'Castlegate', 23-27 High Street Bedford Animal and Human Bones (Albion Archaeology Project HS1139)

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Site Narrative

Phase 4: Middle Saxon

L3.01 – Infill of ditch L3 with burnt refuse material

Three contexts produced an animal bone assemblage of 166 fragments (NISP – number of individual specimens). These include 142 from two sieved samples that consist mainly of small unidentified mammal fragments. Many of these have been burnt and largely account for the high percentage (54%) of burnt fragments in the assemblage. The only charred or calcined elements identified to species consist of two teeth, a radius, ulna and tibia of sheep/goat and a pig second phalanx. The total identified assemblage consists of sheep/goat (10), cattle (9), pig (5), horse (2), goose (2) and domestic fowl (1). Three cattle metapodials bore evidence of axial splitting to release the marrow.

Phase 5: Middle Saxon

L3.02 – Final backfill of ditch L3

Hand recovery produced an assemblage of 131 animal bone fragments, of which 73 were identified to species. In contrast with the material from the lower fills of this ditch, none of the bones have been damaged by fire. Cattle elements (30) dominate the identified material and at least three animals are represented by radii. A cattle metatarsal split open longitudinally for marrow was recovered as well as a second specimen that had been chopped transversely through the shaft, presumably for the same purpose. Sheep/goat (15), pig (13), horse (3) are other mammals represented. A minimum number of four elements (MNE) are represented by tibiae and scapulae for sheep/goat and pig respectively. Bird bones consist of domestic fowl (8) and goose (4) and three unidentified fragments. At least three (MNE) domestic fowl tibiotarsi are represented.

Phase 6: Saxo-Norman

L5 – Orange layer

Eleven animal bone fragments were recovered from three contexts. Most of the material is fragmented and some elements are slightly eroded. Species identified were cattle (6), sheep/goat (2) and pig (1).

L6 – Postholes and burnt dump

Twenty-seven animal bone fragments were recovered including 21 (only one identified) from a sieved soil sample. Species represented are sheep/goat (2), cattle (1) and pig (1). Most of the identified elements have been damaged by gnawing.

Phase 7: Saxo-Norman

L7 – Infill of postholes and dumping of green layer

Four contexts produced a total of 565 animal bone fragments, if which 306 were identified to species. Cattle elements (170) are the most abundant and include relatively large numbers of cranial and foot elements. A lot of this material is fragmented. For example, 25 mandible fragments derive from a minimum of only six elements (MNE). Five specimens bear knife cuts on the lateral aspect of the ramus made during separation from the skull. There are also 24 skull fragments (excluding premaxilla and maxilla) with at least seven temporals represented. In addition 11 premaxillae and maxillae elements were recorded from at least five upper jaws. The bias towards cattle foot bones is also demonstrated by both NISP and MNE counts. Twenty-two phalanges were recovered, for example. At least six elements are represented by calcanea, five by the metatarsal and distal tibia and three by the metacarpal. In contrast MNE counts were low for most upper limb bones (ulna 3; humerus 2; pelvis 2; radius 1; femur 1). Largely fragmentary scapulae are better represented with 16 fragments from at least five elements.

Sheep/goat (63) were the second most common species identified. The assemblage includes 13 metacarpal fragments. Many of these are fairly complete and derive from at least seven elements. Thirteen sheep/goat tibia fragments were also recovered from at least eight elements. Pig (58) was also quite well represented with no major biases towards particular elements. Seven fragments each of scapula and tibia were identified. MNEs of four were obtained for the pelvis and ulna.

The three horse fragments include a femur from a young foal. The two dog bones both belonged to adult animals. Seven rodent bones were recovered. A skull and mandible were identified as house mouse and the five rodent limb bones probably belong to the same skeleton. Only three bird bones were found, of which only a domestic fowl radius was identified to species.

Phase 8: Saxo-Norman

L8 and L8.1 – Pits and postholes

Eight contexts produced 148 animal bone fragments, of which 69 were identified. Thirty of the unidentified fragments were retrieved from sieved soil samples. Cattle (49) provide the majority of the identified fragments. Cranial elements are well represented with 11 mandible fragments from at least four jaws. At least three maxillae and three temporals are also represented.

Pig (8) and sheep/goat (5) are both poorly represented in these features. Red deer is represented by a fairly complete mandible of an adult animal. Six bones of domestic fowl complete the identified counts.

