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Technical report: Vertebrate and other biological remains from excavations at Welton Road, Brough, East Riding of Yorkshire

by

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Summary

Deposits of ?Iron age/early Roman to post-medieval date from a site at Welton Road, Brough, East Riding of Yorkshire, were excavated by York Archaeological Trust (YAT) in the latter part of 1994. A small vertebrate assemblage from these deposits, dating to the later 3rd and early 4th Centuries, was examined.

Although detailed analysis of the vertebrate data is limited because of the small size of the assemblages, a number of general points could be drawn. The meat diet was clearly based on the consumption of beef, with much smaller quantities of mutton and pork. There was a deliberate selection of adult cattle which indicated multi-purpose beasts. Primary butchery and intensive exploitation of the cattle carcass appeared to have taken place on the site, while there is evidence to suggest that some of the larger joints of meat may have been consumed, and the bones consequently deposited, elsewhere. The fragmentary remains of a number of burnt caprovids may represent so-called 'special deposits'. The assemblage, as a whole, fits well with others of contemporaneous date.

Other biological remains were scarce and add only a small amount of additional information.

Keywords: WELTON ROAD; BROUGH; EAST RIDING OF YORKSHIRE; ROMAN; BONE; INSECT REMAINS; PLANT REMAINS; CREMATION; ANIMAL BURIALS

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Introduction

Deposits of ?Iron age/early Roman to post-medieval date from a site at Welton Road, Brough, were excavated by York Archaeological Trust (YAT) in the latter part of 1994.

A total of eighty-five 'environmental' samples (66 GBAs, 15 BSs, one SRs and three spot samples, using the classification of Dobney *et al.* 1992), five boxes of hand-collected molluscs, fourteen boxes of hand-collected animal bone and a single box of human bone were assessed for their bioarchaeological potential by the Environmental Archaeology Unit in 1994 (Carrott *et al.* 1994).

The results of the assessment showed that plant and invertebrate remains were present in approximately one-third of the sixty-six samples assessed but, with the exception of one context (1277), in numbers too small to be of interpretative value.

The flot from Sample 49, Context 1277, produced at least twenty plant taxa. Weeds predominated, but there were also quite frequent rush (*Juncus*) seeds and some probable indicators of grassland, though the assemblage was too small to say whether this might have been turf growing near the site or material from hay and/or stable manure.

The insect assemblage from Context 1277 was also too small to be of definite interpretative value but, subjectively, may have indicated a stable manure community in the early stages of formation. There was no dominant beetle group but rather a mixed community of mostly ground-dwelling species.

Following the assessment, no further work was recommended on material from the sediment samples, as it was felt that little additional information would be retrieved. The sediment descriptions made during assessment can be found in Appendix 2.

The human remains, two cremations and an inhumation, were recorded during the assessment phase. No further work was considered necessary on this material. An archive of the recovered material (based on the assessment records) can be found in Appendix 3.

Further work was recommended on the molluscs (Carrott *et al.* 1994, 7). However, this aspect of the analysis was not possible within the financial constraints of the project.

From the assessment, two small groups of vertebrate remains, the first dating to the later 3rd Century and the second of early 4th Century date, were identified as assemblages worthy of further investigation. The first group related to intense activity (mainly revealed by ditches and dumps) alongside the nearby Roman road, whilst the second group was recovered from a series of levelling/dumps which extended from a roadside building and sealed the later 3rd Century activity. The remainder of this report is concerned with the analysis of the vertebrate remains from these two groups.

Vertebrate remains

The following account is based on material excavated from 52 contexts (39 from Trench 1 and 13 from Trench 2). Thirty of these contexts date from Phase 1 (early 3rd Century) with the remaining 22 dating from

Phase 2 (early 4th Century). These contexts were selected on the basis of their tight date and the presence of vertebrate material as discussed in the assessment report (Carrot *et al.* 1994). The Phase 1 deposits are from context groups 1.6 - 1.11 and 2.6 - 2.11, whilst those from Phase 2 are from context groups 1.12 and 2.12.

