Cowlam Animal Bone Report

Jane Richardson

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Summary

Animal bones recovered from two features, a ditch and a grubenhaus of Anglo-Saxon date, have been analysed. Animal husbandry at Cowlam during this period was probably concerned with the local rearing of cattle and sheep for meat, as well as some milk and wool, although in the absence of any neonatal bones, local production could not be confirmed. Pigs, chicken and goose apparently contributed little to the diet. Horses, presumably work animals, were rarely deposited here.

1 Introduction

In total, 1216 animal bone fragments were recorded, of which only 291 (24%) were identified as bone zones, that is easily identifiable and non-reproducible parts (cf. Tables 1 and 2). The low proportion identified as diagnostic zones is a reflection of the fragmented nature of the assemblage. To facilitate meaningful interpretation, the bones were considered by feature (ditch F1 and grubenhaus F2) and occasionally by fill. In only one instance (the secondary fill of the grubenhaus), however, did the sample size exceed the minimum reliable sample size of around 500 (with reference to a number of statistical parameters after van der Veen and Fieller 1982, 296). As such, subsequent data are typically represented by feature or site only.

The assemblage has been analysed in order to assess indicators of animal exploitation: meat consumption, secondary products (e.g. milk, wool and traction) and/or industrial activities such as tanning or bone working. Atypical deposits, such as animal burials, were not present. This Anglo-Saxon assemblage has also been compared to faunal data of similar date from the Wolds area; West Heslerton (Richardson 2001a), Wharram Percy (Pinter-Bellows 2000), Cottam (Dobney *et al*. 1999) and Caythorpe (Stallibrass 1996).

Table 1. Fragment count by feature and fill

	Primary fill of F1	Secondary fill of F1	Primary fill of F2	Secondary fill of F2	Total
Cattle	1	50	10	44	105
Cattle-size		53	44	114	211
Sheep	1	3	10	7	21
Sheep/goat	6	129	79	156	370
Sheep-size	6	125	72	197	400
Pig		5	9	18	32
Pig-size		2	5	3	10
Horse		5	1	2	8
Cat				1	1
Rabbit		20	11	1	32
Small mammal				1	1
Goose spp.				2	2
Domestic fowl		2	1	7	10
Bird spp.		3	6	4	13
Total	14	397	248	557	1216

Table 2. Number of diagnostic zones by feature and fill

	Primary fill of F1	Secondary fill of F1	Primary fill of F2	Secondary fill of F2	Total
Cattle	1	24	5	16	46
Cattle-size		1	3	5	9
Sheep	1	3	10	5	19
Sheep/goat	2	37	33	51	123
Sheep-size		4	7	11	22
Pig		1	6	5	12
Pig-size			4	2	6
Horse		4	1	1	6
Cat				1	1
Rabbit		19	11	1	31
Domestic fowl		2	1	7	10
Bird spp.			3	3	6
Total	4	95	84	108	291

2 Methods

Bones were identified to taxa wherever possible, although lower-order categories were also used (e.g. sheep/goat, cattle-size). The separation of sheep and goat bones was routinely attempted, using the criteria of Boessneck (1969) and Payne (1969, 1985), but in the apparent absence of goat, the sheep/goat bones are assumed to be of sheep. Given the small size of the assemblage all fragments were recorded, although identification of diagnostic element zones was also made.

For age-at-death data, epiphyseal fusion (after Silver 1969) and the eruption and wear of deciduous and permanent check teeth were considered. Dental eruption and wear were recorded using the letter codes of Grant (1982) and age stages were calculated using Halstead (1985) for cattle, Payne (1973) for sheep and a similar wear progression was assumed for pig. The sexing of the cattle and sheep populations was achieved with reference to the sexually dimorphic distinctions of the pelvis (after Prummel and Frisch 1986, 575), while the sexually dimorphic tusks of pigs were noted.

Bone condition, erosion and fragment size were recorded in order to assess bone preservation, while gnawing, burning and butchery marks were noted to determine bone treatment. Butchery was routinely differentiated into chop and cut (knife) marks and the position and direction of these marks were noted in order to identify dismembering, filleting and skinning activities.

Given the fragmented nature of the assemblage, the recovery of biometrical data was limited. These are not considered in any detail below, but are held with the site archive. Pathological bones were noted.

3 Results

Taphonony

In order to assess the usefulness of a bone assemblage for the reconstruction of animal husbandry practices, relevant taphonomic processes are considered (Table 3). Regardless of feature, bone condition is excellent with no evidence of cracking, porosity or flaking. No eroded bone surfaces are present. Fragmentation (see size index) is consistently high with fragmented bones being the norm from both ditch and grubenhaus. Such levels of fragmentation, whilst typical of the majority of faunal assemblages, will have impacted on bone survival.