Phase 9: Saxo-Norman

L9 – Limestone cobbles

Three contexts produced 339 animal bone fragments, of which 202 have been identified. As in the previous phases, the assemblage is dominated by cattle (126) with head elements again well represented. Mandible fragments are the most common with 27 fragments from at least seven jaws.

At least five parietals, four maxillae and three horncores are represented amongst the 31 cranial fragments. The most notable feature of the limb bones represented is the presence of eight metacarpals (MNE 7), of which seven are more than 75% complete. Nine smaller fragments of pelvis came from at least four elements and a minimum of four elements are also represented by proximal radii.

Pig (29) is the second most common species identified on this assemblage and includes six maxillae fragments from at least four elements. Sheep/goat fragments (11) are poorly represented, although a MNE of four distal humeri are present. Ten of the 11 horse bones came from the right forelimb of the same adult animal (context 3030). A complete radius and largely complete ulna, humerus and third metacarpal were recovered along with four of the carpals and the peripheral metacarpals. The humerus, ulna, third metacarpal and one of the carpals have been damaged by gnawing, indicated that the articulated limb was at some stage accessible to dogs prior to final burial.

A single bone each of domestic fowl and goose were recovered.

L10 and L10.01 Kiln

Only nine fragments of animal bones were recorded consisting of cattle (4), sheep/goat (3), pig (1) and unidentified mammal (1). The bones were only moderately preserved including a number of eroded and gnawed fragments and a slightly charred cattle femur.

Phase 9.1: Saxo-Norman

L13 – Occupation and possible rampart deposits

Fifteen animal bone fragments were recovered from the two dumps with only cattle (7) and sheep/goat (5) identified. No more than a minimum of one element was represented for either species.

L14 – Hearth and associated postholes

Fifteen animal bone fragments were found with only cattle (6), sheep/goat (3) and pig (2) identified. Both the pig elements are fourth metacarpals. A minimum of two distal humeri of cattle are also represented.

Phase 9.2: Saxo-Norman

L14.01 – Collapsed superstructure of hearth and disuse fills of postholes

Only seven animal bone fragments were recovered consisting of cattle (2), sheep/goat (1) and unidentified mammal (4). Both cattle fragments are from scapulae. One unidentified mammal is burnt.

Phase 10: Early Medieval

L10.02 – Kiln backfill

A total of 93 animal bone fragments were found amongst the refuse in the kiln. Sixty-seven fragments were identified to species with cattle (25) and sheep/goat (24) found in fairly equal numbers. MNE counts do not exceed two on any of the cattle elements. At least four sheep/goat metacarpals and three femora are represented. A horncore is the only cranial sheep/goat element identified. Pig (13) includes fragments from at least two mandibles, radius and femur. A complete mandible and radius of domestic cat were found in the same context and could be from the same adult animal. Single elements of goose, mallard-sized duck and partridge were also identified.

L11 – Rubbish pits

Ten contexts produced 156 animal bone fragments, of which 71 were identified. Thirty fragments were retrieved from sieved samples, of which only two (cattle mandible; sheep/goat fibula) were identified. Cattle (38) provide most of the identified fragments. Twelve of these are from at least five mandibles, two of which (from context 4074) survive as a relatively complete pair. Two complete metacarpals were found in the same pit. Sheep/goat (18) includes fragments from at least three humeri and a complete mandible. Pig (12) and single finds of domestic fowl, a medium-sized duck and goose complete the assemblage.

The proximal part of a left human femur was recovered (in context 4064). The proximal end is unfused indicating that the bone is not from an adult. Its overall size suggests that it probably belonged to an adolescent.

Phase 11: Early Medieval

L12.01 – limestone rubble and burnt waste in base of kiln

Twelve of the 14 animal bone fragments were extracted from a soil sample. Altogether, only five fragments were identified, of which four belong to cattle and one to pig. Six of the fragments in the sieved sample are burnt including a cattle tooth.

L15 – Posthole and pit

Only five animal bone fragments were recorded, of which only a small eroded fragment of sheep/goat metacarpal was identified.

Phase 12: Early Medieval

L12.02 – Secondary fills of kiln

Fourteen fragments were recorded including five unidentified mammal fragments, three of which are burnt. Cattle (5), sheep/goat (2), pig (1) and horse (1) are present in the assemblage.

