age sites in southern England (Harcourt 1979; Grant 1984a; Maltby 1994) and therefore the skull may have some significance because of its rarity. Horse bones are most common in context 4334. These include five skull fragments, a mandible and an atlas, possibly from the same adult animal. However, knife marks on the atlas show that, if they did belong to the same animal, the neck had been separated from the skull. At least three adult horses are represented in this pit by left humeri, two from context 4334 and a third from context 4385, which formed one of a pair. A third metatarsal, lateral metatarsal and tarsal belonged to one horse in the same context. Several of the horse bones were butchered and/or slightly gnawed. Three unfused sheep/goat thoracic vertebrae were found as an articulated group (Object No.3128) in context 4385, in which sheep/goat elements dominate and include four jaws of lamb and kid. The general impression is that the pit was a repository for a range of butchery episodes involving different species but including horse more frequently than usual.

Feature: 4423 *Type:* Pit *Section:*South *Feature Group:* 1
Contexts with ABG: 4424 4482
Animal Bone Group No 1

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	25	67	8	7	79	2			290	478
% identified	13	36	4	4	42	1				
% identified exc. ABGs	23	61	7	6	1	2				

Description of ABG
A substantial portion of an adult dog skeleton (Object No.3099) was found in both contexts. The presence of the baculum indicate the dog was male. Most of the vertebrae, ribs and pelvis are present. However, the only limb bones represented are the femora, and the atlas and skull are also missing. No evidence of butchery was found.

Discussion
The pit was fully excavated, which means that the missing parts of the dog skeleton were never deposited in the pit or were subsequently removed. Gnawing damage on a pelvis and femur indicates that at some stage the carcass was accessible to other dogs, which may explain its incompleteness. The fragmentary remains of the front of an immature horse skull (Object No.3098) were found in context 4424. Surviving teeth include the canines indicating the skull was probably from a male. The third incisor and canine are not erupted and the fourth premolar is unworn. The rest of the assemblage consists of typical fragmentary remains dominated by sheep/goat. Butchery and gnawing evidence was found on a number of bones.

Feature: 4486 *Type:* Pit *Section:* South *Feature Group:* 1
Contexts with ABG: 4507
Animal Bone Group No(s) 3 4 5 6 7 8
Other contexts in feature with bones: 4432 4508 4509 4510 45111 4513

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4507	5	183	1					39	28	256
Bones in context 4508	1	3		1				72	7	84
Bones on other contexts	13	22	3	6				1	16	61
Bones in feature	19	208	4	7				112	51	401
% identified	5	59	1	2				32		
% identified exc. ABGs	17	73	4	6				<1		

Description of ABG(s)
ABG 3 consists of 75 bones from a sheep skeleton (Object No. 3156). It belonged to a neonate or possibly foetal animal. All the main limb bones, vertebrae, ribs, skull, mandibles and maxillae are represented. There are knife cuts on the proximal metacarpal, indicative of skinning. The skeleton is slightly larger than the other foetal/neonatal sheep that forms ABG 4.

ABG 4 belongs to a second partial skeleton of a neonatal sheep (Object No.3112). Both tibiae, a femur, astragalus, calcaneus and metatarsal survive.

ABG 5 consists of nine vertebrae (sacral, seven lumbar, one thoracic) from the lower spine of an adult sheep/goat (Object Nos.3114, 3157). This group probably belongs to the same skeleton represented in ABG 6-7. Butchery marks were recorded on the right sides of all the vertebrae, and the sacrum also has had the left iliac joint surface removed, indicating removal of the flanks during butchery.

ABG 6 is a collection of 28 sheep lower limb and foot bones, which, given their size, almost certainly belong to same individual (Object Nos.3114, 3156-3158). The bones include a left tibia, which articulates with the astragalus, centroquartal and metatarsal, which in turn articulates with an almost complete set of phalanges and sesamoids. These bones are matched by the right astragalus, centroquartal, metatarsal and phalanges. There is also a right metacarpal and associated phalanges. Knife cuts were found on both centroquartals and the right tarsal, indicating skinning and possible dismemberment.

ABG 7 consists of pairs of sheep humeri and femora. These also probably belong to the same sheep skeleton as ABG 5 and AGB 6. Knife cuts were recorded near the caput of both femora and were made during disarticulation from the pelvis.

ABG 8 is comprised of a lamb metacarpal, two first phalanges and a second phalanx. All epiphyses are unfused apart from the proximal epiphysis of the first phalanx, which has just fused. There is no evidence of butchery marks on this specimen.

ABG 9 consists of 39 bones of a toad skeleton (Object No.3140).

Discussion
The assemblage is dominated by the accumulation of 126 bones from partial skeletons of at least four sheep. ABGs 3-4 belong to two neonatal fatalities, representing spring deaths (and probably deposition shortly thereafter). At least one of them has been skinned prior to disposal, although the complete carcass seems to have been deposited. ABGs 5-7 comprise most of the limb bones of a partially processed adult sheep, which has been skinned and segmented prior to deposition. The skull, neck, pelvis and some of the upper limbs were either not deposited in the (completely excavated) pit or were subsequently removed. The absence of gnawing damage suggests that the missing bones were not removed by dogs. ABG 8 represents a lamb that died possibly around 12 months old. Other very porous mandibles and skull fragments may have belonged to ABG 4.

The toad skeleton is probably a pitfall victim and 72 further amphibian bones from context 4508 indicate that the pit may have lain open for a while. Relatively few bones came from other contexts, although fragments of a worked horse radius and red deer antler were found in contexts 4509 and 4513 respectively.

The deposition of partially processed sheep skeletons can be regarded as the disposal of butchery waste accumulated possibly over a short period of time. The skins of the neonatal sheep were utilised but perhaps their carcasses were considered too small (or diseased) to be worth eating. However, the segmented carcass of the older sheep appears to have been carefully collected before deposition in the pit and this could imply that special attention was paid to its deposition, which probably took place in the spring.

Feature: 4584 *Type:* Pit *Section:* South (Group D) *Feature Group:* 2
Contexts with ABG: 4586 4634 4635
Animal Bone Group No 116
Other contexts in feature with bones: 4585 4587

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in contexts 4634-5	17	12	1	4			49	5	51	139
Bones in other contexts	14	10	2	2	3		1	4	62	98
Bones in feature	31	22	3	6	3		50	9	113	237
% identified	25	18	2	5	2		40	7		
% identified exc. ABGs	33	24	3	7	3		1	9		

Description of ABG(s)

ABG 116 consists of 49 bones of an adult raven skeleton found mostly in context 4635 but nine bones were found in context 4634 and a femur was located in context 4586. No evidence for butchery or gnawing was found.

Discussion
The raven was found in three contexts which suggests that the skeleton was disturbed prior to or subsequent to deposition. There is no clear evidence therefore that it was carefully placed. It was associated in context 4586 with fragmentary remains of adult cattle (Object No.3149) and horse skulls (Object No.3189). A complete dog femur and radius in the same context may have been from the same animal. Amphibian bones indicate that the pit was left open for a time. Cattle are better represented than in most Phase 3 pits with cranial fragments and loose teeth well represented.

Feature: 4598 *Type:* Pit *Section:* South (Group C) *Feature Group:* 2
Context with skull: 4603
Other contexts in feature with bones: 4599 4601 4602 4850

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4603	3	1							3	7
Bones in other contexts	39	57	7			1			106	210
Bones in feature	42	58	7			1			109	217
% identified	39	54	6			<1				

Description of skull
A fragmented cattle skull (Object No. 3141) was found in context 4603. Most of the skull survives, although the parietal region is missing. It includes complete maxillae but no teeth survive in the sockets and there are no other loose teeth in the context. Knife cuts were located near the frontal sinus and on the lateral part of the maxilla.

Discussion
The preservation of the cattle skull suggests it was not immediately deposited in the pit but located elsewhere for long enough for teeth to loosen before deposition. Its good surface condition suggests it was not exposed to gnawing, trampling or weathering and it possibly was curated after careful cleaning, as indicated by the butchery marks. The specimen is similar to the skulls found in ditch 4105. A complete cow radius and part of an ulna were found near to the skull (Object No.3164). The rest of the assemblage consists mainly of sheep/goat and cattle bones, including a lot of butchered specimens (including a dog rib found in a sieved sample not included in the above totals) and a worked red deer antler tine in context 4599 (Object No. 3818).

Feature: 4641 *Type:* Pit *Section:* South (Group D) *Feature Group:* 2
Contexts in feature with bones: 4642 4728 4742 5083 5084

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4642	34	54	3	8	1	1		4	408	513
Bones in context 4728	29	104	10	5	3		2		251	404
Bones in context 4742	16	21	2	3	3	3		1	64	113
Bones in context 5083	8	35	3	3	1				70	120
Bones in context 5084	14	12	1	2			1		51	81
Bones in feature	101	226	19	21	8	4	3	5	844	1231
% identified	26	58	5	5	2	1	<1	1		

Discussion
There are no ABGs assigned to this assemblage. However, a horse left femur, patella and tibia (Object No.3166) were found in context 4642 and may be associated with an astragalus (Object

No.3167). Unfortunately the group is poorly preserved with many modern breaks. The same context produced an almost complete, although fragmented, horse radius and ulna, parts of which are also recorded in context 4728. Fragments of a sawn cow scapula are also present in both contexts. Complete cattle humerus and tibia were found in context 4642.

The assemblage from context 4728 is dominated by sheep/goat elements. It also contained a dog humerus with knife cuts and a complete cattle radius, which also has knife cuts. A sawn cattle horn core base and other worked bone fragments (Object Nos. 3317 and 3320) were also recovered as well as the sawn cattle scapula fragments. A tibiotarsus of a small bird and the radius of a wader (cf plover) were also recovered.

Context 4742 produced a complete cattle metacarpal and two further sawn cattle horn cores. The left radius and humerus of a foetal or neonatal puppy and a fragment of cattle skull with knife cuts on the frontal were also found.

Sheep/goat elements dominate the assemblage from context 5083, which also includes a horse tarsal with knife cuts. In contrast, cattle bones outnumber those of sheep/goat in the smaller assemblage from context 5084. These include a very fragmented cattle skull (Object No. 3283), consisting of both frontals and zygomatics, the right temporal and parietal, the left lacrimal and parts of both maxillae. There are no signs of cut marks but only four of the 12 teeth survive in the maxillae, their wear indicating that the skull is from an adult animal. This skull may be associated with one of two left cattle horn cores, one of which has been sawn ([part of] Object No.3301). A woodcock radius was also found in this context.

There is no doubt that this pit produced a rich assemblage containing evidence for the deposition of skulls, complete bones, butchery and bone working waste. However, the high percentage of unidentifiable fragments indicates that much of the material was also very fragmented and was probably thrown in the pit after originally being deposited elsewhere. Bones of amphibians, mouse and field vole were found in most contexts indicating that the pit lay open at various times and that the depositions should be regarded as a series of separate episodes. Sheep/goat then cattle bones dominate the assemblage with horse and pig represented in small numbers.

Feature: 4707 *Type:* Pit *Section:*South (Group D) *Feature Group:* 2
Contexts with ABG: 4811
Animal Bone Group No(s) 11
Other contexts in feature with bones: 4708 4709 4810 4851 4852 4853

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 4811	9	18	2	3		1	44		15	92
Bones in context 4709	60	31	5	15					236	347
Bones in other contexts	29	34	4	11		1	3		49	131
Bones in feature	98	83	11	29		2	47		300	570
% identified	36	34	4	11		<1	17			
% identified exc. ABGs	44	37	5	13		<1	2			

Description of ABG
A corvid skeleton, probably from a crow, is represented by 43 bones from context 4811 (Object No.3243). It was an adult bird and no evidence for butchery or gnawing damage was found.

Discussion
The assemblage from pit 4707 has some unusual features. Rooks and crows would have been common birds in the vicinity and would be attracted as scavengers to rubbish deposits. The case for the casual deposition of the skeleton could, however, be compromised by its association with other unusual finds in the same context. These include a tarsometatarsus of a crane, the only identified

occurrence of this species in the whole Battlesbury assemblage. Only the distal portion of this bone is represented and it is probably an offcut from boneworking (see also butchery section). A segment of horse skull (Object No.3219) consisting of the left temporal, frontal and zygomatic bears many fine knife cuts on the frontal near to and behind the orbit. The marks again convey the impression that the skull was carefully cleaned beyond the requirements of routine skinning and butchery. A sheep skull (Object No.3240) is represented by both sides of the parietal and frontal and the right sides of the occipital and temporal. Both horn cores are present providing evidence that the skull belonged to an adult ewe. No butchery marks were recorded.

Several other finds associated with bone, horn and antler working were found in the pit, including three sawn horn cores fragments, a sawn base of the coronet of a red deer shed antler (Object No.3213) and another fragment of sawn antler (Object No.3252). Butchery marks are also common. A left tibia, astragalus and calcaneus of a horse were found in articulation in context 4853 (Object No.3263). The distal portion of a right tibia could belong to the same animal. No butchery marks were found but there is some gnawing damage.

Overall, cattle and horse bones are better represented than in most pits, particularly in context 4709. Cattle scapulae and upper forelimb bones are better represented than usual (30% *18%*). The overall impression of the assemblage from pit is that it contains elements of special deposition admixed with more typical waste.

Feature: 4796 *Type:* Pit *Section:* South *Feature Group:* 1
Contexts in feature with bones: 4797

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	54	28	7	44	11				214	358
% identified	38	19	5	31	8					

Discussion
Almost all of the bones in this assemblage are included in Object No.3231. There are no ABGs but there are several quite large and complete bones, including five metapodials, two humeri and three radii of horse, and two radii, two metapodials and two pelves of cattle. Horse bones are unusually numerous and at least four individuals are represented, including bones of at least one foal. A fragmented calf maxilla (Object No.3267) and a partial skull of a polled specimen are included in the cattle sample, which is also better represented than usual, with sheep/goat providing a much lower percentage of the bones than in most pits. There is abundant evidence of butchery on cattle and horse bones. All the dog elements are from small groups of two or three bones (two cervical vertebrae; two metacarpals; three metapodials; group of mandibular loose teeth). It is possible they could all belong to the same adult animal. The single fill of the pit suggests that these bones could have been deposited in one episode and represent butchery waste from a number of horse and cattle and a few sheep and pigs. The very low incidence of gnawing could suggest that these were primary depositions. If this is the case it represents the processing of quite a substantial amount of meat but the extraction of marrow seems not to have been carried out on many of the limb bones.

Feature: 4868 *Type:* Pit *Section:* South *Feature Group:* 3
Context with skulls: 4884
Other contexts in feature with bones: 4822

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	8	4	3	1				4	28	48

Discussion
Context 4884 produced two hornless cattle skulls. One (Object No.3238) consists of both occipitals, temporals, the sphenoid and the back of the frontal. It belonged to an adult and has no evident butchery. The other, consisting mainly of both frontals has blade marks and knife cuts near the frontal sinus and behind the orbits suggesting defleshing. It is also slightly gnawed.

Apart from in this pit and pit 4796, there were no other hornless cattle skulls discovered during the excavations and, generally, hornless cattle are rarely found on British Iron Age sites. The presence of both skulls in the same context with one of them having evidence for careful cleaning, perhaps for display, would suggest that their placement could have special significance. There are no unusual bones associated with the skulls, however. The amphibian bones indicate that the pit lay open for a period of time.

Feature: 5358 *Type:* Pit *Section:* North *Feature Group:* 4
Contexts with ABG: 5735 5848
Animal Bone Group No(s) 13 104 105 106
Other contexts in feature with bones: 5359 5734 5769 5770 5771

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 5735							7			7
Bones in context 5848	31	49	4	2				2	104	192
Bones in other contexts	26	77	13	9			2		170	297
Bones in feature	57	126	17	11			9	2	274	496
% identified	26	57	8	5			4	<1		
% identified exc. ABGs	18	64	10	6			1	1		

Description of ABG(s) and skulls
Three ABGs were found in context 5848 and one in 5735.

ABG 13 from context 5735 consists of seven bones of a corvid, probably a crow. Most of the bones are from the left wing plus the sternum and right femur. The skeleton is of an adult bird. No evidence of butchery or gnawing was found.

ABG 104 consists of 14 cattle vertebrae and seven ribs (Object Nos.3420-3421) in context 5848. Six cervical, four thoracic, three lumbar and the sacral vertebrae are represented. The vertebrae are just fusing or unfused and belonged to an adult but not elderly animal, perhaps around five years old. There is evidence of gnawing on at least two of the vertebrae but no evidence of butchery.

ABG 105 is a smaller group of five cattle bones from context 5848 consisting of both pelves, the sacrum and two lumbar vertebrae. The vertebrae are unfused and belong to a younger animal than the one represented in ABG 104. Most of the bones are slightly gnawed and the right pelvis bears a knife cut on the ventral aspect of the shaft of the pubis.

ABG 106 consists of 13 bones of a lamb (Object No. 3416). Elements represented include the fragmentary remains of the skull, including both maxillae, both mandibles, scapulae, radii and metacarpals and the left pelvis and humerus. Tooth eruption and fusion evidence suggest that the lamb was about six months old and horned. Gnawing marks were noted on the scapula and radius. Knife cuts were found on posterior aspect of the right metacarpal.

Context 5848 also produced three skulls. The fragmentary remains of a horse skull is represented by the back of the right maxilla, frontal and temporal (Object No.3419). No evidence of butchery was found. Two cattle skulls were also found (Object No.3392). One has survived with the frontals and sphenoid area intact but with the brain cavity exposed; the other is very fragmentary

but includes the frontal, temporal, parietal, and base of the horn core. Neither specimen has evidence for butchery.