Table 3. Bone preservation and treatment by feature and fill

	Primary fill of F1	Secondary fill of F1	Primary fill of F2	Secondary fill of F2
Size index	0.23	0.22	0.23	0.21
Condition index	1.00	1.00	1.00	1.00
Erosion index	1.00	1.00	1.00	1.00
% butchered	7.1	1.0	8.1	4.1
% gnawed	7.1	1.3	6.5	6.3
% burnt	7.1	3.5	2.4	2.9

For the size, condition and erosion index, values closer to 1.0 indicate more complete or better preserved bones

Butchered bones are relatively rare and consequently there is no evidence that butchery processes resulted in significant bone loss (Table 3). Gnaw marks are also rare and suggest that bones were not commonly accessible to dogs or rodents (indeed their bones are not included in the assemblage). Instead the bones were probably buried fairly rapidly, as indicated by the lack of weathered bones. Burning, another process that may have influenced bone survival, is scarce from both features.

In general, therefore, bone survival is likely to have been affected most severely by the high levels of fragmentation. In contrast, bone condition and preservation are excellent, while butchery, burning and gnawed are likely to have had little impact.

Animals present

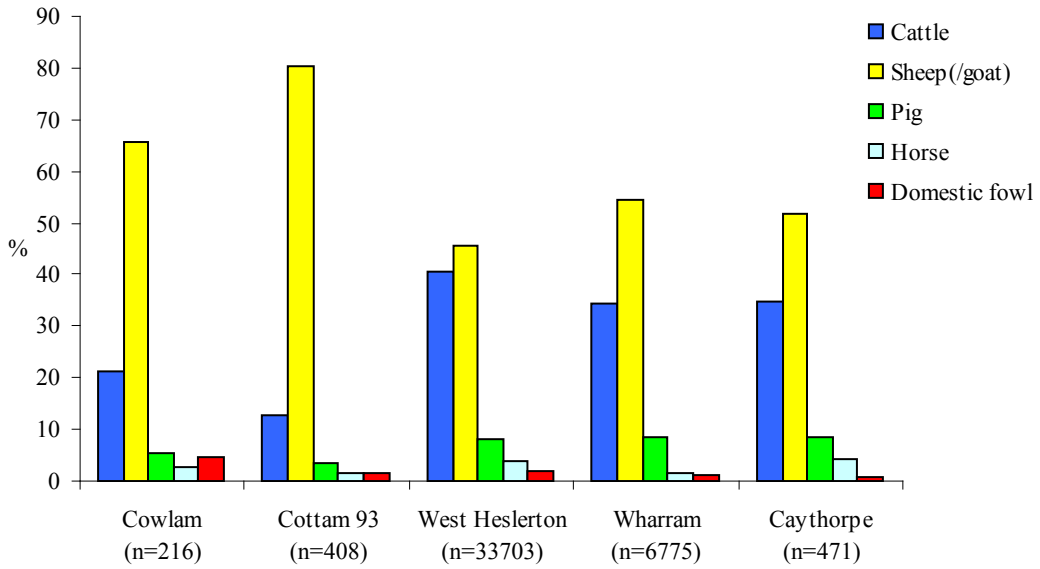
The proportions of the main domestic animals present by feature have been calculated from the number of bone zones (Table 4). These show that, regardless of feature, sheep predominated, although cattle are likely to have contributed most to the diet due to their greater meat weight. Such a dominance of sheep is expected in a dry, upland area ideally suited to their rearing, and is a pattern repeated at other Anglo-Saxon sites on the Wolds (Fig. 1). The greater proportion of cattle bones at West Heslerton reflects its position on the

northern escarpment of the Wolds, but with ready access to damper lowland pasture of the Vale of Pickering. The diet at Cowlam was supplemented by pigs and domestic fowl (chickens), but rarely by goose (Table 1). Horses are unlikely to been consumed (certainly no horse bones were butchered) and instead would have been valued for traction and as pack animals. A single cat bone from the grubenhaus (F2) is not noteworthy, while the rabbit bones are likely to be intrusive. Their introduction is commonly assigned to the Norman period (Bone 1988) and it is through burrowing that they become incorporated into earlier deposits. Otherwise, the bones of wild species are absent, perhaps reflecting the ready availability of domestic resources and/or the limited opportunities for hunting.