L16.01 – rubbish fills of pits

Twelve of the pit fills produced 369 animal bone fragments including 80 unidentified. The identified material includes 142 bones from a largely complete piglet skeleton (in context 4036). All parts of the body are represented apart from back of skull, atlas, axis and some of the other cervical vertebrae, most of the right humerus and a few phalanges and caudal vertebrae. No evidence of processing was found on the skeleton. Tooth eruption evidence indicates it belonged to an animal

that died probably between 6-9 months old. None of the limb bone epiphyses or vertebral bodies are fused, also indicating that the pig is unlikely to have been much over six months old.

Cattle (56), pig (38) and sheep/goat (31) provided most of the remaining 147 identified fragments. No more that three bones were represented by any of the cattle elements. Fragments from at least four pig ulnae (excluding those in the skeleton) are present. Most of the sheep/goat elements are from the upper limbs with at least four femora represented (MNE). A horse femur, a cat humerus, a red deer first phalanx and a dog rib were the only elements of other mammals identified. Bird bones include those of domestic fowl (4), goose (3) and woodcock (1).

Phase 14: Early Medieval

L17.01 – Gully infill

The gully produced an animal bone assemblage of 54 fragments, including 25 identified to species. Sheep/goat (9), pig (8), cattle (5) and goose (3) were recorded. Most of the bones of all species were from areas of the body associated with high meat content.

L19 – Black occupation layers

Eleven contexts provided an animal bone assemblage of 772 fragments, of which 343 were identified. Overall, cattle fragments (170) are the most abundant, followed by sheep/goat (90) and pig (52). In some areas (such as in context 3033), the assemblage includes a high proportion of cattle cranial fragments and phalanges, reminiscent of some of the Saxo-Norman phases. Given the presence of large numbers of Saxo-Norman pottery sherds, it is feasible that much of the bone from these layers may also be residual. However, this may not be the case in the layers in the vicinity of car stacker 4, which include much fewer cranial fragments of all species and higher proportions of pig and sheep/goat than from other areas.

In car stackers 1-3, cattle (141) greatly outnumbered sheep/goat (44) and pig (36). Cattle elements include 20 mandible fragments from at least five jaws, 10 loose teeth and 30 other cranial fragments (including maxillae horncores and hyoids) from at least four skulls. Seventeen cattle phalanges were also recovered. At least five sheep/goat tibiae and four pig mandibles were represented in these deposits. The four dog bones include the left humerus, radius and ulna of a sub-adult (context 3033). Horse (2) and hare (1) are also present. Only one species of bird – domestic fowl (3) – was identified.

In the equivalent deposits in car stacker 4, cattle fragments (29) ranked second to sheep/goat (46), with pig (16) also less well represented. The cattle assemblage includes only one mandible fragment, two loose teeth and no other cranial element. There are no phalanges. Rib heads (5) are quite well represented in comparison with other assemblages from this site. Similarly, the only sheep cranial elements consist of the frontal of a young lamb and loose tooth. At least seven tibiae and six scapulae are present (MNE) whereas there is only one metacarpal and no metatarsals. The pig assemblage does include four jaws and three other cranial fragments but no foot bones. There is also a greater diversity of other species than in the other areas. There are 22 bird bones, of which 14 are from five different species (domestic fowl (6), goose (3), mallard-sized duck (1), woodcock (3), pigeon (1)). The two unidentified fish fragments represent the only records of fish from the excavations. A deer metatarsal has been tentatively identified as red deer, although it is not impossible that it belonged to a large fallow deer. Five bones of hare and a cat bone were also identified.

Phase 15: Early Medieval

L20 – pits

Two contexts produced 66 fragments, of which only 24 were identified. Cattle (9), sheep/goat (5), pig (4), domestic fowl (4), dog (1) and cat (1) are represented. In addition two human bones were identified. Part of a left pelvis was found in context (3021) and the proximal end of a tibia was recovered from context (3026). The proximal epiphysis has fused indicating it belonged to an adult. The fragmentary nature of the human remains suggests they were redeposited and probably residual.

Phase 16: Modern

L18 – Pits

Only two cattle metatarsals and a horse radius were retrieved. One of the cattle metatarsals is a large specimen from an improved breed.

Phase 17: Modern

L23 Demolition layers

Seven animal bones were recovered including cattle (2), sheep/goat (1) and pig (1).

Animal Bones: Discussion

An assemblage of 2,983 animal bone fragments was recovered, of which 1,535 (51%) were identified (Table 1). Animal bones were recovered from 89 contexts. Twelve (13%) were designated as being quite poorly preserved with slight erosion on many of the bones. Thirty-seven (42%) of the assemblages are moderately preserved with good surface preservation but with relatively high amounts of fragmented and gnawed bones. The remaining 40 contexts (45%) have quite well preserved assemblages with good surface preservation and less fragmentation. The better-preserved assemblages tend to be larger than those from other contexts. A total of 2,073 (70%) of the bones are from quite well preserved assemblages.