Discussion
The presence of at least three skulls and at least four ABGs suggests that there may have been structured deposition of bones in this pit. However, the two cattle ABGs may simply be butchery residues and the lamb ABG has been skinned and possibly also segmented. There is no evidence of butchery on the crow skeleton or on the skulls. The presence of gnawing marks suggests that scavengers have at some stage disturbed the skeletons involved. The rest of the assemblage is dominated by sheep/goat elements but there are also several fairly complete limb bones of cattle and horse. Bones of a young rook/crow and a woodcock were found in context 5359.

Feature: 5592 *Type:* Pit *Section:* North *Feature Group:* 4
Contexts with ABG: 5728
Animal Bone Group No(s) 12
Other contexts in feature with bones: 5593 5594 5726 5727 5729 5730 5731 5732 5733 5882

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 5728	18	54	6	4		10			70	162
Bones in other contexts	41	127	27	7	3	7			200	412
Bones in feature	59	181	33	11	3	17			270	574
% identified	19	60	11	4	1	6				
% identified exc. ABGs	20	62	11	4	1	2				

Description of ABGs and skulls
ABG 12 consists of ten bones from context 5728 of an adult fox, consisting of parts of the front foot and lower hind limbs. No evidence for butchery or gnawing was found.

A cattle skull (Object No.3878) was found in context 5731. Both sides of the parietal and frontal and sphenoid area were found. No evidence for butchery was noted.

Maxillae belonging to a second cattle skull were found in context 5882. Only one tooth survived in the jaws but this indicated the skull was from an adult. No butchery or gnawing marks were recorded.

Discussion
The fox shows no evidence for skinning or other processing. It is uncertain whether it was buried as a complete carcass as the pit was only half sectioned. Fox burials have been found on a number of Iron Age sites, notably at the hill fort at Winklebury in Hampshire where a number of skeletons were found in a pit associated with a red deer skeleton (Jones 1977).
The cattle skulls show no clear evidence of special treatment and may simply have been discarded butchery waste. The remaining assemblage is dominated by sheep/goat bones. These include a high percentage of ribs (14 *4%*) but all other parts of the skeleton are also represented. There are a fair number of porous bones of lambs, several of which could have belonged to the same carcasses. There is a lot of evidence of butchery on the bones of the major domestic species. A badger radius was found in context 5732 and a foal tibia in context 5594. A fragment of worked red deer antler was retrieved from context 5822. Most of the assemblage appears to be waste from processing activities typical of assemblages elsewhere on the site.

Feature: 5750 *Type:*Pit *Section:* North *Feature Group:* 4
Contexts with ABG: 5751 5752
Animal Bone Group No(s) 107 108 109

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context 5751	3	28	4	1	23				62	121
Bones in context 5752	19	26	18						65	128
Bones in feature	22	54	22	1	1				127	249
% identified	18	44	18	<1	19					
% identified exc. ABGs	19	61	18	1	1					

Description of ABG(s)
ABG 107 consists of 22 bones of dog from context 5751 (Object No.3372). The group contains the dorsal parts of five thoracic vertebrae and 17 rib fragments. Two rib heads are fused and therefore the bones are from an adult. There is no evidence of butchery or gnawing.

ABG 108 consists of four phalanges (two first, one second, one third) and the metacarpal of an immature cow recovered from context 5752. The proximal epiphyses of the phalanges and the distal epiphysis of the metacarpal are unfused and all bones are slightly porous, indicating the bones belong to a calf. Knife cuts were observed on the lateral aspect of the proximal end of the metacarpal.

ABG 109 was also found in context 5752. It is comprised of two sets of three pig vertebrae, which are at a similar stage of development and are therefore likely to have belonged to the same animal. The axis, third and fourth cervical vertebrae form one group with knife cuts on the ventral aspect of the axis. The second group consists of three lumbar vertebrae, at least one of which bears evidence of having one of the lateral processes removed by butchery. The bodies of all the vertebrae are unfused indicating they belonged to a juvenile animal.

Discussion
ABG 107 consists of part of a rib cage of an adult dog. There is no clear evidence whether this is from a butchered carcass or represents the disturbed remains of a complete skeleton. A large number of medium-sized ribs, also probably of sheep/goat were found in the same context, suggesting that there may also have been a rib cage of a sheep deposited here.

ABG 108 can be interpreted as skinning and/or butchery waste with the forefoot having being disarticulated from the upper limb. A number of cattle skull and mandible fragments at a similar state of development to the bones in ABG 108 may indicate that the head of this and at least one other calf were discarded at the same time. Two left mandibles possess the first molar in early wear but the second molar has not erupted, possibly indicating they (and by implication the bones in ABG 108) belonged to calves of about three month of age. The left lacrimal, frontal and zygomatic of two calves, one of which also was still associated with the left maxilla, also belong to this group. Superficial chop marks on the back of the zygomatic show that the mandibles were detached from the skull and cuts near the frontal/nasal border and above the premolars indicate skinning. The impression is that processing waste from two calves has been deposited in the pit, possibly in the summer. The rest of the carcasses are not present.

ABG 109 can be interpreted as segments of butchery waste from a piglet. Knife cuts on the axis show the neck was separated from the skull and the removal of the lateral processes of the lumbar vertebrae would have occurred when the flanks of the animal were removed.

The rest of the assemblage from pit is, as usual, dominated by sheep/goat elements.

Phase 4

Feature: 4272 *Type:* Pit *Section:* South (Group A) *Feature Group:* 1
Contexts in feature with bones: 4273 4346

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	9	24	2		1				202	238

Discussion
This feature is chosen because of the discovery of human remains. The animal bone assemblage appears unremarkable, however. A humerus of a lamb was found close to the pelvic area of the human skeleton. In addition to the bones listed above, sieved samples produced small fragments of sheep/goat, dog, amphibian, pig and cow. There are a large number of small unidentified fragments.

Unphased

Feature: 4625 *Type:* Pit *Section:* South (Group C) *Feature Group:* 2
Contexts with ABG: 4626
Animal Bone Group No. 10

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in context		50							72	122
% identified		100								
% identified exc. ABGs		100								

Description of ABG
ABG 10 consists of five sheep distal forelimb elements. The right metacarpal articulates with two first phalanges and one second phalanx. A left metacarpal is almost certainly from the same individual. The distal epiphysis of the metacarpal is fused and therefore the sheep was probably over 18 months old at death. No evidence for butchery or gnawing was found.

Discussion
ABG 10 may represent the disposal of the feet of a sheep that has been skinned and possibly dismembered. Other parts of the skeleton may, however, be represented in the unexcavated half of the pit. The other identified bones in the pit are also entirely from sheep/goat. In addition nearly all of the unidentified fragments are of medium-sized mammal, which are also probably sheep/goat. The identified sample includes quite a high proportion of porous bones of young sheep and it is possible that several of these belonged to the same animals. At least three sheep are represented. Butchery marks on three bones indicate that the carcasses have been at least partly processed prior to disposal.

Feature: 5102 *Type:* Pit *Section:* South *Feature Group:* 3
Contexts with ABG: 5104
Animal Bone Group No(s) 102
Other contexts in feature with bones: 5103

	Cow	S/G	Pig	Hor	Dog	Wild	Bird	Amp	Uni	Total
Bones in feature	16	20	6				2		63	107

Description of ABG(s)
A partial skeleton of a neonatal pig was found in context 5104. Only the ulna was represented in the hand-collected sample but 17 further bones were retrieved from sieved samples, including parts of the skull and most of the upper limb bones. No evidence for butchery or gnawing was observed.

Discussion
There is no clear evidence that the pig skeleton represents a deposition of any ritual significance. It could have entered the pit as a complete carcass (the pit was only half-sectioned) and may have been a natural neonatal mortality. Associated bones included two wing bones of a buzzard and a number of porous bones of cattle and sheep representing other neonatal mortalities and indicating that the pit may have been infilled during the spring.

Contextual Analysis – Discussion

The assemblages from the 37 features described above have been selected from the 357 features that produced animal bones. Selection was based mainly on the size of the assemblage and/or the presence of ABGs and substantial portions of skulls. The 37 features produced 12,074 bones and teeth from hand-collection. Therefore, we are examining just over 10% of the features but over 53% of the total assemblage collected. Apart from six assemblages from Phase 1-2 ditch sections, all the assemblages in this contextual analysis are derived from pits. None of the assemblages from postholes and other types of feature were large enough to be selected for analysis. We acknowledge that this selection is biased towards "richer" assemblages from pits that arguably are untypical of the assemblages from the site in general. Typically, many pits and other features did not contain large quantities of animal bones. By concentrating mainly on larger assemblages, we are imposing our own selection bias into the analysis. However, species representation in the selected features is generally similar to the sample as a whole (cattle 29% *30%*; sheep/goat 55% *52%*; pig 9% *11%*; horse 5% *4%* and dog 3% *2%*).

It is clear from the analysis of the selected assemblages that within the general pattern of bone deposition, there are assemblages that appear "unusual". They may include one or more groups of associated bones or contain relatively complete skulls, or limb bones. They may simply contain a much denser concentration of bones than is found generally. Occasionally all these traits are found in one assemblage.

The most unusual assemblage is undoubtedly the one from ditch 4105. It may be correct to assign special significance to the deposition of the cattle and horse skulls but we would argue that the evidence suggests that their deposition in the ditch concluded at least as significant a "life" for the skulls above ground. After the skulls had been carefully cleaned and their brains removed, they may have been placed on poles or hung on walls for some considerable time. This may have been at Battlesbury itself, although their importation from elsewhere cannot be ruled out.

There is evidence that the skulls in ditch 4105 were not the only ones carefully cleaned prior to deposition, implying that other skulls also were displayed prior to deposition. Probable examples of cattle skulls treated in this way were found in pits 4470 (Phase 1-2), 4606 (Phase 2-3), 4598 (Phase 3) and 4868 (Phase 3). A portion of cleaned horse skull was also found in pit 4707 (Phase 3). This suggests that the practice may have been one that was not restricted to a particular phase or indeed a particular area of the site.

These results have implications for the analysis of skulls from contemporary sites. Only by careful examination for butchery marks, gnawing damage and other taphonomic indicators has it been possible to demonstrate that the symbolic importance of the skulls extended beyond their deposition. It would be surprising that such treatment of skulls was restricted to Battlesbury and re-examination of skulls from other Iron Age assemblages may be revealing. The practice of accumulating large numbers of curated skulls for placement and display has been evidenced on a Beaker burial mound at Irthlingborough, Northamptonshire (Davis and Payne 1993). An accumulation of cattle skulls was recorded by the excavator of an early Iron Age enclosure at Harrow Hill, Sussex (Holleyman 1937). A skinned horse skull and mandible were found in the entrance terminals of the penannular ditch of a Middle Iron Age round house at Farmoor (Wilson 1979).

However, it is also important to point out that not all cattle and horse skulls were treated in the same way. Most of the skulls did not produce evidence of careful cleaning. For example, the calf skulls found in pit 5750 (Phase 3) have evidence of skinning but not to the excessive extent as the previous specimens. They were also probably deposited with their foot bones and they are most convincingly interpreted as discarded waste from the skinning process. Other skulls in the pits bear no evidence of being carefully cleaned. Whether they were placed in the pits or casually thrown in is unclear and we have to rely on the detailed observations in excavation records for guidance. The suggestion that there was selection of only a certain (probably very small) proportion of the skulls is interesting in the light of the two hornless cattle skulls found in pit 4868. The unusual nature of these skulls may have been the reason for their special treatment.

There are no complete burials of animals from Battlesbury. Most ABGs consist of relatively small numbers of bones from various parts of the body. The most complete skeletons that show no evidence of butchery belong to dog (e.g. Phase 3 pit 4423) and corvids (raven in Phase 3 pit 4584; crow in Phase 3 pit 4707). The fact that here is evidence that the dog skeleton was partially destroyed by gnawing and bones of the raven skeleton were recorded in three different contexts is indicative that the skeletons may not have been been completely articulated when deposited. Indeed, several of the ABGs have evidence for slight gnawing damage. We suspect that most of this damage occurred prior to deposition, particularly in the cases of ABGs from the lower pit fills. This suggests that many of the groups may have been secondary depositions after being accessible to scavengers prior to deposition. The cattle forelimb in ditch 4105, on the other hand, may have been disturbed by dogs after disposal.

A substantial proportion of the Battlesbury ABGs display evidence of butchery and clearly represent well preserved carcass processing waste. There are other small groups that, although they do not display butchery marks, also have probably been butchered. This is not to say that the evidence of butchery precludes them from being considered as being part of a ‘special’ or ‘structured’ deposit, particularly when they are found in association with other animal ABGs or groups of artefacts. A good example of this is from pit 4486 (Phase 3), in which a carcass of a sheep has clearly been butchered and segmented but the bones have been collected and deposited together. This could be interpreted merely as the remains of a sheep after it had been fully processed and eaten. However, this does not seem very likely. “Processed” sheep burials have been identified as foundation deposits in structures from Roman Winchester and on the Iron Age site at Wilby Way, Wellingborough (Maltby unpublished 1-2). The association of the “processed” sheep in pit 4486 with an almost complete skeleton of a skinned newborn lamb adds to the likelihood that this was a case of structured deposition.

Some of the isolated groups of butchered remains, particularly those of small groups of vertebrae are, however, probably best considered as well preserved butchery waste.

It is clear from the descriptions and the discussion that it is not easy to distinguish between what we might regard as mundane butchery waste, and deposits that we consider to have a greater significance in their deposition. It is dangerous to prejudge what we should place in these two groups. As has been demonstrated, many of these ABGs are associated with assemblages, which do appear to be the waste from basic butchery activities. Some skull depositions would have had special significance; others, we believe, would not. Some of the assemblages (containing ABGs would have had special significance; others, we believe, would not. It may be that on occasions it was the entirety of the assemblage derived from middens that was considered to be of special significance. In that case, we should not be surprised to find bones that were gnawed, burnt and butchered included in the assemblage. On other occasions, it is equally possible to envisage that the decision to backfill pits may simply have resulted in the collection and dumping of any convenient soils and associated rubbish that had accumulated nearby.

Indeed, to assign the faunal assemblages (or their components) subjectively along the lines of "sacred" or "profane" may be to artificially divide the assemblage in a misleading way. There is every reason to suppose that food consumption and symbolic and ritual behaviour often occurred simultaneously. For example, feasting often accompanies sacrifice. We should, therefore not be surprised that the residues from these practices are also found in complex associations.

Butchery Recording Methods

The presence of butchery marks on identified specimens was noted by the authors on the individual bone record form in the database. Marks on unidentified fragments were not routinely recorded. All butchered specimens were examined and recorded onto a butchery record form/table. This form contains three fields. The first allowed the recording of the location of the butchery marks to the approximate area (e.g. distal end; proximal end; mid-shaft; distal shaft) and aspect (e.g. anterior; posterior; lateral; medial) of the element. The field was also used to record the types of marks (e.g. chop-marks; knife-cuts; saw-marks), their severity (e.g. superficial; deep) and their orientation (running medio-laterally, obliquely etc.). These observations were recorded as a string of one-character codes. For example, a medio-lateral knife-cut located on the anterior aspect of the distal end of the element was recorded as "DFK-". The full key of the coding system is stored within the animal bone archive.

The second field in the butchery table allowed the recording of a butchery classification code. In this way it was possible to summarise the diverse individual butchery records into a more restricted and usable classification. The classifications were based on those originally devised for categorising butchery marks found on cattle bones from Iron Age and Romano-British settlements in southern England (Maltby 1989). The numbers of classifications have since been expanded and are used here on all species identified. The numbers of classifications available vary between elements. For example, the mandible currently has 22 whereas the calcaneus only has 10. Definitions of all the available classifications are available as part of the animal bone archive.

The third field in the Butchery Table was used sparingly to provide additional notes about the observed butchery marks. Brief notes of butchery records were also made on the Context Summary Form/Table.

In cases where more than one butchery mark was observed on the same specimen or where marks were found in different locations, further records were made for that specimen within the Butchery Table. The relational database allowed such multiple records to be linked to the Main Table via the unique identification number assigned to each specimen.

Butchery Quantification – Introduction

In total, 561 specimens were noted as having butchery marks. Including specimens with multiple records, there are 596 observations of butchery damage. These totals include butchery observations made on five specimens retrieved from sieved samples. Observations of butchery were made on bones of all the domestic species. Marks were also noted on red deer, roe deer and crane specimens. In the case of these wild species, all the marks are associated with the creation of objects made from antler or bone. These will be described below but are omitted from the calculations carried out in this section. Analysis will also be restricted to hand-collected specimens only. To facilitate possible comparisons with other samples, calculations of butchery frequency also omit loose teeth from the calculations. Two cattle teeth bearing knife cuts from Phase 1-2 pits are thus excluded from the totals.

Overall Quantification of Butchery by Phase and Context Type

Using the criteria described above, at least 7.4% of the 7,273 bones identified to domestic mammals (excluding loose teeth) bear butchery marks. These figures vary between 3.5% (Phase 1) and 11.8% (Phase 4), although both these are based on small samples. The larger samples from Phases 1-2 and 2 also produced slightly lower than average butchery percentages (Table 17). The largest sample (Phase 3) includes 8.6% butchered specimens. There are therefore slight increases in butchery frequencies in the later phases.