Table 4. Zone counts and percentages of the main domestic animals by feature

	F1		F2	
	Count	%	Count	%
Cattle	25	33.3	21	14.9
Sheep(/goat)	43	57.3	99	70.2
Pig	1	1.3	11	7.8
Horse	4	5.3	2	1.4
Domestic fowl	2	2.7	8	5.7
Total of domestic 'meat' animals	75		141	

Fig. 1. Proportion of the main domestic animals by site



Interestingly, the smaller animals, sheep, pig and fowl were more commonly recovered from the grubenhaus (F2) than the ditch (F1), while the reverse is true for cattle and horse. Similar depositional practices have been identified from Thetford (Jones 1984, 187), Riby Cross Roads, Lincolnshire (Scott 1994, 291-2) and from excavations along the M1-A1 Link Road (Richardson 2001b, 216), although the pattern was not repeated at West Heslerton (Richardson 2001a). Maltby (1996, 19) has suggested that these structured deposits are related to the different locations used for the processing of various animals. Cattle and horses due to their size need more rigorous dismembering than the smaller species and this would tend to occur away from the main habitation areas, although alternative interpretations relating to cultural/ritual behaviour and the spatial framework of a community may also be valid. Significantly, the type and range of features excavated is likely to strongly influence the proportion of taxa recovered.

Age and sex data

Unfortunately, relatively little epiphyseal fusion and dental wear data, and almost no sex data, are available and this makes the interpretation of husbandry practices problematic. Nevertheless, epiphyseal fusion data for sheep indicate that they were apparently raised specially for their meat (Table 5). Dental eruption and wear data support the hypothesis of meat production with a significant proportion of sheep killed when sub-adult (Table 6). The dental data, however, also indicate the maintenance of a few sheep to maturity, presumably as breeding animals, although this was not corroborated by the recovery of neonatal bones or by a sex ratio of three females: two males. The targeting of sheep for wool or milk is unlikely as a mature population (either ewes for milk or castrates for wool) was largely absent. Low-intensity milk and/or wool production for domestic use, however, remains possible. A similar bias towards the slaughter of young sheep was identified at Caythorpe (Stallibrass 1996, 76). Here a producer site was proposed despite the dearth of the older animals essential for breeding. These must have been represented elsewhere either in an unexcavated area of the settlement or traded off site, perhaps to urban consumers.

In contrast, epiphyseal fusion data for cattle indicate that a much greater proportion of cattle were maintained to (osteological) maturity when compared to sheep (Table 7). These adult cattle may have been kept for breeding (but again no neonatal bones were recovered), for milk or for traction. Traction cattle, usually castrated males (oxen), would have been highly valued and kept to old age if still useful, but unfortunately in the absence of dental data, such mature cattle could not be identified.

In summary, local rearing of cattle and sheep is assumed rather than demonstrated (no neonatal bones were retrieved), sheep were clearly targeted for their meat, while cattle provided meat and probably milk also. The use of cattle for traction power was not identified but the small size of the recovered assemblage is a limiting factor.

Table 5. Fusion data for sheep (zone > 0, F = fused, NF = not fused)

	6-16 months	18-28 months	30-42 months
Fused	25	10	0
Not fused	2	8	13
% fused	93%	56%	0%

6-16 months calculated from distal scapula, distal humerus, proximal radius, first phalanx, second phalanx

18-28 months calculated from distal metacarpal, distal tibia, distal metatarsal

30-42 months calculated from proximal humerus, proximal ulna, distal radius, proximal femur, distal femur, proximal tibia, calcaneus

Table 6. Number of sheep jaws at various wear stages (after Payne 1973)

	No.
A: 0-2 months	0
B: 2-6 months	1
C: 6-12 months	6
D: 1-2 years	1
E: 2-3 years	7
F: 3-4 years	4
G: 4-6 years	2
H: 6-8 years	2
I: 8-10 years	0
Total	

Table 7. Fusion data for cattle (zone > 0, F = fused, NF = not fused)

	7-18 months	24-36 months	36-48 months
Fused	13	2	7
Not fused	3	2	2
% fused	81%	50%	78%

7-18 months calculated from distal scapula, distal humerus, proximal radius, first phalanx, second phalanx

24-36 months calculated from distal metacarpal, distal tibia, distal metatarsal

36-48 months calculated from proximal humerus, proximal ulna, distal radius, proximal femur, distal femur, proximal tibia, calcaneus