Gnawing was recorded on 273 (22%) of the identified elements excluding loose teeth and the pig skeleton from Phase 12. This figure varies slightly between species and periods (Table 2) but the consistently high percentages indicate that many of the bones of the larger mammals were accessible to scavengers prior to final burial. Gnawing damage particularly affects the survival of limb bone extremities and the bodies of vertebrae. In many cases these have been completely destroyed, which limits the survival of epiphysial fusion and metrical data. It is also likely that the bones of sheep/goat and pig are more likely to be totally destroyed by gnawing than those of larger mammals. Their numbers are therefore likely to be under-represented in the surviving assemblage.

Surface erosion was recorded on 97 (8%) of the identified elements excluding loose teeth. Most of this erosion was slight. Of particular note is the higher percentage of eroded elements in the early

Medieval assemblage. This supports the impression that a substantial amount of the material in these deposits was residual from earlier periods.

Most of the burnt bone fragments were found in sieved samples and were associated with deposits that contained other burnt material. Elsewhere, burnt bone fragments were rarely recovered.

Species Representation

The identified material is composed of at least ten mammal and seven bird species (Table 1). The sheep/goat category includes 63 elements diagnostic of sheep (4 Middle Saxon; 24 Saxo-Norman; 35 early Medieval) and only three (2 Saxo-Norman; 1 early Medieval) identified as goat. It is assumed therefore that the remainder of the sheep/goat elements belonged to sheep. "Horse" bones could also include mules, although no diagnostic elements were recovered.

Phases 4-5: Middle Saxon
Only 102 identified fragments were recovered, which limits any detailed analysis of species representation. In a sample of 87 mammal fragments, cattle (45%) are the most common, followed by sheep/goat (29%), pig (21%) and horse (6%). Although the sample is very small, the high percentage of cattle bones contrasts with most later Saxo-Norman and medieval assemblages from Bedford, which usually contain higher percentages of sheep/goat remains (Grant 1979). The species representation in this sample has greater similarities with the material from the Anglo-Saxon sites at Clapham (Maltby nd1), where cattle elements (49%) also comfortably outnumbered those of other species (sheep/goat 23%; pig 24%), and Harrold (cattle 51% sheep/goat 28%; pig 18% - Maltby nd2). The small number of bird bones consists of domestic fowl and goose. These species were also identified in small numbers at Clapham (Maltby nd1).

Phases 6-9.02: Saxo-Norman
A total of 1,136 animal bone fragments were recovered including 602 identified specimens (Table 1). Of these, 593 are from mammals including small associated bone groups of horse (10 elements) and house mouse (7 elements). Excluding the associated bones, cattle (63%) provide the majority of the identified remains, followed by pig and sheep/goat (both 17%), with small numbers of isolated horse bones (0.7%), dog (0.3%) and red deer (0.2%). This assemblage is therefore markedly different to most Saxo-Norman and medieval assemblages from Bedford with much higher percentages of cattle (Grant 1979). As noted above and discussed further below, it seems that at some stage the area was used for the disposal or perhaps redeposition of significant amounts of cattle cranial and foot elements, particularly associated with the L7 dumps, which could account for the unusually high percentage of cattle. The slightly gnawed horse forelimb could represent the redeposited and comminuted remains of a complete horse carcass dumped in the same area. The presence of house mice in urban deposits is not unusual. Birds are represented only by a few bones of domestic fowl and goose.

Phases 10-15 Early Medieval
A total of 1,540 animal bone fragments were retrieved from these phases, of which 824 were identified (Table 1). This total includes 142 bones from a largely complete piglet skeleton, which appears to have been deposited as an unprocessed carcass in one of the pits. Excluding the pig, in an overall sample of 643 mammal bones, cattle (49%) continue to be the best represented species, followed by sheep/goat (28%) and pig (20%). Small numbers of dog, hare (both 0.9%), cat (0.8%), horse (0.6%) and red deer (0.3%) were also recovered. The high percentage of cattle can to some extent be related to the presence of residual material. Several of the assemblages (particularly some of the dumps in the occupation layers of L19) are very similar to some of those from the Saxo-

Norman deposits. Residuality has been a problem in analysing early medieval animal bones from previous excavations in Bedford. On some sites Saxo-Norman and medieval assemblages have had to be amalgamated in faunal analyses (Grant 1979) and the problem of residuality was noted in the sample from the neighbouring site to the rear of 29-41 High Street (Hutchins (1999). Therefore, given the high percentage of residual Saxo-Norman pottery in the assemblage, we must be cautious in interpreting the animal bones as representing continuity in the relative importance of different species in the diet.