There is some evidence to suggest that bone surface preservation affected butchery observations. Only 13 (3.4%) of the 377 eroded fragments of domestic species also have butchery recorded, whereas 525 (7.6%) uneroded specimens are butchered. Surface erosion tends to mask fine knife cuts. On the other hand, butchery marks were found slightly more frequently on gnawed specimens (8.2% NISP = 1378) than on ungnawed fragments (7.2% NISP = 5895). This suggests that butchered bones were more commonly damaged by dogs and other carnivores, particularly as undoubtedly many butchery marks would have been destroyed by gnawing.

Context type also appears to have some bearing upon the frequency of butchered bones. The large majority (452) of butchered specimens were found in pits and these unsurprisingly represent a very similar percentage of butchered specimens (7.7%) to that of the overall sample (7.4%). Ditches and other linear features produced 62 butchered specimens representing 5.5% of the domestic species in that assemblage. As discussed previously, the assemblages from the ditches tend to be less well preserved than the pit assemblages and more butchery marks may have been obliterated. A small sample of 183 bones from postholes includes 17 (9.3%) butchered bones. This is a surprisingly high percentage given the shallow nature of many of these contexts, although the sample size is limited. Layers and other feature types produced just seven (6.2%) butchered bones.

Species Quantification of Butchery by Phase

This section will also be restricted to consideration of domestic species from hand-collected samples only. Most (42.2%) of the 538 butchered bones recorded belong to cattle. These bones represent 10.5% of all cattle bones (excluding loose teeth) (Table 17). As is to be expected, fluctuations in the percentages of butchered cattle bones mirror the overall patterns observed in the previous section. Higher percentages were encountered in the Phase 2-3, Phase 3 and Phase 4 assemblages than in the Phase 1, 1-2 and 2 samples.

Overall, 40.0% of the butchered bones of domestic mammals belong to sheep/goat. Only 5.6% of the sheep/goat bones are butchered. There is less variation in the percentages of butchered sheep/goat bones between phases than in the case of cattle. Percentages range between 2.6% (Phase 4) and 6.8% (Phase 3) (Table 17).

Pig bones provide 11.5% of the butchered specimens. Pig carcasses (unless from very young animals) are generally larger than sheep/goat but smaller than cattle. This may partly explain why the percentage of butchered pig bones (8.1%) lies between the figures obtained for sheep/goat and cattle, reflecting the fact that larger carcasses require more butchery. Percentages of butchered pig bones fluctuate between assemblages from different phases, although small sample sizes hinder these comparisons. The three largest samples of pig bones from Phases 1-2, 2 and 3 include 8.3%, 4.9% and 7.1% butchered bones respectively (Table 17).

The total of 538 butchered bones includes 6.1% that belonged to horse, representing 10.3% of the horse sample. These figures clearly indicate that horse carcasses were commonly butchered for meat. Indeed, the percentage of butchered horse bones is closely comparable with cattle. However, there does appear to be chronological variation in the incidence of horse butchery. Only one (1.7%) horse bone was recorded as butchered in the Phase 1-2 deposits. This figure rose to 5.3% in the Phase 2 assemblage. However, in both phases, cattle bones were more frequently damaged by butchery (Table 17). In contrast, butchered horse bones were much more frequently observed (13.2%) in Phase 3 features. This suggests that there was an increase in the intensity of exploitation of horse carcasses for meat and other products in Phase 3. Taken in conjunction with the evidence for the higher frequencies of horse bones generally in Phase 3 features, this implies an increase in horsemeat consumption in that phase, or at least an increase in the deposition and survival of processed horse carcasses at that time. However, the increased percentage of horse butchery is due in part to concentrations of butchered horse bones in some Phase 3 pits. For example pits 4332 and 4796 each included six butchered horse bones and pit 4707 produced three examples. Such concentrations may indicate that horse butchery and/or the disposal of butchered horse bones was carried out less routinely than in the case of cattle.

Only two dog bones were recorded with butchery marks, both from Phase 3 features. One of these is from a sieved sample. Amongst the hand-collected material, butchery was found only on 0.5% of the dog bones (Table 17). There is therefore little evidence to indicate that dog carcasses were commonly processed for meat or skins.

Types of Butchery Marks Recorded

These were divided into three types. Chop marks were recorded on specimens where an axe or a cleaver had inflicted damage. Occasionally it was noted that some of the superficial marks recorded as chops could have been made with a blade inserted more deeply than usual. Knife cuts were recorded on specimens where fine incisions were noted. Although it is likely that most of these were inflicted with a metal blade, it is possible that a few represent ephemeral marks made by a heavier implement. Saw marks were recorded in cases where a serrated blade had left characteristic patterns.

Including bones that had more than one type of butchery mark, a total of 596 separate butchery observations were recorded. Excluding marks on wild species, loose teeth and on bones from sieved samples, 584 records were made on the bones of domestic species.

Incisions made with a knife or other fine blade were by far the most common type of butchery mark encountered, accounting for 76.2% of all the butchery observations, with comparatively little variation between phases. Chop marks were, in comparison, relatively rare and located mainly on the vertebrae (see below) but did account for 21.4% of the observations. Saw marks were infrequent representing only 2.4% of the observations. There were no major variations in the types of butchery marks found on different species. Saw marks were not found on any of the pig or dog bones. Most of the saw marks were found on cattle and sheep horn cores. Perhaps surprisingly, relatively fewer chop marks were observed amongst the butchered cattle bones (15.3%) than on those of sheep/goat (28.1%), pig (19.1%) and horse (26.3%). In the case of sheep/goat and pig, the larger proportion of vertebrae identified amongst their butchered bones largely accounts for the higher percentage of chop marks.

Cattle butchery

The frequency of butchered bones for all the domestic mammals is given by element in Table 18. Details of the butchery codes are stored with the archive.

Skull including horn core and maxilla
Twenty-one cattle skull fragments (excluding maxilla fragments) were recorded as butchered. These included the group of skulls deposited in ditch 4105. As discussed above, fine incisions were found on seven of these skulls (five in context 4101, one each in contexts 4100 and 4450). The marks were made during the skinning and careful cleaning of these skulls. Incisions were usually located near the frontal sinus (SK18 – 4 specimens) or near the horn core (SK9 – 2 specimens) and/or beneath the eye socket on the zygomatic (SK6 – 2 specimens).

Evidence for similar treatment of other cattle skulls is limited by the lack of substantial portions of intact skulls. Indeed, the survival of substantially complete skulls could in itself be indicative of special treatment. Similar marks were recorded on several partially intact skulls recovered from pits. For example, Phase 3 pit 4598 (context 4603) contained a substantial portion of a skull bearing knife cuts near the frontal sinus (SK18) and on the maxilla (SK8). A second relatively intact skull with knife cuts near the horn cores and the frontal sinus was located in Phase 1-2 pit 4470 (context 4483). A Phase 2-3 pit 4606 (context 4633) contained about 25% of a complete skull with ten short transverse knife cuts on the centre of the frontal level with the orbit. Such butchery goes beyond what is required for skinning and implies careful cleaning. The same pit (context 4653) produced a cattle frontal and parietal segment bearing knife cuts on the frontal near the horn core (SK9). A similar portion of frontal and parietal in Phase 3 pit 4868 (context 4884) has both knife cuts and heavier blade marks (SK16) on the frontal clearly made when scraping clean the top of the skull. A similar segment from Phase 3 pit 4641 (context 4742) bore knife cuts posterior to the frontal sinus. Two further frontal fragments bore knife cuts in the same area (pits 4221, 4305). Two zygomatic fragments (pits 4223 and 5670) bore similar knife cuts to those found on some larger skull segments (SK6).

Other types of butchery marks on cattle skulls were found infrequently. The left lacrimal, frontal and zygomatic bones of two calves from the same Phase 3 pit 5750 (context 5752) bore superficial chop marks on the lateral surface of the zygomatics presumably made when the mandibles were detached from the skull (SK19). One of these also had knife cuts on the frontal near the nasal. A maxilla bearing knife cuts to the anterior of the deciduous premolars (SK15) probably belonged to one of these skulls. These distinctive butchery marks indicate that these skulls were processed at the same time.

A substantial portion of the back of a cattle skull was found in Phase 1-2 pit 4993 (context 4995). Evidence of decapitation was found on the ventral of the occipital were a serrated knife had snagged into the surface of the bone. Superficial chop marks on a parietal fragment (Phase 3 pit 4796) are indicative of the removal of the horn core (SK3).

Twelve cattle horn cores (all from pits) bear chop (3 specimens) or saw marks (9 specimens). All of the chop marks and two of the saw marks are located at the proximal end of the horn core at the junction with the skull and indicate that the whole core together with the horn sheath was removed. The other seven specimens bear saw marks on various parts of the horn core indicating either removal of only the distal part of the horn or subsequent segmentation. All the marks represent evidence for the removal of all or part of the horn preparatory for working. The horns themselves have not survived but the evidence indicates that the material was utilised.

Of the nine sawn specimens, seven were from Phase 3 contexts, whereas only one was from a Phase 1-2 feature (pit 4784) and one was unphased (pit 4639). Of the three specimens bearing cleaver marks, two were from Phase 1-2 and one from Phase 2 pits. This suggests that saws were more widely used (and available?) in the later phase. The distribution of worked horn cores, however, does not appear to be randomly scattered. Pit 4641 produced

four sawn specimens from three contexts and Pit 4707 provided three from two contexts. This suggests that on occasions several horn cores were accumulated for processing. The latter pit also contained fragments of sawn goat horn core, worked red deer antler and a worked crane tarsometarsus (see below). These and other pits with sawn cattle horn cores (pits 4784, 4639) were all from feature group 2.

Four of the seven butchered maxillae/premaxillae were found in Phase 2 Ditch 4105. One of the group of skulls in context 4101 has fine incisions on both right and left maxillae including ten on the right side above the premolars (SK8). Again the number of cuts suggests very careful removal of the cheek meat. Two other maxillae from the ditch bear similar knife cuts above the cheek teeth whilst another has incisions running vertically on the premaxilla (SK15). The butchered maxilla from pit 5750 has been discussed above. Two Phase 3 pits (4332 and 5358) also produced maxillae with knife cuts.

Mandible

Twenty-eight cattle mandibles were recorded as butchered including two specimens with two different butchery classifications. Of the 30 observations of butchery damage, 27 consisted of incisions compared with only two with chop marks and one with either deep knife cuts or superficial chop marks. Knives were clearly the usual tools employed for butchery. Eighteen observations of knife cuts were observed on the ramus. Ten were situated on the lateral aspect near the condyle (J8), three were on the caudal surface (J9) and five were located on other parts of the ramus (J10), mainly on the caudal part of the medial surface. Most of these marks are likely to have been made during the separation of the skull from the mandibles. Five mandibles bore knife cuts on the diastema, four running vertically on the lateral (buccal) aspect (J1) and one running obliquely along the medial (lingual) surface (J4). Four specimens bore knife cuts running below and parallel to the cheek teeth, two on the buccal surface (J14) and two along the lingual surface (J17). These are all likely to be associated with the removal of meat from the jaws.

The two definite examples of chop marks were found on the rami of specimens from Phase 2-3 and Phase 3 pits. There were no clear chronological or spatial variations in the types of butchery mark observed on mandibles. All but two of the mandibles were found in pits; the others came from ditches.

Scapula

Butchery marks were observed on 22 cattle scapulae, of which two had more than one classification. Twenty were located in pits, one from a ditch and one from a layer. Seven consist of chop marks compared with 17 observations of knife cuts. Disarticulation from the proximal humerus is indicated by knife cuts on four specimens near the edge of the glenoid cavity (S8). The same explanation could account for the knife cuts on the neck of four specimens (S21). Various knife cuts were found on the blades of nine scapulae on both medial and lateral surfaces, most of these probably being associated with filletting.

The glenoids of two scapulae have been split by blows to the medial or lateral surfaces (S1), presumably to separate the bones from the humerus. Superficial chop marks were found on various surfaces of five of the blades (S5 and S14). Again, there are no clear chronological or spatial variations in the types of butchery mark observed on scapulae.

Humerus

Twenty butchery classifications were recorded on 18 cattle humeri. All but three of these were recovered from pits; two came from ditches and one from a layer. Again knife cuts predominate accounting for 17 of the observations; the others consist of superficial chop marks or deeper incisions. Ten knife cuts were found on or near the distal end, six on the medial aspect (H10) and four on the lateral surface (H18). Most of these would have been made during disarticulation from the radius and ulna. Poor survival restricted the observation

of knife cuts on or near the proximal end to two specimens (H14). Knife cuts on the shaft were all found on the medial aspect (H13 – 5 specimens). Two of these are located quite close to the distal end and may have been made during disarticulation; the others are more likely to have been made during filletting.

Two specimens with superficial chop mark on or near the distal joint surface (H21) were both from Phase 3 pits (4486 and 5592). A humerus with a deep incision on its shaft was found in Phase 1-2 pit 4305.

Radius and Ulna
Nine radii provided ten observations of butchery. Six of these consist of knife cuts on the medial aspect near the proximal end (R11) made during disarticulation from the humerus (cf H10). Knife cuts on other aspects of the proximal end (R23) were found on two specimens, again probably associated with segmenting the carcass. A knife cut was also found on the anterior of the shaft of a complete radius (R13). The only example of a chop mark was found on a proximal fragment from pit 4606 (Phase 2-3). The posterior has been heavily chopped axially near the medial aspect. The bone has not been fully split, which suggests that segmentation rather than marrow extraction was the cause of this damage.

Six butchery records were made on five ulnae, all but one of which were found in pits. One specimen from Phase 3 pit 4796 bears knife cuts on the posterior of the olecranon (U16), which matches marks on the medial and lateral aspects of the associated radius (R11 and R23). These are all associated with the separation of these bones from the humerus. Similar incisions were found on various aspects of the proximal part of four other ulnae (U7, U8, U16).

Pelvis
Fourteen cattle pelvis fragments provided 15 examples of butchery. All but two of the specimens were found in pits; two were from ditches. Twelve instances of knife cuts were recorded; two specimens bear chop marks and one has been sawn. The most common type of butchery consists of knife cuts on various parts of the ilium (P13 – 5 examples). Some of these are associated with disarticulation from the sacrum; others are located relatively close to the acetabulum and may have been made during the removal of the femur. One specimen from Phase 3 pit 4796 has knife cuts on the ventral aspect of the ilium shaft near the acetabulum but has also been sawn through the iliac tuberosity (P1). Four fragments bear knife cuts on the ventral aspect of the shaft of the pubis (P15). One of these belongs to ABG 105 in Phase 3 pit 5358. The right pubis in this group, which consists of both pelves, sacrum and two lumbar vertebrae, bears an oblique mark on the ventral aspect of the shaft, again demonstrating that associated groups were often butchered. Knife cuts on the edges of the acetabulum (P14) were found on two specimens. A knife cut was also made on the lateral aspect of the shaft of an ischium (P16). Only two specimens had been chopped, both on the shafts of the pubis near the acetabulum (P7-P8). One of these was from the same Phase 3 pit as the sawn specimen; the other also came from the Phase 3 pit 4724.

Femur
Sixteen cattle femora produced 17 butchery records. Twelve came from pits, two from ditches and two from postholes. Only four chopped specimens were recorded, all in this case belonging to Phases 1-2 or 2. Seven specimens bear horizontal knife cuts on or just above the distal condyles (F13). One of these specimens also has a vertical incision on the medial aspect (F24). All were probably made during the separation of the femur from the tibia. This process was carried out with a cleaver in a further two instances (F7, F14). Five specimens have knife cuts on the shaft (F12), most of which were probably made during filletting. Surprisingly, only one specimen bears a knife cut near the proximal articulation, usually a common location for marks made when the femur is separated from the pelvis (F10). Finally, a small shaft fragment from pit 4991 bears three heavy chop marks just above the fossa (F15).

Tibia
Nine tibiae (7 from pits; 2 from ditches) were recorded as butchered. Two bear knife cuts on the proximal end (T9) made during disarticulation from the femur. Two have similar marks near the distal end (T11) made during the removal of the astragalus. In one case corresponding marks were found on an associated fibular tarsal (see below). Horizontal knife cuts were found on two shafts (T10) and oblique cuts were found on the distal shaft of two further specimens (T18). Filletting is the most likely cause of these marks. The only specimen bearing a superficial chop mark on the shaft (T13) was found in Phase 2 pit 4836.

Carpals and tarsals
Four radial carpals (3 from pits; 1 from a ditch) bear knife cuts on their posterior aspect, made during the disarticulation of the front foot from the radius and ulna.

Butchery marks were observed on 13 cattle astragali, including two with more than one classification. Ten of these were found in pits, two in ditches and one in a layer. All marks consist of incisions usually running transversely on the anterior aspect. Most commonly, these are found near the centre of the bone on the medial or lateral ridges (A9 – 9 specimens) or sometimes more distally (A10 – 4 specimens). Two astragali bear horizontal marks on the medial aspect (A15). These marks would have been made during the cutting of the associated ligaments and would have facilitated the disarticulation of the hind feet from the tibia and the rest of the upper hind limb. It is possible that these incisions could also have been made during skinning, detaching the skin at the ankle at the beginning of the process. However, the common occurrence of incisions on the shafts of first phalanges (see below) suggests that these initial insertions were commonly made around the foot rather than the hock.

Knife cuts were recorded on six cattle calcanei, all found in pits. These all appear on the lateral aspect, although the location varies between the *tuber calcis* (C10) and the distal facet (C7). These marks are likely to have been associated with those made on the astragali.

Five centroquartals (4 from pits; 1 from a ditch) possess transverse knife cuts on their anterior surface (Q4) again corresponding to those on the anterior of the astragalus and proximal metatarsals. None of the butchered centroquartals, however, were found in Phase 3 contexts.