The total sample consisted of 399 recorded mammalian fragments and eight avian fragments. Most (92%) of the material is from Trench 1. One hundred and sixty-eight fragments (42%) are from Phase 1, and 231 fragments (58%) are from Phase 2. In view of the small sample size and the homogeneous nature of the assemblage, the data have been combined from both phases.

The material analysed for this report was all hand-collected. Using hand-collected material will inevitably bias the results in favour of more robust and denser fragments, thereby increasing the representation of larger mammals. Sieving can recover smaller skeletal elements and bones from young individuals, as well as small mammal, fish and bird remains. Small amounts of bone were recovered from some of the samples but, on assessment, were found to contribute little additional information to the material recovered by hand.

Only three samples (11,12 and 46) from two deposits (1094 and 1255) produced material worthy of comment; these are discussed below. The rest of the sieved material has not been included in this analysis.

Methods

The recording methodology followed the protocol described in detail by Dobney *et al* (in preparation). Minor deviations from this protocol were as follows: no measurements were taken on any teeth and the only loose teeth recorded were M3 and Dp4; no horn core measurements were taken; and no distinction was made between sheep and goat bones.

Detailed recording of all identifiable fragments of major domesticates or large wild mammals followed the diagnostic zones scheme outlined by Dobney and Rielly (1988).

Within the assemblage of mammal bones, only the following skeletal elements were recorded; horn core, mandible, M3 and Dp4, scapula, distal humerus, distal radius, distal metacarpal, pelvis, distal femur, distal tibia, distal metacarpal, astragalus, calcaneum and first and third phalanges.

Recording of mandibular tooth wear for caprovids followed Payne (1973), whilst that for cattle and pigs followed Grant (1982). Cattle mandibles were assigned to the general age categories outlined by O'Connor (1988). Age assessments based on the fusion of long bone epiphyses followed Silver (1969).

Measurements (unless otherwise specified) followed von den Driesch (1976). Additional measurements, not detailed by von den Driesch, followed those outlined by the Davis (1992) and Dobney *et al.* (in preparation).

Preservation

The preservation of the material did not show any significant variations between contexts, periods or excavation areas. The assemblage could be described as well preserved, although there was variability in both the angularity (nature of the broken surfaces) and the colour of the fragments.

Black staining was noted on some bone surfaces. A small number of fragments appeared highly abraded compared to the rest, and this may indicate the presence of residual material in some contexts.

In general, there was limited direct modification of the bone surfaces; burning was rare and only 13% of the bones showed evidence of butchery. A higher proportion of the fragments (20%) showed signs of dog gnawing. No evidence of cat or rodent gnawing was observed. A single caprovid astragalus appeared to have passed through the digestive tract of, presumably, a dog. As noted in the initial assessment (Carrott *et al.* 1994), these are all characteristics of material which has been discarded but not immediately buried.

Species representation and quantification

Table 1 and Figures 1-2 illustrate the relative abundance of the three major domesticates. These data demonstrate the problems caused by variations in different methods of quantification. The NISP (number of identified specimens) shows cattle to be the most abundant, while calculations of the MNI (minimum number of individuals) suggests that there is more caprovid material. This discrepancy can be explained in two ways. Firstly, the NISP for cattle is inflated by the large numbers of first phalanges. This may be a reflection of differential preservation (this bone is compact and durable) or of some specialist carcass utilisation. The MNI is, in all cases, based upon mandibles. This again may be biased by the relative durability of caprovid mandibles and the potential economic value of cattle mandibles (Dobney *et al.* 1996a, 25). Table 2 shows that there is no significant change in the relative frequency of the species represented between Phases 1 and 2.

The remaining mammalian species represented in the assemblage are horse (17 fragments), dog (three fragments) and roe deer (*Capreolus capreolus* (L.) (one fragment). In terms of the NISP, these three species represent only 5% of the total analysed sample (Table 3 and Figure 3).

The economic base

The relative dietary importance of the three main domesticates can be more clearly presented if approximate carcass/meat weight calculations are made. There are numerous potential sources of error, but such calculations can be informative if used with caution. Based on data provided by modern livestock (Boessneck *et al.* 1971, 9), these calculations are determined using the following ratios; 7.3 sheep = 1 cow, and 2.3 sheep = 1 pig (after O'Connor 1991). The figures for Brough (Table 4) were arrived at by multiplying the live weight ratios by the NISP or MNI. The importance of cattle is increased, whilst that of pig is reduced, relative to values determined from NISP and MNI counts (see Table 1).