Indeed, it is perhaps significant that the admittedly small sample from Phase 14 deposits around Car Stacker 4 has a much lower percentage of cattle (28%) and instead sheep/goat elements (46%) are the most abundant (Table 1). This is more typical of early medieval assemblages from Bedford (Grant 1979) and may indicate that there is much less residual material in this sample. As discussed above, there is slightly more diversity in species represented in this sample. All but one of the hare bones and one of the two deer bones derived from this assemblage. However, there is no evidence that venison or other game formed a significant part of the diet. This again is typical of most sites from medieval Bedford. The assemblage from Bedford Castle produced slightly higher percentages but even there they formed less than 0.5% of the identified mammal fragments in well-dated contexts (Grant 1979: 60). There, bones of roe, red and fallow deer were present, whereas only red deer was specifically identified from this site.

Bird bones feature slightly more prominently in the early Medieval assemblage. A total of 39 bones from seven species were identified. Bird bones provide 6% of the identified elements compared with under 2% in the Saxo-Norman assemblage. Galliformes, with no evidence that species other than domestic fowl are present, provide 46% of the identified bird bones. They usually provide the majority of bird bones in early medieval deposits from all types of settlement (Serjeantson 2006: 135). Domestic goose (28%) is the second most common bird species represented and again this is typical of British medieval sites. Mallard/domestic duck, a smaller species of duck (of a size comparable with wigeon), woodcock, partridge and pigeon are also present in small numbers. All of these species have been found on many other British medieval sites. It is possible but there is no proof that the mallard and pigeon bones belong to domesticated birds. However, there is little evidence that birds, wild or domestic, featured prominently in the meat diet. Only two unidentified fish bones were recovered and, perhaps surprisingly, none were found in any of the sieved samples.

Phases 16-17: Modern
Only seven fragments of domestic mammals were identified.

Element Representation

Tables 3-6 provide a summary of the different types of element identified for each of the mammal species represented. Two methods of calculation were carried out. The first involves a simple count of specimens (fragments) identified to each type of element (NISP). The second method records the zones of the element represented, enabling the determination of the minimum number of elements (MNE) present for each element.

Cattle
The middle Saxon assemblage is too small for detailed analysis (Table 3). The radius and metatarsal are the best represented elements. Most of the sample consists of limb bone elements with mandible and other cranial elements less prominent than in later periods.

The Saxo-Norman assemblage includes a substantial number of cranial elements. This is particularly noticeable in the NISP counts, which do not take into account fragmentation. However,

MNE counts also demonstrate this with mandibles and skull fragments being particularly well represented. Amongst the post-cranial elements, bones of the lower limb, particularly metapodials and phalanges, are well represented. The assemblage therefore includes a relatively high proportion of non-meat bones that are likely to have been discarded during the early stages of carcass processing. Good meat bones are represented but apart from the scapula in lower numbers than most of the major bones of the limb extremities.

The early medieval assemblage has a more even distribution of elements. This would suggest that there was a trend towards the deposition of more meat bones on the site in this period. There is a noticeable increase in the relative abundance of ribs as well as upper limb bones. However, given the problems of residuality, one should be cautious about this interpretation.

Sheep/Goat
In contrast with cattle, there is comparatively little evidence for preferential disposal of non-meat bones in the Saxo-Norman deposits. There are small clusters of metacarpals in a few deposits but mandibles and other cranial elements do not feature prominently (Table 4). The poor representation of cranial elements becomes even more marked in the early Medieval phases, where upper limb bones dominate the sheep/goat assemblage. Metapodials are also comparatively poorly represented. This suggests that a substantial proportion of the assemblage is derived from joints of lamb and mutton and that the disposal of primary processing waste more often took place elsewhere. Interpretation of sheep/goat element representation must, however, always take into account problems of differential survival and retrieval. Small bones such as the phalanges, carpals and tarsals are poorly represented and some may have overlooked during excavation. The high incidence of gnawing will also have had a more detrimental effect on more fragile elements such as vertebrae and limb bone epiphyses.