A fibular tarsal bore knife cuts on the anterior and lateral surfaces made during the separation of the associated tibia from the astragalus.

Metapodials
Cattle metacarpals rarely produce evidence of butchery damage. Only six specimens were recorded, five from pits. Three specimens bore knife cuts near the proximal end, one on each aspect apart from the anterior (M19). These are located close to those observed on the carpals and represent evidence for the same dismemberment and/or skinning process. One of these found in pit 5750 (context 5752) was from a calf and may have been associated with four phalanges (ABG 108). Butchered skulls and mandibles of calves were found in the same context (see above). One metacarpal bore a deeper knife or possibly a cleaver mark on the posterior of the proximal end. This mark would also have been made during disarticulation.

A metacarpal from the Phase 2 linear 4012 bears at least ten incisions on the posterior aspect on the proximal part of the shaft. Some of these extend onto the medial or lateral aspects. The purpose of these is not clear. They are too numerous to be simply skinning marks. There was only one example each of specimens having knife cuts at the distal end or near the centre of the shaft of the metacarpal.

Only seven metatarsals (5 from pits, 2 from ditches, all from Phases 1-2 or 2) were recorded as butchered including one specimen from linear feature 4134 that had been split preparatory

to working. Three have knife cuts near the proximal end, on or close to the anterior aspect, corresponding with those on the centroquartals. One bears an oblique cut on the medial aspect of the shaft. A complete specimen bears horizontal cuts on both the medial and lateral aspects of the shaft. In the latter case, incisions made at the outset of skinning are the most likely cause. Axial knife cuts were found on the lateral aspect of the proximal end of one specimen.

Phalanges
Seventeen records of butchery were made on 13 cattle first phalanges, eight of which were found in pits, three in ditches and two in layers. Fifteen observations were made of incisions on the shaft, indicative of marks made at the instigation of skinning (PH4-PH6). Three of these were found on a pair of phalanges belonging to ABG 18 in the Phase 2 ditch 4105 - a clear indication that the lower forelimb involved had been skinned. One example each of knife cuts at the proximal (PH1) and distal ends (PH7) was recorded. These could also have been skinning marks but these could also have facilitated disarticulation.

No butchery marks were observed on cattle second or third phalanges.

Vertebrae, Sternebrae and Ribs
Only nine butchered cattle vertebrae and one sternebra were recorded. No ribs were recorded as butchered. This appears to be a very small total compared with sheep/goat and pig (Table 18). It can partly be explained by taphonomic factors. Many large mammal vertebrae were too fragmentary to be identified to species, whereas a much greater proportion of medium-sized mammal vertebrae survive in a more complete, identifiable state. Similarly, although cut marks were observed on the shafts of a number of ribs, only those ribs with surviving dorsal articulations were identified to species. Given, the high level of gnawing damage in this area, many butchery marks may have been destroyed. Finally, whereas many of the sheep/goat and pig vertebrae and ribs were chopped (and therefore the butchery was easily observed), it may have been more difficult to chop through vertebrae of larger mammals with the tools available.

Two cattle atlases and one axis bear transverse knife cuts on the ventral surface (V9) made during decapitation. Two cervical and three lumbar vertebrae (all from Phases 1-2 or 2) have been chopped through the body of the bone towards the lateral processes (V2), indicating that the flanks of at least some cattle have been removed. It seems likely that it was more common that knives were used near the lateral processes but no evidence of this practice has survived. One knife cut was found on the internal surface of the body of a cervical vertebra (V15).

There is no evidence for the transverse segmentation of cattle vertebrae. However a sternebra had been chopped through in this way (V4).

Sheep/Goat Butchery

The frequency of butchered bones by element is given in Table 18. Of the 215 butchered elements, only two were identified on goat elements compared with 37 on bones and horn cores identified to sheep. As in the case of the sheep/goat sample as a whole, it is assumed that the vast majority of the butchered elements not specifically identified belonged to sheep. Several ABGs include some butchered bones. In addition several other butchered vertebrae are associated with one or two adjoining vertebrae.

Skull, horn core and mandible
Twelve skull fragments were recorded as butchered in the hand-collected sample (10 from pits; 1 each from a ditch and a posthole). Seven specimens (6 definitely sheep) show

evidence of the frontal and parietal being split open with a cleaver cranio-caudally on or near to the centre of the skull (SK1) in order to provide access to the brain. Examples of this practice were found in all of the main phases, indicating that sheep brains may have been a source of food throughout the occupation. Three sheep occipital condyles bear incisions across the condyles (SK17) made during decapitation. This includes the skull of the fairly complete lamb skeleton (ABG 115) from the Phase 1-2 pit 4612 (context 4613). This indicates that the severed head was nevertheless buried with the rest of the skeleton.

There is one example from Phase 3 pit 4423 of a cleaver being used to chop through the lateral part of an occipital condyle (SK4). A small frontal fragment from an unphased posthole has been chopped through obliquely to remove the horn core (SK2). Other examples of horn removal were found on seven horn cores (4 from pits including one from a sieved sample; 2 from ditches; 1 from a posthole). In four cases chop marks were found on or just above the base of the horn core. In Phase 1-2 pit 4221, there is evidence that a saw was used to remove the large horn of a ram at its base. A knife cut is located on the edge of the base of a sheep horn core from Phase 3 pit 4598 (SK9). Three of the butchered sheep horn cores were large and probably from rams.

The horn core of a goat found in Phase 3 pit 4707 has been sawn through near the centre of the core. This pit also produced other evidence for horn, antler and bone working. However, in contrast to cattle, only this specimen and the only other Phase 3 butchered horn core was found in feature group 2. The others were all found further South in feature group 1. Therefore although the evidence for the working of sheep horns does not appear to be scattered randomly, they did not cluster in the same area as those of cattle. This may signify that there was a change in location for horn-working to the area of feature group 2 in Phase 3. This activity was more common in the area of feature group 1 in the earlier phases.

Only four sheep/goat mandibles (all from pits) were recorded as butchered. Three bore knife cuts near the condyle of the ramus (J8-J9). The fourth has knife cuts on the ventral aspect of the diastema (J3).

Scapula, humerus, radius and ulna
Six sheep/goat scapulae bear knife cuts (5 from pits; 1 from a posthole). Three of these consist of incisions on the rim of the glenoid cavity (S8) or on the scapula neck (S21) made during disarticulation from the humerus and two were found on the blade (S10, S11) associated with filletting.

The five butchered humeri include two whose distal trochlea have been chopped through axially (H16), representing unusual butchery on sheep for the period. The marks are the result of dismemberment rather than marrow extraction since in one case the blow has not opened up the marrow cavity. The specimens involved were found in unphased posthole 5374 and Phase 2 pit 5688. The knife cut on the medial aspect of the distal end (H10) of a sheep humerus in Phase 2 ditch 4105 is more typical of disarticulation marks found on Iron Age sites (Wilson 1978; Maltby 1989). Poor preservation limited observations of butchery at the proximal end of sheep/goat humeri to a single specimen from Phase 2 pit 4836 bearing a knife cut associated with disarticulation from the scapula (H14). An oblique knife cut on the shaft (H13) of another specimen from a pit provides evidence of filletting.

Four butchered sheep/goat radii (all from pits) include three with knife cuts on the medial aspect of the proximal end (R11). These marks correspond to similar marks on the humerus (H10) and were made during separation of these bones. One of these specimens is from the Early Bronze Age pit 5613. A shaft fragment has an oblique knife cut associated with filletting (R13).

Only three sheep/goat ulnae show evidence of butchery. Two (one each from a pit and a ditch) bear knife cuts on the medial aspect of the olecranon (U7), which correspond to similar disarticulation marks on the humerus and radius described above. A goat humerus from Phase 2 Linear 4134 bears a knife cut on the lateral part of the proximal articulation (U14). This is the only clear evidence for the butchery of goat for meat in the assemblage.

Pelvis, femur and tibia

Sheep/goat pelves were one of the commonly butchered elements. Fifteen such fragments (all from pits) were recorded, of which one had more than one type of butchery. The majority of marks consist of fine incisions but three specimens bear deeper marks. A superficial saw mark was found on the medial of the iliac tuberosity (P1) of a specimen found in Phase 1-2 pit 5670. Another specimen from Phase 3 Pit 5592 has been damaged in the same zone, although in this instance the mark has the appearance of a snagged deep knife cut rather than a chop mark. Butchery of this type would have separated the pelvis from the vertebral column. A serrated blade appears to have damaged the shaft of an ilium near the sacro-iliac joint (P11) of a specimen from Phase 3 Pit 4553.

A common location for knife cuts is in the vicinity of the acetabulum (P14 – 6 specimens) made during separation from the femur. Knife cuts were also found on the shaft of the ilium (P12-P13 – 5 specimens), usually on the medial or ventral surface and again most likely to be associated with the removal of the femur. Two of these were found on the pelves of neonatal lambs. Only one observation of a knife cut on the shaft of the ischium was made (P16) and no marks were recorded on the pubis. This contrasts with the butchery observations on cattle pelves.

Five of the six sheep/goat femora (all from pits) with recorded butchery bear fine incisions on the medial aspect on or near the caput (F10). These correspond to the marks around the acetabulum and were made during disarticulation. Two of these were found on a pair of femora belonging to ABG 7 in Phase 3 Pit 4486. Knife cuts were observed on only one distal femur fragment (F13).

Butchery was observed on 11 sheep/goat tibiae, of which ten came from pits and one was found in a ditch. Three specimens bear superficial axial chops. One of these from Phase 1-2 Pit 4612 has damaged the proximal joint surface (T1) presumably during segmentation from the femur. Part of the anterior crest of a tibia from Phase 3 Pit 5358 had been removed by an axial blow (T12). A complete tibia from Phase 1-2 Pit 4348 has an axial chop mark on the medial edge of the posterior aspect of the distal end (T21).

Horizontal knife cuts were found near the distal end of four sheep/goat tibiae (T11). These were made during separation from the astragalus and/or during skinning. Four specimens have horizontal knife cuts on various parts of the shaft (T10). These are most likely to have been the result of filletting but other processes including skinning could have created some of them, particularly those situated on the distal part of the shaft.

Carpals and tarsals

Only one radial carpal was recorded as butchered having knife cuts on its anterior surface. On the other hand, astragali are amongst the most commonly butchered of all sheep/goat elements. Twenty-five specimens including three with two types of butchery mark were recorded. All bar one of these were recovered from pits, the other coming from a ditch. In every case the marks consist of fine incisions. In 13 cases the marks are located on the anterior surface near the centre of the bone on the medial or lateral ridges (A9). Marks on the anterior surface of the distal end (A10) were found on 11 specimens. Four astragali bear knife cuts on the medial aspect near the distal end (A15). All these marks would have facilitated the separation of the upper hind limb from the foot. The same action would have enabled the skin to be released preparatory for stripping, perhaps attached to the metapodials.

One astragalus with knife cuts on both the distal and central part of the anterior surface came from Phase 1-2 Pit 4612 and formed part of ABG 115. It has already been noted that this fairly complete skeleton of a lamb was decapitated. The marks on the astragalus also demonstrate that butchery was carried out on at least one of the hind limbs, possibly when it was skinned, as in this case the metapodials were found with the rest of the skeleton.

Only two calcanea from pits were recorded as butchered: one bears knife cuts on the anterior of the anterior facet (C8) – a mark that corresponds with those on the astragali; the other bears a knife cut on the lateral aspect (C7). Four centroquartals were recorded as butchered. All have knife cuts either on the anterior or on the medial aspect close to the anterior (Q4). These include a pair of butchered centroquartals belonging to the sheep skeleton ABG 6 from Phase 3 Pit 4486. Both tarsals of this group (one recovered from a sieved soil sample) have a corresponding cut on the anterior face. The left tibia and the astragali (but neither calcanea), metatarsals and many of the phalanges of both feet were recovered. Other parts of the same skeleton are probably represented by ABG 5 and ABG 7 (including the butchered femora described above). These marks represent skinning and/or disarticulation at the ankle joint. If the skin was removed, the metatarsals were seemingly not removed with them but perhaps the calcanea were.

Metapodials and phalanges
Seven metacarpals (all from pits) were recorded as butchered. The neonatal lamb skeleton ABG 3 from Phase 3 Pit 4486 includes the left metacarpal which has fine cut marks on the medial and lateral edges of the posterior surface adjacent to the proximal joint surface (M11). This could have been a skinning mark created at the point where the skin was initially cut, although it may also have resulted in disarticulation at this point. Similar marks were found on the right metacarpus of ABG 106 from Phase 3 Pit 5358. Knife cuts were observed on the proximal anterior (M10) and medial (M19) aspects respectively of two other complete metacarpi. Again both disarticulation and/or skinning could account for these marks. A transverse knife cut on the posterior of a fragment of a metacarpal shaft from a Phase 2-3 pit was also recorded (M12).

The distal parts of the shaft of two metacarpal fragments bear marks that could be associated with bone-working. In one case the anterior midline groove has been accentuated axially (M17); the other specimen has a transverse knife cut on the medial surface. This may have been a skinning mark but the polished surface of the bone indicates that further modification took place, probably associated with boneworking.

Knife cuts were recorded on four sheep/goat metatarsi (all from Phase 1 or 1-2 pits), one of which has knife cuts on both the anterior (M10) and medial aspects (M19) of the proximal end. Two other specimens have knife cuts on or close to the anterior aspect. Disarticulation, skinning or a combination of both accounts for these marks. A shaft fragment bears transverse knife cuts across its anterior surface.

In contrast to cattle, only one sheep/goat first phalanx (from a Phase 3 pit) was recorded as butchered. Transverse knife cuts on the anterior surface (PH4) of a complete bone attest to skinning. However, it appears that such incisions were more commonly made at the ankle joint.

Vertebrae and Ribs
Butchery marks were frequently observed on sheep/goat vertebrae and ribs. In several cases sections of vertebrae were recovered, which include one or more specimens with butchery marks.

Eight atlases (five from pits, one each from a ditch, posthole and layer) were recorded as butchered. In seven cases transverse knife cuts were found, usually near the cranial end.

Four have cuts on the ventral surface and three on the dorsal aspect (V9). These would appear consistent with marks made during decapitation. In the case of a specimen from Phase 2 ditch 4105 (context 4100), the cut on the ventral surface was supplemented by a chop mark, which has severed the bone transversely (V4). A similar chop mark was found on another atlas from a Phase 1-2 pit.

Only one axis (from Phase 1-2 pit 4497) was recorded as butchered, bearing superficial transverse chop marks on the ventral surface of the cranial end (V7). These marks are also most likely to be associated with decapitation.

Of the seven other butchered cervical vertebrae, two bear transverse knife cuts on the dorsal surface (V9), two have been chopped superficially across the ventral surface (V7) and three have been chopped completely through transversely (V4). Segmentation from the head or the rest of the vertebral column would account for all these marks. All six of the butchered specimens that were assigned to phase come from Phase 1-2 or Phase 2 features.

Thirteen sheep/goat thoracic vertebrae were recorded as butchered, of which 11 came from pits and two from ditches. One specimen bears two types of butchery mark. Six thoracic vertebrae (including one from ABG 5) have been damaged by chop marks or deep incisions on or near the junction with the ribs (V3) and two bear finer knife cuts in the same location (V8). Two have been chopped through axially along the ventral aspect of the body towards the lateral (V2) and another bears a knife cut in the same area (V13). All of these are associated with the removal of the rib cage from at least one side of the vertebral column. In one case both sides have been butchered. No evidence for transverse segmentation was noted. Either it was common to keep all the thoracic vertebrae together as a unit or it was customary for segmentation to take place between vertebrae using a knife, a practice that would have rarely left traces on the bones. The dorsal processes of two vertebrae bear knife cuts on the lateral surface (V14).

Sheep/goat lumbar vertebrae were commonly recorded as butchered. A total of 32 bones produced 37 observations of butchery. All but three of the butchered specimens were found in pits, two were from postholes and one was recovered from a ditch. Most of the marks are again associated with the removal of the flanks of the animal. In at least eight cases both left and right sides of the vertebrae have been damaged, indicating that it was common practice to remove the meat from both flanks from the lumbar region. There are also several cases where butchered bones form part of a group of bones. The best preserved group forms part of ABG 5 (Phase 3 pit 4486), in which all seven of the lumbar vertebrae and the sacrum are butchered. All the lumbar vertebrae have been chopped through the right lateral process (V3) and similar damage was observed on both sides of the associated sacrum. Nine other lumbar vertebrae have been cut or chopped through in the same location. In two cases adjoining vertebrae have been damaged. In 14 cases knife cuts were recorded on the lateral process, nearly always on the ventral surface (V8). In one case three adjacent vertebrae have been damaged in this way as meat was removed. Five lumbar vertebrae have been chopped on the side of the body (V2), one of which has also been chopped transversely through the cranial joint surface (V4), the only direct evidence of segmentation of the lumbar region, although one specimen does bear a superficial transverse chop across the body (V7). The evidence suggests that both flanks of sheep carcasses were commonly removed from the vertebrae, which were then sometimes deposited in small articulated groups.

In addition to the sacrum described above, two other sacral vertebrae were recorded as butchered. One has been chopped axially near the sacro-iliac joint on both sides during the removal of the flanks and separation from the pelvis (V3). The other has been cut across the ventral surface at the cranial end (V9) during disarticulation from the lumbar vertebrae.