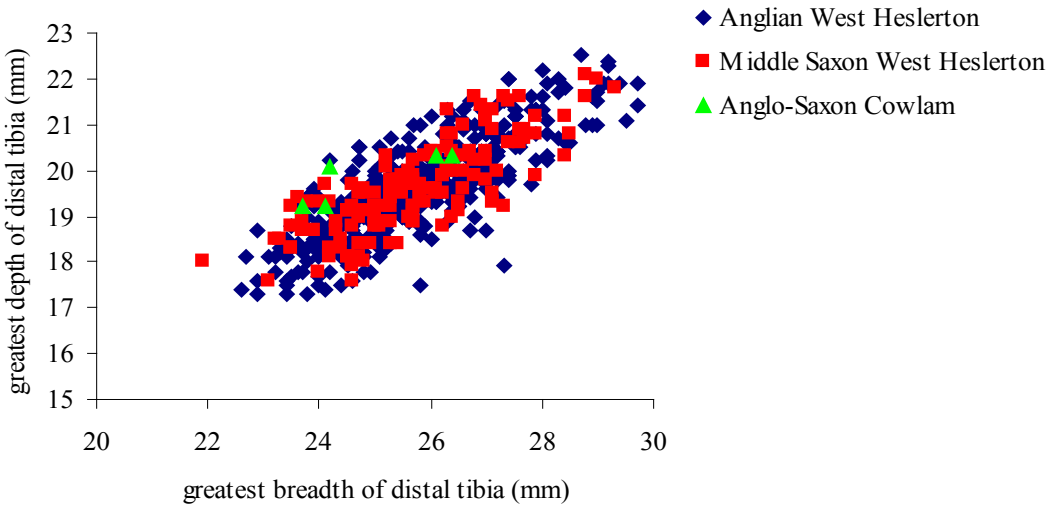
To this economy, pigs (in the absence of any significant secondary products) would have contributed meat. They have the advantage of being fecund and can readily turn household food waste into a valuable meat source. The little age data available (fusion data from only four bones) indicate that pigs were slaughtered as sub-adults when the maximum weight had been gained compared to the fodder consumed. Given limited sex data (one female and one male identified) and an absence of neonates, local rearing has not been confirmed.

No sub-adult horse bones, and only one sub-adult domestic fowl (chicken) bone was identified.

Metrical data

Given the fragmented nature of the bone assemblage, metrical data were rarely collected. Only a few sheep bones and a single horse bone proved to be measurable. The latter provided a withers' heights of 1343mm, indicating an animal just under 13 hands 1 inch. The five measureable sheep tibiae when plotted against data from West Heslerton sit comfortably within the range of this large dataset (Fig. 2).

Fig. 2. Plot of the breadth and depth of sheep tibiae



Pathologies and congenital abnormalities

Pathological bones are restricted to sheep, sheep-sized and horse bones.

Of the sheep bones, five mandibles (of fifteen) were affected by calculus with one developing jaw recession due to periodontal disease. Two sheep humeri (of seven) display the signs of penning elbow (osteophytes to the distal articulation) due to a strain or dislocation. As its name suggests, this trauma can occur when animals are closely corralled (Baker and Brothwell 1980, 127). A sheep metatarsal (one of three) shows pitted grey bone growth around the medial facet of the proximal articulation and porotic damage to this articular surface indicative of infection, while a sub-adult sheep metacarpal (one of six) also suffered probable infection, as indicated by sinuous bone growth, slight pitting and deformation to the distal articulation. Slight lipping to the distal articulation of a sheep first phalanx (one of three) is indicative of joint disease, while another example of joint disease, of a sheep-sized

vertebra (one of fifteen), is indicated by significant osteophytes associated with the distal side of the centrum.

Trauma to a horse is indicated by the fracture of a lateral metacarpal (one of three) and its subsequent fusion to the metacarpal shaft. Joint surfaces were not affected, however, and once the soft tissue damage had healed the animal was probably unaffected.

Butchery and body part representation

Butchery marks were noted on cattle (and cattle-sized) and sheep (and sheep-sized) bones. Proportionally more cattle bones (6%) are marked than sheep (4%) and this probably reflects the need for rigorous butchery to reduce the larger carcass. The knife and cleaver marks on the cattle (and cattle-sized) bones indicate dismembering and meat removal. Sheep carcasses were also dismembered and filleted, while marks to maxilla and mandibles suggest that cheek meat was also targeted. Two pig bones and a single domestic fowl tibia show meat removal and dismembering marks respectively.

An assessment of the range of elements present for the main domestic animals indicates that all body parts were deposited here and no one element was particularly over or under-represented. This suggests that animals are likely to have been slaughtered and processed locally (hence the presence of low-utility parts such as heads and feet that might otherwise have been removed elsewhere, as well as the bones associated with meat-rich joints).

As no caches of horncores or foot bones were encountered, industrial activities such as horn-working or skinning activities are unlikely to have occurred within the vicinity. Some bone working was indicated, however, with the recovery of two sheep radii from the secondary fill of the grubenhaus, those shafts had been modified to form points or scoops.

4 Conclusions

Given the range of body parts represented for the main domestic animals (cattle, sheep and pig), it is likely that the majority of bone waste recovered is indicative of carcass reduction, food preparation and consumption. The presence of all body parts indicates that the animals were probably slaughtered locally but in the absence of neonatal bones, livestock rearing was not confirmed here. No evidence for intensive farming practices was identified (such as large-scale milk or wool production), although sheep were clearly targeted for their meat. Clearly lamb and beef were a significant component of the diet, with pork/ham and poultry offering rare variability. Wild resources were not targeted. The bone record provides no indication that skins were targeted or that horns were worked, but two sheep radii had been worked. Horses, and presumably oxen, would have meet transport and traction needs.

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