Four of the seventeen horse bones bore cut marks indicating that horse meat may have been eaten. With such a small sample size, however, the relative importance of horse meat in the diet is impossible to assess. It is highly unlikely, that this was the primary use of these animals or that horse meat formed a significant part of the diet.

In common with other contemporaneous rural and urban assemblages, the quantity of wild mammals is negligible (e.g. Dobney *et al.* 1996a, 50; Maltby 1979, 60; Smith 1996, 69).

Carcass representation and butchery

The relative abundance of the different skeletal parts recorded in an archaeological assemblage can be used to interpret a range of human activities relating to the processing and disposal of the carcasses, (Dobney *et al*. 1996a, 23)

Table 5a - 5b and Figures 4 - 5 illustrate the relative abundance of caprovids and cattle skeletal elements. The sample size remains very small, even after the data from Phase 1 and 2 have been combined. To minimise the problems created by the small sample size the simplest method of calculating the relative abundance of body parts has been used. The MNI of all skeletal elements is expressed as a proportion of the most frequent element (shown as 100%). For these tables and figures MNI values have been calculated by assuming there are equal numbers of left and right elements.

It is immediately clear that the assemblage is biased against the major meat bearing bones and in favour of the distal limb bones and mandibles. There are two possible explanations; firstly that this reflects the greater durability of certain dense bones, and secondly that this reflects intensive exploitation of the carcass and the disposal of selected body parts. In reality, it is probably a combination of both.

The pattern of butchery has many of the distinctive features associated with the organised, large scale processing of cattle carcasses in the Roman period (Hamshaw-Thomas and Bermingham 1993; Dobney *et al.* 1996a; Maltby 1989; Smith 1996, 20). Evidence from the bones suggested that much of the processing of cattle carcasses was achieved by the use of a heavy chopper. Knife marks were only recorded on the phalanges, presumably resulting from their removal from the hide. A number of the epiphyses and the tarsal bones bear witness to the systematic reduction of the carcass into small pieces for further processing, either for a broth (Mensch 1974) or, more likely, marrow extraction. There was clear evidence of this process in the form of a number of longitudinally split long bones. The many transversely broken metapodial fragments were also probably the result of marrow extraction. These processes will have reduced the representation of the meat-bearing bones in Figure 5.

Interestingly, several mandible fragments were split or chopped through the diastema. Four diastema fragments from Context 1045 were split and burnt. This feature has been interpreted as a result of the extraction of liquid marrowfat for lamp oil or as a base for cosmetics (Dobney *et al.* 1996a, 26). No cattle scapulae with perforated blades were recorded, although examples of the removal of the spina was noted.

The almost total lack of horncore fragments suggests that the horn cores were perhaps removed and processed at some other location. Negative evidence is, however, dubious and a number of taphonomic reasons could account for the lack of horn cores. One horn core fragment showed signs of being worked. The small curved rectangular fragment (approximately 4 x 2.5 cm) had a chopped and sawn edge, suggesting the unsuccessful production of a blank.

Despite the small sample size, it is possible to see that the processing of the carcasses was well organised and followed a similar pattern to that deduced for contemporaneous sites. Primary butchery appears to have taken place on, or near to the site. The dressed carcasses were then further reduced, in some cases very intensively. There is little evidence for domestic or kitchen refuse which

suggests that this type of waste may have been dumped elsewhere on the site. Alternatively, meat may have been exported to other locations, with the remains of the main domesticates from Welton Road, Brough reflecting a producer rather than a consumer economy.

The caprovid sample is less easy to interpret. A similar pattern to that for the cattle could be envisaged if one takes into account the possibility that the smaller distal limb bones were not recovered. However, the samples that were processed did not contain large quantities of these elements. It is safer, therefore, to view the skeletal element representation as a reflection of the small sample size and the variable durability and archaeological visibility of the different body parts.

The pattern of cut and chop marks on the caprovid bones is unremarkable. As with the cattle, no scapulae had perforated blades, although there was again evidence for the removal of the spina in some cases.