Thirty-four sheep/goat ribs were recorded as butchered. Twenty-eight specimens have knife cuts on or near to the dorsal articulation (RB6) made during separation from the thoracic vertebrae. Most of these marks are found on the ventral surface. Three rib heads have deeper chop marks or incisions in the same location (RB2). Three bear knife cuts on the lateral surface of the shaft (RB7).

Pig Butchery

Sixty-two pig bones were recorded as butchered. The relative frequency of butchered elements is similar to sheep/goat, with ribs and vertebrae well represented (Table 18). Two of the butchered specimens form part of ABG 109.

Skull and mandible
Knife cuts were observed on three pig skull fragments found in pits. Two of these are located on the lateral part of the occipital (SK17) and are associated with decapitation. The third runs across the nasal bone (SK10). Knife cuts were also recorded on four mandibles (two from pits; one each from a posthole and a ditch). Two consist of cuts on the lateral of the ramus (J8, J10) both probably associated with the detachment from the skull. The other two were found on the front of the jaws (J2, J3).

Forelimb
Pig scapulae were relatively more frequently recorded as butchered than sheep/goat. Seven specimens were noted to have two different types of marks. Five were found in pits and one each in a posthole and ditch. Most are from Phase 1-2 features. The most common location for knife cuts is around the rim of the glenoid cavity (S8 – 5 examples) indicating that the scapula was commonly disarticulated from the humerus. Knife cuts on the neck of two specimens probably signify the same process (S21). A transverse knife cut was also found on the anterior surface of a fragment of a blade (S11).

Four humeri from pits were recorded with knife cuts. All of these were found on various aspects of the shaft (H13), probably all associated with filletting. One specimen also has knife cuts near the proximal articulation (H14) corresponding to those found around the glenoid of the scapulae.

No marks were recorded around the distal end of pig humeri or on any radii. However, evidence for disarticulation at the elbow joint is provided by records of knife cuts on three ulnae, one of which from posthole 5374 bore three different types of knife cuts. These consisted of incisions on both the medial and lateral aspects of the olecranon (U7-U8) and also marks on the proximal articulation (U14). A similar mark appeared on the proximal articulation of a second specimen and marks on the lateral surface of the olecranon were found on a third.

Three carpals bear transverse knife cuts made during the separation of the feet from the upper forelimb. A knife cut on the lateral side of the proximal end of a peripheral metacarpal (M19) is the only evidence for butchery on any of the pig foot bones in the assemblage.

Hindlimb
Surprisingly, in contrast with both cattle and sheep/goat, observed butchery marks on pig pelves are restricted to just one specimen from a Phase 1-2 pit. These consist of knife cuts on the acetabulum made during disarticulation from the femur (P14).

Corresponding cuts were found adjacent to the caput of two proximal femora (F10), both from unphased features. Cut marks on the distal articulation (F13) were observed on two specimens found in pits.

An oblique knife cut on the shaft of a tibia (T17) from a Phase 1-2 pit was the only observation of butchery on this element. It was probably associated with filletting. A superficial transverse chop mark was recorded on the shaft of a fibula (FB5) also from a Phase 1-2 pit.

Five pig astragali from pits bear knife cuts in similar locations to those found commonly on cattle and sheep/goat. Four bear incisions on the anterior surface, three near the centre of the bone (A9) and one towards the distal end (A10). One has a knife cut on the anterior edge of the medial surface towards the centre of the bone (A15). All are likely to have been made during the removal of the feet. An oblique knife cut was recorded on the medial aspect of a calcaneus (C7) from a Phase 1-2 pit, again probably associated with disarticulation.

Vertebrae and Ribs
An atlas from a Phase 3 pit bears a transverse knife cut on the dorsal surface (V9) made during disarticulation from the skull. An axis has an oblique knife cut on the ventral aspect of the cranial end (V15). The axis was from ABG 109 (Phase 1-2 pit 5750), which also consisted of two other cervical vertebrae from a young pig. No butchery was noted on these or any other cervical vertebrae.

Four pig thoracic vertebrae were recorded as butchered. One from a Phase 3 pit has been chopped axially along the midline (V1) and also through the lateral process in the same plane (V3). This indicates that the vertebra was chopped though on both sides to remove the rib cages, in a similar manner to that observed commonly in sheep/goat. A second specimen from a Phase 2 ditch has been chopped through the lateral part of the body (V2) and superficial chop marks (V6) were noted in the same location on a third specimen from a Phase 1-2 ditch. Both were associated with the removal of the ribs. The final butchered specimen from a Phase 1-2 pit has knife cuts on the dorsal process (V14).

Five pig lumbar vertebrae bear butchery marks. These include one of a group of three lumbar vertebrae from Phase 3 pit 5750, which may have been from the same animal as the cervical vertebrae described above (ABG 109). The butchered specimen has been chopped through at the junction of the lateral process (V3) when the flank was removed. A similar mark was found on a specimen from a Phase 1-2 pit. This specimen has also been butchered on the other side of the body, which bears superficial chop marks (V7). Two specimens have knife cuts on the lateral process (V8) and one has been chopped through along the body near the lateral process (V2). None of the pig thoracic or lumbar vertebrae provide evidence for transverse segmentation of the vertebral column.

Twelve pig ribs were recorded as butchered, mostly on or near the dorsal articulation. Four display superficial chop marks or deep incisions (RB2) and six have finer incisions (RB6). All these marks confirm that separation of the ribs from the thoracic vertebrae was common practice. Two ribs have incisions on the shaft, one on the medial surface (RB8) and one on the lateral (RB7).

Horse Butchery

Butchery marks were recorded on 33 horse bones. In contrast to cattle, most of the butchery was observed on the girdle and upper limb bones whereas there are very few records of marks on the head and limb extremities. As noted above, nearly all the butchered horse bones were found in Phase 3 deposits (Table 18) with concentrations of butchered bones in some pits.

Skull

No butchery marks were found on any of the 26 horse mandibles recorded compared with nearly 10% of the cattle mandibles. Although all the horse mandibles were found separately from skull fragments, any deliberate disarticulation does not appear to have left any marks on the ramus or around the temporal area of the skull.

Three skull fragments bear evidence of butchery. Two were found in Phase 3 pit 4332. One specimen consists of the parietal and occipital, on which an oblique knife cut was found on the condyle (SK17). A portion of frontal, possibly from the same skull has been split open (SK1). Pit 4332 produced a fragmented portion of temporal, zygomatic and frontal. The frontal was marked by multiple fine incisions along the dorsal surface near the eye socket. Such marks are excessive for routine skinning and represent evidence for careful cleaning of the skull. They can be compared with similar marks recorded on some of the cattle frontals.

Forelimb

Only one horse scapula bore butchery marks and these consist of five superficial chop marks across the lateral spine (S7). None of the 16 horse scapulae therefore bear evidence of knife cuts similar to those quite commonly encountered on cattle.

On the other hand, five horse humeri were recorded as butchered including two with multiple records. All but one of these was found in Phase 3 pits. The other, from Phase 2 pit 4836, is the only one recorded with a chop mark, which is located on the medial aspect of the distal end (H19). Most of the incisions on the Phase 3 humeri were found on various aspects of the distal end (H10 – 2 specimens and H18 – 3 specimens) associated with cutting through the ligaments during disarticulation from the radius and ulna. The proximal end of a humerus from pit 4796 bears a knife cut on the lateral surface associated with separation from the scapula.

Five radii from Phase 3 pits were recorded as butchered. A knife cut on the medial aspect of the proximal end (R11) of a specimen from pit 4332 corresponds with the disarticulation marks found on the humeri. A heavier implement appears to have been used in the same location on a radius from pit 4486 (R9). Superficial chop marks were recorded more distally on the shafts (R6) of two other specimens in pits 4796 and 4849. The distal portion of a shaft from pit 4486 has been split axially with a saw and may be an offcut from boneworking.

Three butchered ulnae include one specimen also from Phase 3 pit 4486, which bears knife cuts on the lateral aspect of the olecranon (U8) and cuts and possibly heavier cleaver marks on the lateral part of the proximal articular surface (U14, U12), all associated with disarticulation. An ulna from an undated posthole 4324 also bears a knife cut on the lateral aspect of the olecranon (U8). The shaft of the ulna fused to the chopped radius from pit 4859 has been damaged by the same blow (U11).

Two radial carpals bear transverse knife cuts on the medial or anterior surfaces associated with the disarticulation of the foot. One specimen was found in Phase 2 ditch 4011; the second came from Phase 3 pit 4332. No marks were found on any of the horse metacarpals.

Hindlimb

Three Phase 3 pits produced butchered horse pelves. One of these specimens from pit 5592 bears superficial chop marks on the ventral aspect of the ischium and acetabulum (P10, P6). Knife cuts on the same area of the ischium were found on two specimens from Phase 3 pits 4796 and 5358 (P16). All the marks are probably associated with the separation from the femur. A corresponding knife cut was found on the head of a femur from Phase 3 pit 4707 (F10). Transverse knife cuts were found on the distal parts of the shafts of two other femora from Phase 2-3 pit 4606 and Phase 3 pit 4796 (F12, F13).

The only record of butchery on a horse tibia comes from a specimen from an undated posthole 4299. Knife cuts were observed on both the medial and lateral aspects of the shaft above the distal end (T10). The procedure that created these marks is unclear, since both disarticulation and skinning incisions could account for them.

Knife cuts were found on the anterior surfaces of two horse astragali (A9, A10) and one other tarsal (Q4). One of the astragali was from Phase 1-2 pit 4497 and thus represents the earliest evidence for the processing of horse carcasses from the site. The other specimens were from Phase 3 pits 4584 and 4641. As with cattle, these marks would have been made during the disarticulation of the hind feet from the tibia and the rest of the upper hindlimb. Skinning is also a possibility for the origin of such marks, particularly as, in contrast to cattle, none of the horse phalanges bear knife cuts. Similarly, a horse third metatarsal from Phase 3 pit 4796 bears fine knife cuts on the medial, lateral and anterior aspects of the shaft near the proximal end, which are possibly best explained as incisions made prior to skinning. No butchery observations were made on other metatarsals.

As in the case of cattle very few butchery marks were recorded on horse ribs and vertebrae. Two atlases from Phase 3 pits 4707 and 4332 bear transverse knife cuts made during decapitation (V9, V15). The latter specimen corresponds with cuts on the occipital condyles of the associated skull. Butchery was not observed on any other vertebra and was recorded on only one rib head from Phase 4 pit 4320. Possible reasons for the absence of butchery records on large mammal vertebrae have been discussed above in relation to cattle.

Butchery observation on other species

Only two dog bones were recorded as butchered. A humerus from Phase 3 pit 4641 bears knife cuts on the posterior and lateral aspects of the distal end (H18), indicating disarticulation from the radius and ulna. A rib head in a sieved sample taken from Phase 3 pit 4598 bears a knife cut. These indicate that at least some of the dogs have been butchered but the rare occurrence of such marks suggests that it was not a routine practice.

Cut, cleaver and saw marks on specimens from other species are probably all associated with artefact production. Two chopped red deer antler fragments were found in Phase 1-2 pit 5645. Sawn offcuts were found in Phase 3 pits 4707 (along with sawn cattle horn cores) and 4486. Ten sawn red deer antler fragments were found in undated layer 4381.

A roe deer metatarsal from Phase 2 pit 5043 bears an axial knife cut on the anterior of the shaft. The nature of the cut suggests filletting, perhaps preparatory to boneworking. Two antlers of roe deer also show evidence of being worked, one from Phase 1-2 pit 4912, the second from Phase 2 pit 4125.

The cut and saw marks on the crane tarsometatarsus from Phase 3 pit 4707 can also be regarded as evidence for boneworking. Deep transverse cuts on the shaft and on the distal condyles indicate careful removal of the phalanges, cleaning and separation from the rest of the shaft. The missing upper part of the shaft may have been the area required for further working, leaving the distal end as a waste offcut, perhaps significantly deposited in the same location as offcuts of antler and sawn cattle horn cores. Alternatively the deposited bone could have been the finished object.

Discussion of the Butchery Evidence

It is a significant period of time since Wilson (1978) first published quite detailed summaries of butchery mark from the Iron Age site at the Ashville Trading Estate, Abingdon. Since then,

there have been a number of less detailed summaries of butchery evidence in bone reports, and occasionally attempts to compare results from sites of other periods (Maltby 1989). However, butchery marks have been generally under-utilised in faunal analyses of British Iron Age sites. It is abundantly clear from the study of bones from this site that any detailed analysis of contextual variation and deposition processes has to be accompanied by detailed butchery observations, if we are to obtain better understanding of these processes.

As has been discussed in the contextual analysis section, perhaps ironically, it is the ABGs that provide the best evidence for butchery practices. Conversely, it is the careful analysis of butchery evidence that has provided further insights into the disposal of carcasses at Battlesbury than would otherwise have been possible.

The combination of butchery and contextual analysis has also revealed that some skulls were carefully cleaned prior to (possible display and) deposition. It has also revealed that the incidence of observed butchery on horse bones increased in Phase 3 to levels closely comparable with cattle but that bones from their butchered carcasses were more likely to be deposited together. This may indicate that on occasions several horses were butchered at one time, which may be related to special events and communal feasting. There also appears to have been some variations in how horse and cattle were butchered, which would repay further comparative studies.

Although specialist butchers may have been operating, their activities have not been recognised in this analysis of the bones. On the other hand, there are indications that small amounts of waste from bone, horn and antler working were on occasions deposited in the same features, suggesting perhaps that specialists working on a variety of materials were discarding waste.

The results of butchery analysis at Battlesbury support previous observations from British Iron Age sites that knives rather than cleavers were used for skinning, filletting and most of the segmentation of the carcass. Cleavers were sometimes used to remove the ribs and loins from the vertebrae of pigs and sheep and occasionally their marks are found on other bones. Saws appear only to have been used for working bones, horn and antler and seemingly were not routinely employed in butchery. This again could indicate that saws were specialist tools used by relatively few people.

Conclusions – Animal Exploitation and Carcass deposition at Battlesbury Bowl

Despite the complexities of depositional and taphonomic histories of the animal bones, it is still possible to gain an impression of the general pattern of animal exploitation by the communities who were present at Battlesbury Bowl.

The main species exploited was sheep. This is abundantly clear from the quantification analysis. It should be emphasised that it is likely that these figures underestimate the overall importance of sheep, because the sieving results indicate that more bones of sheep than cattle were overlooked during hand collection and that more of the bones of sheep were lost through taphonomic decay. The sheep represented were small in stature, slender-limbed and horned. The significant number of neonatal mortalities indicates that they were kept in the vicinity of the site during the lambing season. Kill-off strategies concentrated on the culling of young lambs in the early summer and autumn but thereafter few sheep were likely to be killed at Battlesbury until they had reached three years of age or older. If the Iron Age communities who used Battlesbury were culling sheep for meat between one to three years of age, they were not doing so very frequently at Battlesbury Bowl itself, certainly less often than people who were using Danebury in the Iron Age or Potterne in the later Bronze Age. It is possible that such sheep were slaughtered on other settlements or that a slightly greater emphasis on

secondary products such as wool and meat was a feature of the exploitation of sheep at Battlesbury.

Although cattle are comparatively poorly represented at Battlesbury, there is no doubt that beef was an important commodity that was exploited. Most of the cattle were small and horned and again there is some evidence that calving took place in the vicinity. A mixed husbandry strategy included the culling of substantial numbers of calves for meat but also the retention of a significant proportion of the herds for breeding and possibly dairying and working.

Pork appears to have been a less common addition to the diet. Percentages of pig bones are quite low in most areas of the site and it is possible that the relative numbers of pigs exploited declined slightly in the later phases. However, the proportion of pigs also varied within the excavated area, with higher percentages of bones being consistently deposited in the area of feature group 3. As usual on Iron Age sites, the vast majority of pigs were killed immature.

There is compelling evidence to suggest that horses became more important to the communities who used Battlesbury during the Iron Age. The relative abundance of horse bones increased in the Middle Iron Age and they appear to have been butchered for meat (but not marrow) as frequently as cattle at that time. Most of the horse remains were from mature adults, however, which suggests that they had been kept as beasts of burden and riding prior to death, as the evidence for damage caused by a bit on the teeth of one mandible indicates. The ageing analysis also demonstrates that bones of immature horses and the occasional neonatal mortality were deposited in greater frequencies than on most Iron Age sites in southern England. This suggests that at least some of these horses may have been bred rather than captured from the wild. Most of the horses were the size of Exmoor ponies.

Dogs were rarely eaten but their presence around the site is clearly attested by the abundance of gnawing marks found on the bones. Occasionally, parts of their bodies were deposited in pits and other features but possibly not immediately after they died.

There is little evidence that wild species of mammals, bird and fish contributed to the diet other than on rare occasions. There is no evidence for the exploitation of domestic geese or fowl.

The analysis of animal bones at Battlesbury Bowl has concentrated upon bone deposition. It is clear that within the general cycle of animal husbandry, butchery and consumption of meat and other animal products, there were distinct episodes of deposition that provide us with a complex history of animal exploitation. In several pits it has been possible to determine that several animals may have been culled at the same time. Ageing evidence suggests that these events may have more frequently occurred in the spring/early summer and in the autumn, whereas they appear to have been less common in the winter months.