Pig
Medieval pig assemblages often include high proportions of cranial elements, as these both survive well and are not as frequently separated from other parts of the carcass during butchery as appears to have been the case for cattle and sheep. Although pig cranial elements are not uncommon in this sample, they are by no means dominant (Table 5). The small middle Saxon sample consists mainly of upper limb bones, with the scapula being particularly well represented. The Saxo-Norman and early Medieval samples have fairly equal representation of the major upper limb bone elements and mandible, judging by the MNE counts in particular. Foot elements are less well represented. This could simply be a factor of differential retrieval and preservation. However, the low number of limb extremities has similarities to the early Medieval sheep/goat assemblage and it is possible that upper limb joints were acquired for processing and subsequent deposition in this area.

Although four cervical vertebrae and a few bones of the limb extremities were not found, it appears that the associated pig bones in context 4036 were from a complete carcass, which for some reason was not processed. Its presence suggests that it was an animal that may have been kept in the town.

Other Mammals
The horse assemblage is comprised almost entirely of post-cranial elements and includes ten bones from the forelimb of one animal from Phase 9 (Table 6). Only limb bones of dog were found, including three that came from the same forelimb. The three deer bones do not include any elements from the haunches that often form a significant proportion of the assemblages from high status medieval sites. Indeed, the presence of a mandible in the Saxo-Norman deposits may suggest that it was discarded after initial processing. All the hare bones are from areas of the body associated with high meat content, although the absence of the small bones of the limb extremities may be due to retrieval biases.

Bird
The samples are too small for detailed interpretation (Table 7). Differential retrieval is likely to be one of the major causes of bias. Although, despite this, slender bones such as domestic fowl radii were recovered as commonly as some of the larger elements.

Butchery Evidence

Summative observations of butchery marks for all the identified species are listed in Table 8. They were most commonly observed on cattle elements. Cut or chop marks were observed on 54 (8%) of the elements excluding loose teeth. Most of the marks are characteristic of those associated with dismemberment, which commonly involved a cleaver (26 cases). Such marks were found on nine vertebrae. Only one cervical vertebra, from an early medieval context, has been spilt down the midline. Most of the others from both Saxo-Norman and early Medieval contexts showed damage towards the lateral edge of the vertebral bodies where the ribcage and flanks of the carcass were removed. Four early Medieval vertebrae bear evidence of transverse chops at the edges of the articular surfaces of the bodies where the vertebral column was split into sections. The scapula and pelvis are other bones which include several examples of chops created during dismemberment.

Seven mandibles from the Saxo-Norman layers bear distinctive knife cuts on the lateral aspect of the ramus near the mandibular condyle. These were made when separating the lower jaws from the skull. The accumulation of several of these specimens suggests that consistent butchery was taking place and supports the notion that the Saxo-Norman deposits include dumps of carcass processing waste, perhaps from a specialist butcher.

Probable filleting marks were found on at least nine cattle bones. In nearly all cases these involved a knife but a Saxon-Norman tibia bore filleting marks made with a heavier blade. Possible skinning marks were observed on a Saxo-Norman premaxilla and two Saxo-Norman horncore bases have been chopped through when they were removed from the skull, presumably in preparation for horn-working.

Butchery marks were observed on 13 sheep/goat bones. Ten of these were probably created during dismemberment. In this case knives appear to have been used more commonly than cleavers in disarticulating the limb bones but cleaver marks were occasionally found on these and chop marks were also found on five vertebrae. Six pig bones including four scapulae were recorded as butchered. Finally, a goose synsacrum has been split down the middle.

Ageing and Sexing Evidence

Because of the fragmentary nature of the cattle mandibles, only 15 (including two pairs) possess any surviving cheek teeth. No neonatal or juvenile calves are represented (Table 9). Epiphyseal fusion data, mostly derived from the Saxo-Norman and early Medieval assemblage (Table 10), also shows the survival of few unfused bones in the early-fusing category, supporting the tooth eruption evidence that few cattle under a year old are represented. In addition, only six of the cattle elements were recorded as porous indicating that very few bones of young calves were recovered, and that veal was nor commonly consumed. Only two mandibles (both of Saxo-Norman date) do not have all three molars in wear and belonged to cattle younger than 30 months old. Nearly two-thirds of the 41 later-fusing epiphyses are fused and belonged to cattle over two years of age, suggesting a slightly higher rate of immature slaughter than the tooth eruption evidence. Most of the mandibles

belonged to adult cattle, although only two are from mature animals with heavy wear on all three molars. Slightly over half of the latest-fusing epiphyses have fused and belonged to cattle over three years of age, indicating the slaughter of prime beef cattle as well as more mature individuals probably utilised for breeding, milk and traction before culling.