As previously mentioned, four of the horse bones bore signs of butchery. The position of the cut marks was consistent with the dismembering, skinning and filleting of the carcasses. Whether horses were actually eaten cannot easily be established.

Butchery marks were also recorded on the lingual surface of a pig mandible, presumably the result of the extraction of the tongue.

Husbandry and economy

Age at death

Cattle

The fragmentary remains of the mandibular tooth rows made it difficult to assign them to specific mandible wear stages (Grant 1982). Instead, they were assigned to the general age categories suggested by O'Connor (1988) on the basis of each mandible's highest possible wear stage. Table 6 shows that 'elderly' beasts dominated the assemblage. The rest of the sample is dominated by adult individuals, with only four mandibles from younger animals.

A similar pattern is shown by the tiny sample of unfused long bones. Fourteen percent of bones, which are known to fuse between 2-3 years, were unfused. Most of the post-cranial bones are from skeletally adult animals. The predominance of older individuals is best interpreted as the result of cattle being used as multi-purpose animals, providing traction, beef and milk.

Caprovids

In contrast with cattle, there was a larger and more complete sample of caprovid mandibles enabling a more accurate kill-off pattern to be produced. Figure 6 and Table 7 show the number of caprovids in relation to their age category (Payne 1973). This shows that most animals were killed between the ages of two to three years, with 33 % of the flock killed one year either side of this. As with the cattle, this indicates multi-purpose husbandry, with concern for primary and secondary products (meat, wool and milk). It is significant that few animals survived much beyond four years old, possibly infering the importance of meat over wool. The small number of older animals is presumably the breeding stock. The data from the limb bones are less easy to interpret, although a similar pattern to that deduced from the mandible wear stages can be detected (Table 8).

There are insufficient data to make any meaningful comments about the age at death

of the pigs and horses.

Biometry

In view of the small sample size, only limited interpretation could be drawn from the biometrical data from Brough. An archive of measurements taken can be found in Appendix 1.

Cattle

The astragalus is a useful source of metrical data because of its high archaeological visibility and its consistent relationship to overall body size. Therefore, as a general indication of the size of the Brough livestock, it is useful to compare the greatest lateral length (GLl) measurements with contemporaneous sites. The average GLl of astragali for Brough is 62.8 mm. This is at the upper end of the size range for this period (Table 9). A bivariate plot (Figure 7) of distal breadth (Bd) against depth of the lateral side (Dl) for Brough and Wilcote (Smith 1996), shows these data to fall within the middle of the range for the much larger Lincoln sample. The cattle at Brough appear to be of average size for the period.

Caprovids

Biometrical analysis of the caprovid data from Welton Road, Brough is limited to the most frequently occurring elements, the distal humerus and the distal radius. Comparisons of the BT (breadth of trochlea) measurement on the distal humerus shows the Brough livestock once again to be in the middle of the size range for animals of this period (Table 9). However, the bivariate plot for the Bd/Dd (distal breadth: distal depth) measurements on the distal tibia (Figure 8) shows a relatively narrow range when compared to the Lincoln sample. The Brough individuals are consistently more gracile than those from Lincoln, being of a size more similar to the late Roman sample from Filey (Dobney *et al*. 1996b). This is an interesting observation and supports the argument that provisioning of rural sites might have been from local unimproved livestock while the larger, possibly improved animals were used to provide the large urban markets (Dobney *et al.* 1996b).

The other mammals

No measurements were taken of the pig bones.

A single horse metacarpal measurement provided a withers height (Fock 1966) which indicates an animal standing at 14.2 hands (one 'hand' = 4 inches); a large pony, not untypical of the period.

No direct metrical comparison can be made with the dog bones as there were no complete specimens. However all three recorded fragments were probably from small, terrier sized individuals.