This has several implications. Firstly, it suggests that culling was often planned to be carried out at certain times of the year, the autumn killings perhaps intended to remove surplus stock prior to winter. Secondly, such events could have created a large amount of meat for processing, particularly if larger mammals were included in the cull. Some of this meat may have been preserved through smoking and/or salting. If not, fresh meat may have been consumed in quite large quantities. This could further imply that at certain times of the year, feasting took place at the site. Such occasions may have been ones marked with ceremonies in which the local population, and perhaps visitors, participated. This may explain why some of the pits in which there is evidence for multiple slaughter of animals are the same ones which contain unusual depositions of ABGs, skulls and large bones. The deposition of butchery waste and other remains of feasting and ceremonial activities may symbolically, as well as practically, mark the termination of festivities perhaps associated with ceremonies that

formed part of an annual cycle. This would sometimes include material deposited directly into the pit but could also incorporate bones that had been thrown onto a (temporary) midden, accessible to dogs, prior to their final disposal. As such, the skull and other depositions are not necessarily simply propitiatory votive offerings (*contra* Cunliffe 1992) but mark the close of events that had greater significance at ground level.

In a similar way the deposition of the cattle and horse skulls in ditch 4105 may represent the termination of a significant role for the skulls above ground level rather than any new symbolic role invoked by their burial.

The contextual analysis also drew attention to the presence of small amounts of worked bone, horn cores and antlers, which not uncommonly were found in the same pits as some of the ABGs and larger-scale depositions of butchery waste. The presence of antler (and indeed the worked crane bone) suggests that various materials for working were accumulated together. These may have been brought back as raw material by the residents at Battlesbury but their presence and restricted distribution may also imply that itinerant boneworking specialists may have visited the site. It is not beyond the bounds of possibility that such visits may have coincided with the "festivals" postulated above. Consequently the presence of some of their waste from their specialist work may have been incorporated amongst other depositions that marked (the end of) the event.

However, we are not of the opinion that all the ABGs, skulls and large bones found in the Battlesbury assemblages can be explained in this way. Periodic infilling of pits with midden waste must have occurred on many occasions and need not all represent anything particularly significant in the ritual or social calendar. Indeed our analysis shows that we need to consider carefully how we define "special" deposits and not assume, for example, that all skulls are ritual deposits.

The analysis of the Battlesbury Bowl bones has shown that it is possible to consider general questions regarding animal husbandry and exploitation of animals on Iron Age sites in conjunction with an appraisal of how animals may have been incorporated in annual cycles of activities at the site. What of course we do not know, is how these activities relate to what happening in the adjacent hillfort and indeed to either side of the thin strip of archaeology investigated.

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Tables:

Table 1: Hand-Recovered Animal Bones from Battlesbury

Species	**EBA**	**1**	**1-2**	**1-3**	**2**	**2-3**	**3**	**4**	**Unph**	**Total**
Sheep/Goat	6	51	1473	8	806	253	1588	45	376	4606
Cattle	1	46	682	10	742	136	846	24	166	2653
Pig	1	18	341	2	161	44	292	6	68	933
Horse		1	78		60	13	207	5	25	389
Dog			18		25	9	152	1	3	208
Red Deer		2	8		6		7		16	39
Fox							11			11
Roe Deer			3		3		2			8
Badger			1				1			2
Corvid			1		1	1	56			59
Raven			1				50			51
Mallard			2		1	2				5
Thrush size (*turdidae*)		2	2		1					5
Small Passerine			1			2	1			4
Wader (unknown species)			2				1			3
Buzzard									2	2
Duck (unknown species)					2					2
Woodcock							2			2
Crane							1			1
Rail family			1							1
Field Vole					2	2	8		8	20
Water Vole						1			17	18
House Mouse							5			5
Woodmouse		1					4			5
Mouse (species indeterminate)					1		1		1	3
Frog/Toad			6		1	10	59	7	62	145
Frog (			5		1	10	48		23	87
Toad			3			2	41	2	1	49
total identified	**8**	**121**	**2628**	**20**	**1813**	**485**	**3383**	**90**	**768**	**9316**
unid medium mammal (sheep/sized)	7	108	2067	22	946	407	2030	130	683	6400
unid large mammal (cattle sized)		101	841	6	689	319	1233	39	398	3626
unidentified mammal	4	32	716	1	520	145	1112	130	204	2864
unid small mammal (rodent sized)		3	27	1	117	23	85	1	14	271
unidentified bird		1	1		1		5			8
overall total	**19**	**366**	**6280**	**50**	**4086**	**1379**	**7848**	**390**	**2067**	**22485**
% identified to species	**42%**	**33%**	**42%**	**40%**	**44%**	**35%**	**43%**	**23%**	**37%**	**41%**

Up = Unphased

Table 2: Animal Bones from Sieved Samples from Battlesbury

Species	**1-2**	**1-3**	**2**	**2-3**	**3**	**4**	**Unph**	**Total**
Sheep/Goat	91	5	42	22	157	13	32	362
Pig	13	4	4	5	10	4	20	60
Cattle	7		9	1	6	1	9	33
Dog					8	1		9
Fox							1	1
Red Deer	1							1
Small Passerine					1			1
Field Vole			2		8			10
Mouse (species indeterminate)	4				2		1	7
House Mouse	2				1			3
Woodmouse				2				2
Frog/Toad					8	1		9
Toad						9		9
Frog					6			6
total identified	**118**	**9**	**57**	**30**	**207**	**29**	**63**	**513**
unid mammal	467	57	372	217	1018	486	395	3012
unid medium mammal (sheep/pig sized)	351	6	241	70	689	14	294	1665
unid large mammal (cattle sized)	18		14	5	32	2	38	109
unidentified small mammal (rodent sized)	12		1		13	3	5	34
unidentified bird	1				4		1	6
Total	**967**	**72**	**685**	**322**	**1963**	**534**	**796**	**5339**
% identified to species	**12%**	**13%**	**8%**	**9%**	**11%**	**5%**	**8%**	**10%**

Table 3: Hand-Recovered animal bones by phase, feature type and location

Total no hand recovered frags by phase & feature type

Phase	Pit	Ditch	Posthole	Hearth	Unassigned	Total
Unassigned	1172	62	492	6	335	**2067**
EBA					19	**19**
1	366					**366**
1-2	6262		18			**6280**
1-3	30		2	18		**50**
2	1348	2722	16			**4086**
2-3	1206	101	72			**1379**
3	7751	89		8		**7848**
4	390					**390**
total	**18525**	**2974**	**600**	**32**	**354**	**22485**

Total no of bone-yielding contexts (hand recovered) by phase and feature type

Phase	Pit	Ditch	Posthole	Hearth	Unassigned	Total
Unassigned	39	4	115	1	15	**174**
EBA					3	**3**
1	11					**11**
1-2	142		7			**149**
1-3	2		1	1		**4**
2	50	87	4			**141**
2-3	36	3	13			**52**
3	103	9		2		**114**
4	5					**5**
total	**388**	**103**	**140**	**4**	**18**	**653**

total no hand recovered frags by phase & location (feature group)

Phase	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4	Unassigned	Total
Unassigned	558	883	467	158	1	**2067**
EBA				19		**19**
1			366			**366**
1-2	1159	1884	2469	768		**6280**
1-3			32	18		**50**
2	3009	1	769	307		**4086**
2-3	408	661	301	9		**1379**
3	3090	2870	559	1329		**7848**
4	390					**390**
total	**8614**	**6299**	**4963**	**2608**	**1**	**22485**

total no of bone-yielding contexts (hand recovered) by phase and location (feature group)

Phase	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4	Unassigned	Total
Unassigned	49	24	46	54	1	**174**
EBA				3		**3**
1			11			**11**
1-2	25	31	82	11		**149**
1-3			3	1		**4**
2	94	1	39	7		**141**
2-3	23	17	11	1		**52**
3	56	28	7	23		**114**
4	5					**5**
total	**252**	**101**	**199**	**100**	**1**	**653**

Table 4: Comparison of NISP, MNE and MNI methods of quantification for domestic mammals

Total hand-recovered assemblage						
Species	**NISP**	**MNE**	**MNI**	**NISP**	**MNE**	**MNI**
sheep/goat	4606	1560	252	52%	55%	58%
cattle	2653	751	93	30%	27%	21%
pig	933	309	64	11%	11%	15%
horse	389	157	16	4%	6%	4%
dog	208	50	11	2%	2%	3%
	8789	**2827**	**436**			

NISP = number of identified specimens; MNE = minimum number of elements; MNI = minimum number of individuals

Table 5: Representation of Domestic Mammals in hand-recovered Assemblages by Phase and Feature type

NISP counts by phase and feature type

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned	**total**
Unph	sheep/goat	213	4	98	1	60	**376**
Unph	cattle	69	15	43	1	38	**166**
Unph	pig	29		23		16	**68**
Unph	horse	7	1	14		3	**25**
Unph	dog	1		1		1	**3**
	total	**319**	**20**	**179**	**2**	**118**	**638**

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned
Unph	sheep/goat	66.8%	20.0%	54.7%	50.0%	50.8%
Unph	cattle	21.6%	75.0%	24.0%	50.0%	32.2%
Unph	pig	9.1%		12.8%		13.6%
Unph	horse	2.2%	5.0%	7.8%		2.5%
Unph	dog	0.3%		0.6%		0.8%

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned	**total**
EBA	sheep/goat					6	**6**
EBA	cattle					1	**1**
EBA	pig					1	**1**
						8	**8**

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned
EBA	sheep/goat					75.0%
EBA	cattle					12.5%
EBA	pig					12.5%

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned	**total**
1	sheep/goat	51					**51**
1	cattle	46					**46**
1	pig	18					**18**
1	horse	1					**1**
		116					**116**

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned
1	sheep/goat	44.0%				
1	cattle	39.7%				
1	pig	15.5%				
1	horse	0.9%				

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned	**total**
1-2	sheep/goat	1473					**1473**
1-2	cattle	679		3			**682**
1-2	pig	340		1			**341**
1-2	horse	78					**78**
1-2	dog	18					**18**
		2588		**4**			**2592**

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned
1-2	sheep/goat	56.9%				
1-2	cattle	26.2%		75.0%		
1-2	pig	13.1%		25.0%		
1-2	horse	3.0%				
1-2	dog	0.7%				

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned	**total**
1-3	sheep/goat	8					**8**
1-3	cattle	10					**10**
1-3	pig	2					**2**
		20					**20**

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned
1-3	sheep/goat	40.0%				
1-3	cattle	50.0%				
1-3	pig	10.0%				

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned	**total**
2	sheep/goat	261	539	6			**806**
2	cattle	147	594	1			**742**
2	pig	59	101	1			**161**
2	horse	12	48				**60**
2	dog	2	23				**25**
		481	**1305**	**8**			**1794**

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned
2	sheep/goat	54.3%	41.3%	75.0%		
2	cattle	30.6%	45.5%	12.5%		
2	pig	12.3%	7.7%	12.5%		
2	horse	2.5%	3.7%			
2	dog	0.4%	1.8%			

Table 5: Representation of Domestic Mammals in hand-recovered Assemblages by Phase and Feature type continued…

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned	**total**
2-3	sheep/goat	233	10	10			**253**
2-3	cattle	115	18	3			**136**
2-3	pig	37	1	6			**44**
2-3	horse	12		1			**13**
2-3	dog	7	1	1			**9**
		404	**30**	**21**			**455**

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned	**total**
3	sheep/goat	1578	10				**1588**
3	cattle	838	8				**846**
3	pig	289	2		1		**292**
3	horse	206	1				**207**
3	dog	152					**152**
		3063	**21**		**1**		**3085**

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned	**total**
4	sheep/goat	45					**45**
4	cattle	24					**24**
4	pig	6					**6**
4	horse	5					**5**
4	dog	1					**1**
		81					**81**

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned
2-3	sheep/goat	57.7%	33.3%	47.6%		
2-3	cattle	28.5%	60.0%	14.3%		
2-3	pig	9.2%	3.3%	28.6%		
2-3	horse	3.0%		4.8%		
2-3	dog	1.7%	3.3%	4.8%		

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned
3	sheep/goat	51.5%	47.6%			
3	cattle	27.4%	38.1%			
3	pig	9.4%	9.5%		100.0%	
3	horse	6.7%	4.8%			
3	dog	5.0%				

Phase	Species	PIT	DITCH	POSTHOLE	HEARTH	Unassigned
4	sheep/goat	55.6%				
4	cattle	29.6%				
4	pig	7.4%				
4	horse	6.2%				
4	dog	1.2%				

Table 6: Representation of Domestic Mammals in hand-recovered Assemblages by Phase and Feature Group

NISP counts by phase and location

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4	**total**
Unph	sheep/goat	101	157	100	18	**376**
Unph	cattle	58	47	48	13	**166**
Unph	pig	16	12	29	10	**67**
Unph	horse	9	5	6	5	**25**
Unph	dog	1	1	1		**3**
	total	**185**	**222**	**184**	**46**	**637**

% NISP counts by phase and location

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4
Unph	sheep/goat	55%	71%	54%	39%
Unph	cattle	31%	21%	26%	28%
Unph	pig	9%	5%	16%	22%
Unph	horse	5%	2%	3%	11%
Unph	dog	1%	0%	1%	

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4	**total**
EBA	sheep/goat				6	**6**
EBA	cattle				1	**1**
EBA	pig				1	**1**
	total				**8**	**8**

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4
EBA	sheep/goat				75%
EBA	cattle				13%
EBA	pig				13%

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4	**total**
1	sheep/goat			51		**51**
1	cattle			46		**46**
1	pig			18		**18**
1	horse			1		**1**
	total			**116**		**116**

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4
1	sheep/goat			44%	
1	cattle			40%	
1	pig			16%	
1	horse			1%	

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4	**total**
1-2	sheep/goat	263	602	419	189	**1473**
1-2	cattle	105	118	380	79	**682**
1-2	pig	40	49	201	51	**341**
1-2	horse	15	21	36	6	**78**
1-2	dog	6	5	5	2	**18**
	total	**429**	**795**	**1041**	**327**	**2592**

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4
1-2	sheep/goat	61%	76%	40%	58%
1-2	cattle	24%	15%	37%	24%
1-2	pig	9%	6%	19%	16%
1-2	horse	3%	3%	3%	2%
1-2	dog	1%	1%	0%	1%

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4	**total**
1-3	sheep/goat			8		**8**
1-3	cattle			10		**10**
1-3	pig			2		**2**
	total			**20**		**20**

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4
1-3	sheep/goat			40%	
1-3	cattle			50%	
1-3	pig			10%	

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4	**total**
2	sheep/goat	625		107	74	**806**
2	cattle	616	1	103	22	**742**
2	pig	105		47	9	**161**
2	horse	50		7	3	**60**
2	dog	25				**25**
	total	**1421**	**1**	**264**	**108**	**1794**

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4
2	sheep/goat	44%		41%	69%
2	cattle	43%	100%	39%	20%
2	pig	7%		18%	8%
2	horse	4%		3%	3%
2	dog	2%			

Phase	Species	Feature	Feature	Featur	Featur	**total**

Phase	Species	Feature	Feature	Feature	Feature

		Group 1	Group 2	e Group 3	e Group 4				Group 1	Group 2	Group 3	Group 4
2-3	sheep/goat	87	136	29	1	**253**	2-3	sheep/goat	55%	61%	40%	33%
2-3	cattle	55	53	27	1	**136**	2-3	cattle	35%	24%	38%	33%
2-3	pig	12	17	14	1	**44**	2-3	pig	8%	8%	19%	33%
2-3	horse	2	10	1		**13**	2-3	horse	1%	5%	1%	
2-3	dog	2	6	1		**9**	2-3	dog	1%	3%	1%	
	total	**158**	**222**	**72**	**3**	**455**						

Table 6: Representation of Domestic Mammals in hand-recovered Assemblages by Phase and Feature Group continued…

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4	**total**	Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4
3	sheep/goat	647	509	70	362	**1588**	3	sheep/goat	53%	52%	27%	58%
3	cattle	284	317	107	138	**846**	3	cattle	23%	33%	41%	22%
3	pig	81	67	71	73	**292**	3	pig	7%	7%	28%	12%
3	horse	106	68	10	23	**207**	3	horse	9%	7%	4%	4%
3	dog	113	13		26	**152**	3	dog	9%	1%		4%
	total	**1231**	**974**	**258**	**622**	**3085**						

Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4	**total**	Phase	Species	Feature Group 1	Feature Group 2	Feature Group 3	Feature Group 4
4	sheep/goat	45				**45**	4	sheep/goat	4%			
4	cattle	24				**24**	4	cattle	2%			
4	pig	6				**6**	4	pig	0%			
4	horse	5				**5**	4	horse	0%			
4	dog	1				**1**	4	dog	0%			
	total	**81**				**81**						

Table 7: Species representation (hand-recovered) in features producing more than 100 fragments