Sexing evidence for cattle is limited. Four complete metacarpals have distal breadth/greatest length indices more likely to be found in cows than male animals. These would have belonged to cattle probably over two years old. Culling of immature male rather than females is more likely in most domestic mammal husbandry practice regimes. However, three of four pelves possessing the ilio-pubic ridge probably belonged to males of over a year old.

Because of the lack of cranial elements deposited in the site, only six sheep/goat mandibles are available for ageing analysis (Table 9). No neonatal mortalities are represented and probably only one mandible belonged to a lamb of under a year old. The more abundant epiphyseal fusion data (Table 10) provided no evidence that lambs or kids under 8-12 months old are represented. Even allowing for poor preservation of unfused epiphyses, it does seem that few sheep and goats were slaughtered until at least their second year. Second year mortalities are more commonly represented in the mandible sample with probably three of the six jaws belonging to sheep of that age. However 82% of the distal tibia and metapodial distal epiphyses have fused indicated that most sheep represented by the surviving lower limb bones were over 18-24 months of age. Slightly less than half of the surviving latest-fusing epiphyses have fused indicating that although adult animals are well represented, many sub-adult sheep appear to have been killed between the ages of two and four years of age. Two mandibles also probably belonged to sheep of that age. Older sheep will have provided wool but there is also evidence that meat production was one of the priorities in sheep husbandry. The results are typical of other Saxo-Norman and early Medieval assemblages in England, which have generally produced relatively low levels of first year mortalities but contain high percentages of animals killed between 12 and 48 months of age (Sykes 2006: 67).

Seven out of eight fused pelves with sufficiently intact acetabular regions have characteristics more likely to be found in ewes than in male sheep. Three out of five sheep horncores are also probably from ewes.

Twelve pig mandibles (excluding pairs) provided tooth ageing evidence (Table 9). Half of these belonged to pigs of under a year old. One of these was from the complete skeleton that was not butchered but four others of similar age (6-13 months) were presumably slaughtered for meat. The fusion evidence provides less evidence for the slaughter of pigs under a year old (Table 10), with only 12% of the early-fusing epiphyses (omitting the bones from the skeleton) being unfused. Unusually in an assemblage from these periods (Albarella 2006: 83), there is only one mandible from an animal killed between 12-24 months of age. However, the fusion evidence shows that three-quarters of the surviving later-fusing epiphyses are fused. There may be some discrepancy in the accuracy of estimating ages from the two methods. However, it would appear that a substantial proportion of pigs were slaughtered either late in their first year or during their second year. Four mandibles belonged to fully mature pigs probably over three years of age. However, only 6% of the late-fusing epiphyses are fused, indicating that nearly all the surviving ageable limb bones are from immature pigs slaughtered for pork and bacon.

Four pig mandibles with surviving canines or their alveoli belonged to males, including the complete skeleton. Two mandibles and two maxillae belonged to females. All nine loose canines belonged to males but recovery bias against the smaller female teeth needs to be taken into consideration here. However, there may have been some preference towards the acquisition of male pigs for slaughter as found in other medieval urban assemblages (Albarella 2005).

Very limited ageing evidence is available for other species. None of the horse limb bone epiphyses are unfused (Table 10), although an unfused vertebra did indicate the presence of one immature animal. Horses are unlikely to have been deliberately slaughtered at a young age, as they were required for other purposes. Four of the five cat bones belonged to adults and one to an immature mortality. Most of the dogs represented also belonged to sub-adults or adults. Two unfused pelves represent the presence of young hares but three other hare bones belonged to adults. The red deer mandible belonged to an adult animal with all three molars in wear.

Only two (7%) out of 29 domestic fowl bones with surviving articular surfaces were porous, indicating that intensive culling of young chickens was not taking place. Two tarsometatarsi have no spurs, indicating they belonged to hens; one has a spur and belonged to a male. One of the eight domestic fowl leg bones where the shaft cavity is visible has evidence for the deposition of medullary bone in the cavity indicative of a hen in lay. All 11goose bones with surviving articular surfaces are fully formed and belong to fully-grown birds.