Phase	Feature Group	Type	Feature	COW	S/G	PIG	HOR	DOG	Other	Unidentified	Total
Unph	2	PIT	4487	18	40	5	3		82	194	342
Unph	2	PIT	4639	5	22	2				131	160
Unph	2	PIT	4625		50					72	122
Unph	3	PIT	5102	16	20	6			2	63	107
1	3	PIT	5054	23	27	11			5	117	183
1-2	1	PIT	4162	19	80	10				240	349
1-2	1	PIT	4305	25	44	5	1		2	143	220
1-2	1	PIT	4221	22	33	4			1	73	133
1-2	1	PIT	4348	12	32	15	1			59	119
1-2	1	PIT	4751	6	15	3	8	1	5	81	119
1-2	2	PIT	4612	32	251	14	13	4	1	327	642
1-2	2	PIT	4704	41	200	13				354	608
1-2	2	PIT	4497	21	57	11	4		1	158	252
1-2	2	PIT	4564	7	42	5	1	1		131	187
1-2	3	PIT	5318	49	67	30	10			142	298
1-2	3	PIT	4993	40	48	24			1	140	253
1-2	3	PIT	4931	24	30	18	7			150	229
1-2	3	PIT	5004	23	36	21	1		3	118	202
1-2	3	PIT	4865	13	19	9			6	110	157
1-2	3	PIT	4809	13	28	10				101	152
1-2	3	PIT	5149	15	22	8	6	1		75	127
1-2	3	PIT	5189	33	21	5	2	1		48	110
1-2	3	PIT	4912	8	19	9		1	1	64	102
1-2	4	PIT	5670	76	180	49	6	2	2	427	742
2	1	DITCH	4080	75	91	14	6		2	239	427
2	1	DITCH	4096	45	60	19	1	3	1	264	393
2	1	DITCH	4105	127	83	21	15	1		137	384
2	1	DITCH	4090	76	59	6	5	7	1	183	337
2	1	DITCH	4023	45	65	6	3			132	251
2	1	DITCH	4019	59	48	6	6	1		77	197
2	1	DITCH	4455	49	49	9	5	1	1	58	172
2	1	DITCH	4012	17	20	3		3	2	73	118
2	1	PIT	4113	14	70	4	2	1	5	141	237
2	3	PIT	5043	99	66	68	9		9	260	511
2	3	PIT	4836	29	34	9	2		2	232	308
2	3	PIT	4968	19	25	8			1	65	118
2	4	PIT	5688	22	68	8	3			191	292
2-3	1	PIT	4436	12	39	4	1		4	75	135
2-3	2	PIT	4606	32	74	6	7	5		253	377
2-3	2	PIT	4588	8	25	1	1			85	120
2-3	2	PIT	4667	8	27	5	2		1	67	110
2-3	3	PIT	4966	7	10	3		1	19	68	108
3	1	PIT	4423	25	67	8	7	79	2	290	478
3	1	PIT	4486	19	208	4	7		112	51	401
3	1	PIT	4796	54	28	7	44	11		214	358
3	1	PIT	4332	48	65	15	28	2	5	186	349
3	1	PIT	4553	26	46	21	3	5	1	216	318
3	1	PIT	4223	17	53	3	1	2	5	201	282
3	1	PIT	4365	15	30	4			3	111	163
3	2	PIT	4641	101	226	19	21	8	12	844	1231
3	2	PIT	4707	98	107	11	29		49	300	594
3	2	PIT	4724	25	38	15	2	1	1	192	274
3	2	PIT	4584	31	22	3	6	3	59	113	237
3	2	PIT	4598	42	58	7			1	109	217
3	2	PIT	4572	15	34	3	4			130	186
3	2	PIT	4849	5	24	9	6	1	1	85	131
3	4	PIT	5592	59	181	33	11	3	17	270	574
3	4	PIT	5358	57	126	17	11		11	274	496
3	4	PIT	5750	22	54	22	1	23		127	249
4	1	PIT	4272	9	24	2		1		202	238
4	1	PIT	4320	15	21	4	5		9	98	152

highlighted contexts contain associated bone groups

Table 8: Percentage of domestic species fragments affected by gnawing, erosion and burning

	NISP	gnawed	eroded	burnt
sheep/goat	4606	12.5%	5.3%	2.5%
cattle	2653	20.5%	8.3%	0.9%
pig	933	16.2%	8.1%	0.6%
horse	389	23.7%	9.3%	0.8%
dog	208	8.2%	1.0%	0.0%
n=	8789	1378	577	148
total		15.7%	6.6%	1.7%

Table 9: Percentages of loose teeth for main domestic species

Species	PIT	DITCH	POSTHOLE	HEARTH	UNASSIGNED	Total
sheep/goat	16.3%	19.2%	10.5%		24.2%	16.6%
cattle	20.1%	14.8%	10.0%	100.0%	25.6%	18.7%
pig	16.5%	26.0%	29.0%		17.6%	18.0%
horse	14.0%	44.0%	13.3%		33.3%	18.0%
dog	7.2%	12.5%	50.0%			8.2%
total	17.0%	18.5%	13.7%	33.3%	23.8%	17.2%
NISP =	7072	1376	212	3	126	8789

Table 10: Average fragment completeness of the major limb bones* in domestic species

	NISP for major limb bones	WBE** for major limb bones	average fragment completeness
sheep/goat	1634	513.25	31%
cattle	700	193.7	28%
pig	185	52.85	29%
horse	106	43	41%
dog	36	22.2	62%

*humerus, radius, femur, tibia, metapodials

**Whole Bone Equivalent count, based on %completeness values recorded for each fragment

Table 11: Minimum Numbers counts for the main skeletal elements in domestic species

Element	Sheep/goat	Cattle	Pig	Horse	Dog
skull	73	57	14	15	3
atlas	34	18	20	6	0
axis	12	20	2	2	2
mandible	252	93	64	11	11
scapula	97	53	30	9	3
humerus	126	69	31	15	4
radius	173	56	21	16	6
ulna	70	43	21	16	3
metacarpal	81	42		10	1.4
metacarpal 3			6		
metacarpal 4			3		
lateral metacarpal			3	2.5	
pelvis	88	60	11	11	3
femur	100	46	25	5	5
tibia	227	57	23	12	6
astragalus	66	33	7	7	2
calcaneum	56	39	10	3	0
metatarsal	70	51		10	0.6
metatarsal 3			2		
metatarsal 4			11		
lateral metatarsal				2	
phalanx 1	35.25	13.75	4.5	4.5	0.1
total MNE	1560.25	750.75	308.5	157	50.1
MNI	252	93	64	16	11

Table 12: Epiphyseal fusion counts for the domestic mammals from Battlesbury.

	SHEEP/GOAT			CATTLE			PIG			HORSE			DOG		
ELEMENT	**F**	**J**	**U**	**F**	**J**	**U**	**F**	**J**	**U**	**F**	**J**	**U**	**F**	**J**	**U**
SCAPULA D	41	3	19	34	1	3	11		4	10			1		1
PELVIS ACETABULUM	39	3	25	38		10	2		6	9			3		
HUMERUS D	69	11	18	34	3	5	2		6	11			1		3
RADIUS P	60		27	49	3	6	12		6	16			5		1
PHALANX 1 P	94	8	60	44		7	9	1	8	8			2		
PHALANX 2 P	48	3	18	23		8	20	1	5	4		1	2		
TOTAL EARLY FUSING	351	28	167	222	7	39	56	2	35	58	0	1	14	0	5
% EARLY FUSING	**64%**	**5%**	**31%**	**83%**	**3%**	**15%**	**60%**	**2%**	**38%**	**98%**	**0%**	**2%**	**74%**	**0%**	**26%**
METACARPAL D	11	1	32	17		4	2		6	6			5		
TIBIA D	42	2	61	30	3	9	5	1	11	12					2
METATARSAL D	12		30	11		6		1	5	5			4		
METAPODIAL D	3		17	4		1	2		2	1		1	2		
TOTAL MIDDLE FUSING	65	3	123	62	3	20	9	2	24	24	0	1	11	0	2
% MIDDLE FUSING	**34%**	**2%**	**64%**	**73%**	**4%**	**24%**	**26%**	**6%**	**69%**	**96%**	**0%**	**4%**	**85%**	**0%**	**15%**
CALCANEUM P	18	1	29	2		7			5						
ULNA P	7	1	22			5			5			1			1
FEMUR P	24	2	40	12	5	8			12	3			3	1	
RADIUS D	8	1	38	9	2	16			6	5			3		1
HUMERUS P	7		24	14	7	17			6	2	1				3
FEMUR D	11		28	19	2	17			9	3			1	1	
TIBIA P	9	1	41	2	8	21			4	2			2		2
TOTAL LATE FUSING	84	6	222	58	24	91	0	0	47	15	1	1	9	2	7
% LATE FUSING	**27%**	**2%**	**71%**	**34%**	**14%**	**53%**	**0%**	**0%**	**100%**	**88%**	**6%**	**6%**	**50%**	**11%**	**39%**

F= number of specimens with fully fused epiphyses
J= number of specimens with epiphyses just fusing
U= number of specimens with unfused epiphyses

Table 13: Summary of sheep/goat measurements from Battlesbury

	Battlesbury					Danebury				Owslebury Iron Age			
Measurement	**Total**	**Min.**	**Max.**	**Mean**	**sd**	**cv**	**Total**	**Mean**	**sd**	**cv**	**Total**	**Mean**	**sd**	**cv**
Astragalus GLl	39	22.7	27.4	24.2	1.1	4.6					25	25.0	1.2	4.7
Astragalus GLm	40	21.5	26.2	23.3	1.0	4.4								
Astragalus Bd	39	14.3	18.4	15.8	0.8	5.0								
Calcaneus GL	10	46.3	53.8	48.8	2.5	5.2	160	48	2.8	5.9				
Humerus BT	23	21.3	27.6	24.4	1.3	5.4					13	25.2	1.8	7.1
Humerus HT	27	13.1	18.1	15.3	1.0	6.7								
Metacarpal GL	7	110	134	118.1	7.6	6.4	90	116	8.0	6.9				
Metacarpal Bp	21	16.8	20.7	18.9	1.0	5.5	156	19	1.2	6.4	11	19.6	0.8	4.1
Metacarpal Dp	17	11.5	15.8	13.8	1.1	7.7								
Metacarpal Bd	8	20.7	23.8	22.1	0.9	4.1	117	22	1.5	6.7				
Metatarsal GL	6	122	138	128.3	5.4	4.2	104	126	7.5	5.6				
Metatarsal Bp	21	15.0	19.7	17.0	1.2	6.9	121	17	0.9	5.5	8	17.8	1.1	5.9
Metatarsal Bd	9	18.9	21.2	20.3	0.9	4.3	121	21	1.1	5.5				
Radius Bp	18	22.3	30.3	25.8	2.2	8.7	184	26	1.6	5.9	10	26.6	1.3	4.8
Radius Dp	17	12.1	15.6	13.7	0.9	6.7								
Radius BFp	19	21.2	28.5	24.3	1.9	7.7								
Scapula GLP	15	25.1	32.0	27.8	1.8	6.6	223	27	1.7	6.3	7	28.2	1.9	6.8
Scapula BG	17	15.0	21.8	17.9	2.0	11.0								
Scapula SLC	13	14.1	19.0	16.2	1.5	9.0								
Tibia Bd	27	20.6	23.7	22.3	0.8	3.6	289	22	1.3	5.7	15	23.1	1.0	4.4
Tibia Dd	26	16.8	18.9	17.6	0.6	3.6								
Withers height	18	537.9	655.3	576.1	27.7	4.8	279	568			10	571.0	34.0	6.0

All measurements in millimetres

Bd = (Greatest) Breadth distal end
BFp = Breadth proximal articular surface
BG = Breadth glenoid cavity
Bp = (Greatest) Breadth proximal end
BT = (Greatest) Breadth distal trochlea
Dd = (Greatest) Depth distal end
Dp = (Greatest) Depth distal end
GL = Greatest Length
GLl = Greatest Length lateral side
GLm = Greatest Length medial side
GLP = greatest length glenoid process
HT = (Greatest) Height distal trochlea
LG = Length glenoid cavity
SLC = minimum length scapula neck

See von den Driesch (1976) for description of measurements
Withers heights estimates based on Teichert's conversion factors for radius, tibia and metapodials (von den Driesch and Boessneck 1974)
Danebury date from Grant 1984a: 506; Owslebury data from Maltby 1987:461

Table 14: Summary of cattle measurements from Battlesbury

	Battlesbury					Danebury				Owslebury Iron Age			
Measurement	**Total**	**Min.**	**Max.**	**Mean**	**sd**	**cv**	**Total**	**Mean**	**sd**	**cv**	**Total**	**Mean**	**sd**	**cv**
Astragalus GLl	22	50.1	62.9	57.6	3.1	5.3	94	57	4.3	7.5	10	58.8	1.7	2.9
Astragalus GLm	23	45.0	58.4	52.5	3.0	5.7								
Astragalus Bd	23	33.7	42.2	37.6	2.5	6.5								
Humerus BT	22	56.4	73.8	67.1	4.3	6.4					14	66.1	3.1	4.7
Humerus HT	21	32.2	45.3	38.7	3.3	8.6								
Metacarpal GL	10	159	185	172.4	7.7	4.5	34	174	7.3	4.2				
Metacarpal Bp	22	44.9	58.6	51.2	3.5	6.8	49	52	4.1	7.8	23	50.0	2.8	5.6
Metacarpal Dp	16	27.3	37.6	32.1	2.8	8.7								
Metacarpal Bd	12	47.7	57.6	53.6	3.6	6.8	46	56	4.8	8.5				
Metatarsal GL	6	183	215	204.8	11.6	5.7	32	202	10.8	5.3				
Metatarsal Bp	17	38.8	49.0	43.6	2.6	5.9	46	43	2.7	6.3	11	42.9	1.7	4.0
Metatarsal Bd	7	45.3	55.4	52.1	3.4	6.4	41	50	3.8	7.5				
Radius Bp	19	64.1	79.6	71.7	4.0	5.6	72	72	5.5	7.6	26	71.8	4.1	5.7
Radius Dp	11	34.5	43.6	37.5	3.1	8.3								
RadiusBFp	20	60.0	72.6	66.1	3.8	5.7								
Scapula GLP	9	53.5	64.8	58.0	4.1	7.0	81	60	4.6	7.7				
Scapula BG	5	37.8	44.3	40.8	2.4	5.8					32	42.7	2.5	5.9
Scapula LG	10	43.4	55.0	47.4	4.1	8.2								
Tibia Bd	27	47.8	60.7	54.4	3.0	5.6	96	55	3.1	5.7	26	53.0	3.0	5.7
Tibia Dd	27	36.0	44.9	40.8	2.4	5.8								
Withers height	24	973.9	1171.8	1078.6	57.1	5.3	96	1078.3						

All measurements in millimetres

Bd = (Greatest) Breadth distal end
BFp = Breadth proximal articular surface
BG = Breadth glenoid cavity
Bp = (Greatest) Breadth proximal end
BT = (Greatest) Breadth distal trochlea
Dd = (Greatest) Depth distal end
Dp = (Greatest) Depth distal end
GL = Greatest Length
GLl = Greatest Length lateral side
GLm = Greatest Length medial side
GLP = greatest length glenoid process
HT = (Greatest) Height distal trochlea
LG = Length glenoid cavity

See von den Driesch (1976) for description of measurements
Withers heights estimates based on Foch's conversion factors for metapodials and Matolsci's for radius and tibia (von den Driesch and Boessneck 1974)
Danebury date from Grant 1984a: 513; Owslebury data from Maltby 1987:460

Table 15: Summary of horse measurements from Battlesbury

	Battlesbury						Danebury				Owslebury Iron Age			
Measurement	**Total**	**Min.**	**Max.**	**Mean**	**sd**	**cv**	**Total**	**Mean**	**sd**	**cv**	**Total**	**Mean**	**sd**	**cv**
Humerus BT	8	62.4	69.3	66.0	2.6	3.9								
Humerus HT	9	41.4	51.6	45.3	3.3	7.2								
Metacarpal GL	6	194	202	197.2	3.1	1.6	32	204	16.6	8.1				
Metacarpal Ll	6	187	199	192.5	4.1	2.1								
Metacarpal Bp	8	41.5	46.3	43.9	1.8	4.0	18	44	2.9	6.6	5	43.6	2.1	4.8
Metacarpal Dp	6	26.6	30.6	28.9	1.4	4.7								
Metacarpal Bd	5	40.8	44.7	42.9	1.7	3.9	31	44	2.3	5.2				
Metatarsal Bp	5	42.0	45.0	43.1	1.2	2.8	9	44	2.5	5.7	7	44.1	2.5	5.8
Radius Bp	8	68.9	78.3	73.3	3.3	4.5	16	72	3.9	5.1				
Radius Dp	6	35.9	44.2	40.7	3.0	7.4								
RadiusBFp	10	63.6	72.0	67.0	2.9	4.3								
Tibia Bd	7	62.5	67.8	65.2	2.2	3.4	32	63	3.1	4.9	5	61.4	3.9	6.4
Tibia Dd	6	38.1	43.8	40.5	1.8	4.5								
Withers height	11	1172.6	1327.2	1229.8	42.5	3.5								

All measurements in millimetres

Bd = (Greatest) Breadth distal end
BFp = Breadth proximal articular surface
Bp = (Greatest) Breadth proximal end
BT = (Greatest) Breadth distal trochlea
Dd = (Greatest) Depth distal end
Dp = (Greatest) Depth distal end
GL = Greatest Length
HT = (Greatest) Height distal trochlea
Ll = Length lateral side

See von den Driesch (1976) for description of measurements
Withers heights estimates based on Kiesewalter's conversion factors
(von den Driesch and Boessneck 1974)
Danebury date from Grant 1984a: 521; Owslebury data from Maltby 1987:463

Table 16: Occurrences of different types of pathology among the domestic species

	sheep/goat	cattle	pig	horse	dog	Total
Trauma		2	1		3	6
Arthropathy	7	28		4	3	42
Congenital		5				5
Oral	18	12	3	5	2	40
Infection/Inflammation	4	8		2	1	15
Uncertain aetiology	2	5			4	11

Table 17: Butchered bones of domestic species by period

Species	EBA	1	1-2	1-3	2	2-3	3	4	Unphased	Total
Sheep/goat	1	2	66	0	26	12	91	1	16	215
Cattle	0	1	49	0	54	15	93	3	12	227
Pig	0	0	23	0	6	4	19	2	8	62
Horse	0	0	1	0	2	1	25	2	2	33
Dog	0	0	0	0	0	0	1	0	0	1
Total	1	3	139	0	88	32	229	8	38	538