Metrical Data

The archive contains details of measurements taken on 180 bones recovered from the excavations. Table 11 provides a list of the most common measurements available for cattle and sheep. The samples are too small for detailed analysis and there is insufficient data to conclude whether there were any significant changes in stature of these species through time. Withers height estimates based on long bone lengths averaged 111.5cm and 60.2cm for cattle and sheep respectively. As noted above, most of the cattle breadth measurements are skewed towards smaller specimens, which may imply that there are more females than males amongst the measurable bones.

Pathology and other Abnormalities

Abnormalities were observed on 16 bones. Exostoses (abnormal bone growth) was recorded around the articular surfaces of an acetabulum and five limb bones of sheep/goat. Three of these were found on the lateral aspect of the distal humerus, a common location for such pathology. A proximal radius has similar pathology. This condition, sometimes referred to as “penning elbow”, is more common in older sheep. More unusual is the occurrence of a sheep/goat lumbar vertebra, which has osteophytes on the ventral aspect of the body that have extended beyond its cranial articulation and have resulted in the fusion of the bone with its adjacent vertebra. This condition is seen more commonly in dogs and horses.

Three cattle mandibles have evidence for pitting on the articular surface of the mandibular condyle. A proximal metacarpal has extensive pathology on the lateral part of the articular surface with substantial amounts of exostosis around this joint. This has resulted in the fusion of the third carpal to the metacarpal. There is also evidence of grooves on the articular surface. The condition is likely to have been the result of arthritis. A distal metacarpal shows evidence of slight splaying of the articular surface, which may have been a reaction to the animal being used to pull a plough. A third phalanx has exostosis around its plantar surface. The reduction of the posterior cusp of a mandibular third molar was recorded on one specimen. This is a genetic abnormality, which has been observed quite commonly in cattle from both the prehistoric and early historic periods.

Conclusions

Although the faunal sample is of modest proportions, it has provided further evidence of animal exploitation in the Saxon, Saxo-Norman and early Medieval periods in Bedford that supplements earlier work (Grant 1979; Hutchins 1999). The very small Middle Saxon assemblage has similarities in species representation and butchery practices to those found on contemporary sites in the Bedford area. The site has produced evidence for disposal of fairly substantial amounts of carcass processing waste, particularly of cattle, in the Saxo-Norman period and has indicated that some of the animals slaughtered at that time may have been processed by specialist butchers. The problems of residuality hamper the interpretation of the early Medieval material. However, there are indications that joints of meat of cattle, sheep and pig were being deposited in the area during this period. There is little evidence for extensive consumption of high status foods in any period. Wild species of birds and mammal are poorly represented, although there are slight indications of greater diversity in some of the early Medieval deposits. It has not been possible to demonstrate any significant changes in mortality rates and stature of the domestic species because of the limited size of the sample. Some of the cattle and sheep and most of the pigs were slaughtered as immature animals but most of these animals were not killed during their first year and many were not culled until they had nearly attained full size in their second or third years. Older animals represented would have included breeding stock. A few bones have provided indirect evidence that some animals also provided commodities such as wool, eggs and traction power before they died. There is little evidence that dairy production was important, however. The relative importance of the different products in the exploitation of the animals cannot be gauged from this sample alone and more extensive, well-dated samples from both within the town and its hinterland are required to develop further understanding of animal husbandry and the consumption of meat.

The Human Bones

Three isolated human bones were found in early Medieval pits (one in Phase 10: L11; two in Phase 15: L20) and these have been described above. There is little that can be said about the individuals they represent, other than the one from L11 was not skeletally mature. They are not primary depositions and their discovery is further testament to the presence of redeposited material on this site in the early Medieval features. The nearest known burial site is more than 100 metres to the west and forms part of St. Paul's Church in the centre of Bedford. This includes a possible middle Saxon cemetery, the full extent of which is not known, in St. Paul's Square, that borders onto the High Street, (Christiane Meckseper pers comm.).

Animal Bones: Methods of Analysis

All bones and teeth from all stratified deposits from the site were recorded individually onto a relational database (Microsoft Access), which forms part of the site archive. In the main table, where appropriate, the following information was recorded on each specimen: species; anatomy (element); parts (zones) of the element present; percentage of elelemt present; gnawing damage; erosion; weathering; charring; fusion data; other comments (including evidence for pathology). Separate tables linked to the main table by an individual identification number were created for metrical, butchery and tooth ageing data. Where necessary, identifications were confirmed by reference to the comparative skeleton collection housed in the School of Conservation Sciences, Bournemouth University. Tooth eruption and wear descriptions for cattle, sheep/goat and pig

followed the method of Grant (1982). Most measurements followed those recommended by von den Driesch (1976).

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