% of NISP of each species

Species	EBA	1	1-2	1-3	2	2-3	3	4	Unphased	Total
Sheep/goat	20.0	4.9	5.2	0.0	3.9	5.9	6.8	2.6	5.2	5.6
Cattle	0.0	3.1	8.9	0.0	8.5	14.3	13.1	15.8	8.6	10.5
Pig	0.0	0.0	8.3	0.0	4.9	12.5	7.1	40.0	14.8	8.1
Horse			1.7		5.3	7.7	13.2	40.0	10.0	10.3
Dog			0.0		0.0	0.0	0.8	0.0	0.0	0.5
Total	14.3	3.5	6.4	0.0	5.9	8.9	8.6	11.8	7	7.4

Table 18: Butchered elements of domestic species (excluding loose teeth and sieved samples)

Element	Sheep/goat	Cattle	Pig	Horse	Dog	Total
skull	12	21	3	3		39
horn core	6	12				18
maxilla		7				7
mandible	4	28	4			36
scapula	6	22	7	1		36
humerus	5	18	4	5	1	33
radius	4	9		5		18
ulna	3	5	3	3		14
pelvis	15	14	1	3		33
femur	6	17	4	3		30
tibia	11	9	1	1		22
fibula			1			1
carpals	1	4	3	2		10
astragalus	25	13	5	2		45
calcaneum	2	6	1			9
centroquartal	4	5	1			10
other tarsals	1	1		1		3
metacarpal	7	6	1			14
metatarsal	4	7		1		12
phalanx 1	1	13				14
ribs	34		12	1		47
atlas	8	2	1	2		13
axis	1	2	1			4
cervical 3-7	7	2				9
thoracic	13		4			17
lumbar	32	3	5			40
sacral	3					3
strenebrae		1				1
total	215	227	62	33	1	538

Figures:

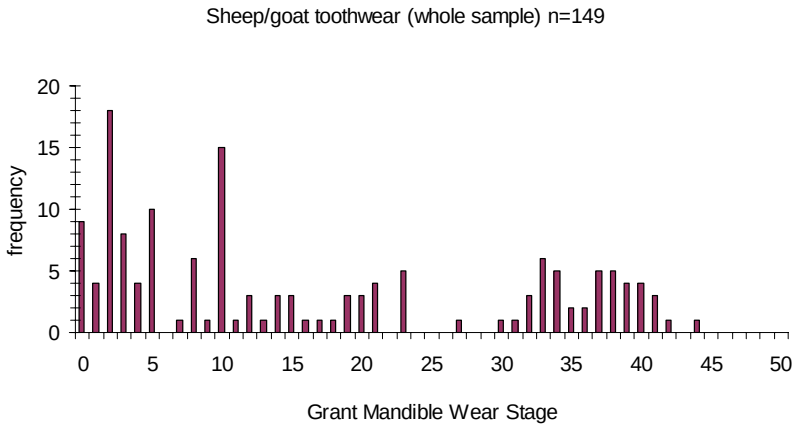


Figure 1: Frequency of Grant Mandible Wear Stages (including estimates) in the Sheep/goat assemblage from Battlesbury

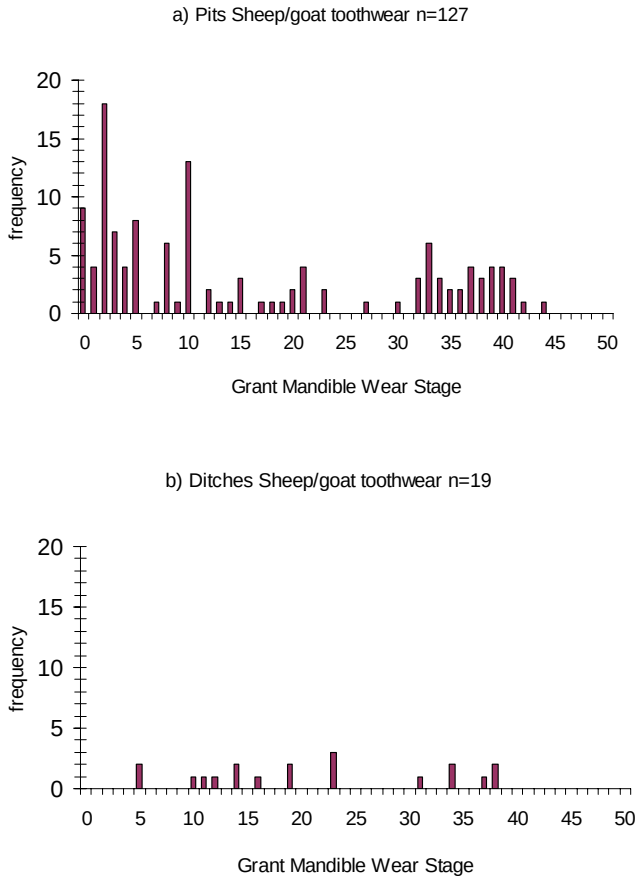
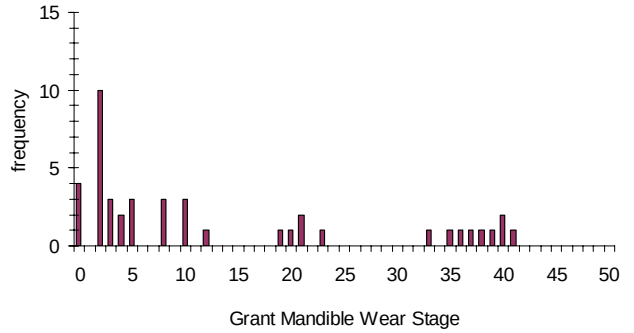
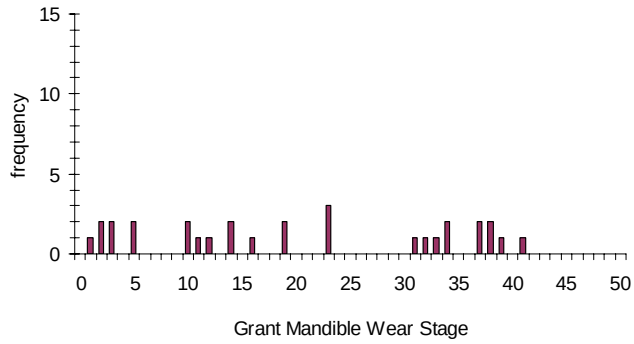


Figure 2: Frequency of Grant Mandible Wear Stages (including estimates) in the Sheep/goat assemblage from a) Pits and b) Ditches at Battlesbury

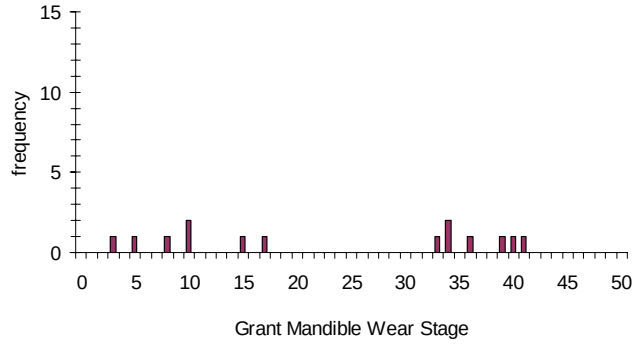
a) Phase 1-2 Sheep/goat toothwear n=43 wl



b) Phase 2 Sheep/goat toothwear n=30



c) Phase 2-3 Sheep/goat toothwear n=14



d) Phase 3 Sheep/goat toothwear n=53

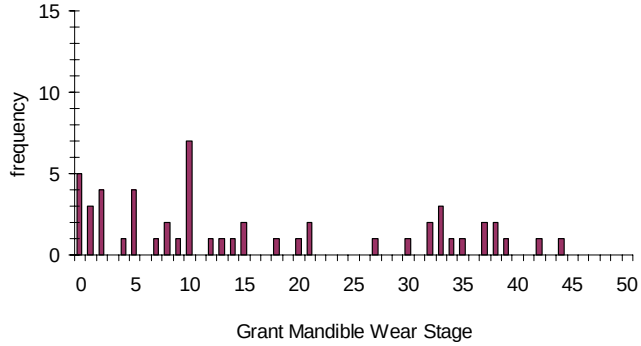


Figure 3: Frequency of Grant Mandible Wear Stages (including estimates) in the Sheep/goat assemblage from a) Phase 1-2 b) Phase 2 c) Phase 2-3 d) Phase 3 at Battlesbury

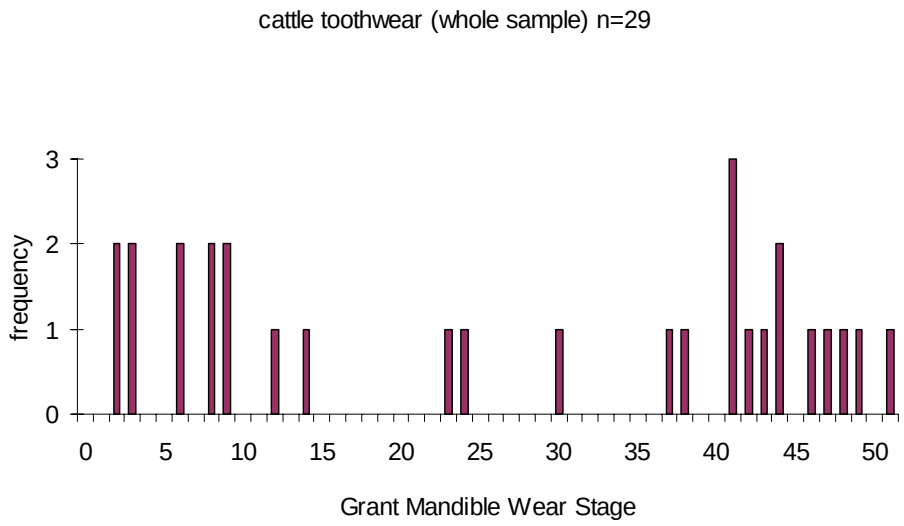


Figure 4: Frequency of Grant Mandible Wear Stages (including estimates) in the Cattle assemblage from Battlesbury

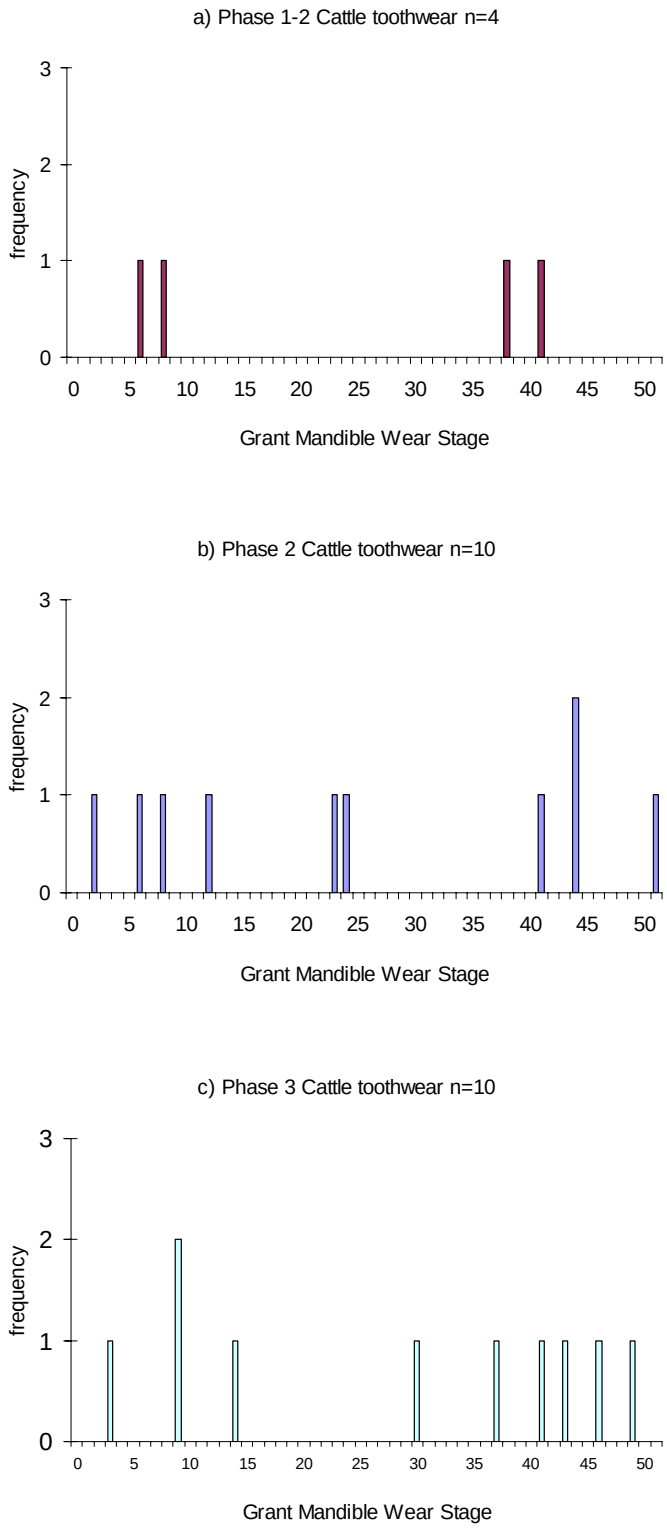


Figure 5: Frequency of Grant Mandible Wear Stages (including estimates) in the Cattle assemblage from a) Phase 1-2 b) Phase 2 c) Phase 3 at Battlesbury

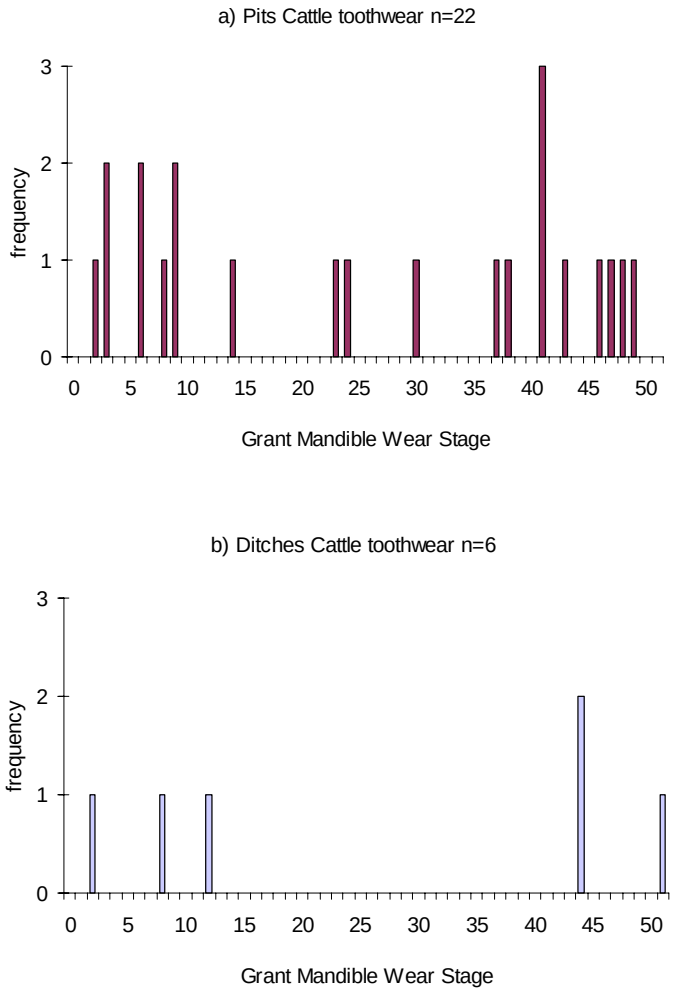


Figure 6: Frequency of Grant Mandible Wear Stages (including estimates) in the Cattle assemblage from a) Pits and b) Ditches at Battlesbury

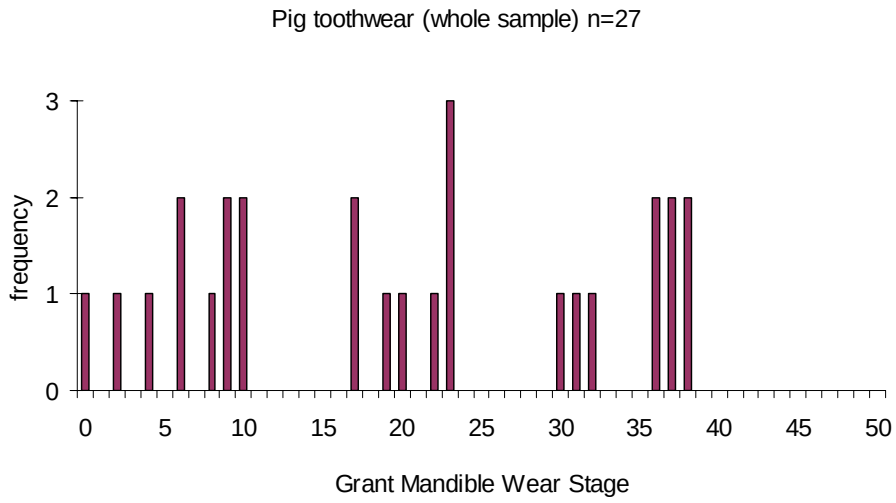


Figure 7: Frequency of Grant Mandible Wear Stages (including estimates) in the Pig assemblage from Battlesbury