Pathology

Eleven fragments showed evidence of pathological abnormalities. A single fragment of cattle cranium (from Context 1021) exhibited a perforation in the nuchal region as described and discussed by Brothwell *et al.* (1997). The remaining pathologies relate to minor dental abnormalities and arthropathies. The presence of abscesses on the buccal side of the tooth rows (leading to the erosion of the surrounding bone) was recorded on one caprovid and three cattle mandibles. Arthropathies were recorded on five cattle fragments and on one horse bone. These included two cattle metapodials which showed signs of splayed distal condyles, and

a horse metapodial fragment exhibiting a fused cuboid-navicular bone. Other arthropathies related to the grooving and eburnation of the articular surface of a cattle astragalus and excessive bone growth around the proximal articular surface of two cattle phalanges. The presence of these 'wear and tear' joint conditions supports the interpretation of cattle being used for traction.

Animal burials

The vertebrate remains from Samples 11 and 12 (Context 1094) consisted of a large quantity of burnt caprovid remains. From the excavator's description and the bones themselves, these fragments appear to represent a single individual, although few complete elements remain. The burnt bones were rather fragile and brittle, with the result that much fragmentation has occurred, both in the past and more recently during excavation. Contexts 1119 (hand-collected only) and 1255 (Sample 46) produced smaller amounts of burnt bone, again identified as sheep/goat. Material from 1119 probably represents a single individual, whereas material from 1255 is less conclusive. It has been suggested (by the excavator) that these deposits were the fills of deliberate animal burials.

Articulated skeletons and limbs of animals have been found at other sites of Iron Age and Roman date, and have, as a result of their deposition or association with other finds, been seen as ritual or special deposits. At Danebury in Hampshire (Grant 1984) there were several examples of these so called special deposits. Interestingly, the individuals from Brough are completely burnt, which appears to be a rare phenomenon amongst other so-called special deposits.

The bird bones

In total, eight bird bones were recorded. All except one were identified as domestic fowl (*Gallus* f. domestic) and are represented by a range of body parts. No direct metrical comparisons have been made but they are of a small size typical of the period. One bone (a carpometacarpus) was recorded as goose (*Anser* sp.). No cut marks or pathologies were recorded on the bird bones.

Discussion

There are a number of general points which can be drawn from analysis of the vertebrate remains from Brough. These have significance both for this site, and, more generally as an example of one of very few assemblages from rural settlements in the area dating from the later Roman period.

The meat diet was clearly based on the consumption of beef, with much smaller quantities of mutton and pork. There was a deliberate selection of adult cattle which were being used as multi-purpose beasts. These data fit into the general pattern of the period, since assemblages of later Roman date are dominated by adult cattle (King 1978, Noddle 1984). The Brough animals seem to have lived to a slightly greater age than those from Lincoln (Dobney *et al.* 1996a) and York (O'Connor 1988). This may reflect differences between rural and urban locations.

The use of cattle for traction is suggested by age-at-death data, and supported by the presence of a number of arthropathies.

The primary butchery and the intensive exploitation of the carcass appears to have taken place on the site, while there is

evidence to suggest that some of the larger joints of meat may have been consumed, and the bones deposited, elsewhere. The pattern of butchery and carcass reduction has many similarities with both early and late Roman urban assemblages (Maltby 1989, Dobney *et al*. 1996a). It is interesting to note that what has been interpreted as large-scale and well-organised processing of cattle carcasses is not restricted to urban sites. This idea is supported by an almost identical pattern of butchery on bones from 4th Century deposits at the rural settlement of Wilcote in Oxfordshire (Smith 1996). The presence of scapulae (both cattle and caprovids) with the spina removed might indicate the long term curing of meat (Dobney *et al*. 1996a, 27)

From the mandibular tooth wear data, it appears that most caprovids were slaughtered before they were three years old, selection of young adults being typical for the later Roman period (Noddle 1988). The maintenance of animals into early adulthood, to allow two or three wool clips, might indicate the local value of wool.

The relative proportion of the main domesticates (here based on the NISP) clearly fits the developing national pattern, Brough fitting neatly into the expected pattern of late Roman civilian/rural sites (Figure 9, reproduced directly from King 1984). This shows a marked difference from two local contemporaneous sites, Lincoln and Filey. These differences are best explained as a reflection of the variation in site function. In this case, the more uniform nature of the assemblage from Brough may be a result of the site's more pedestrian/'producer' function compared to the large urban 'consumer' centres of York and Lincoln and the unusual character of the site of Filey (a Roman signal station).

The possibility that the mutton consumed at Brough originated from smaller local livestock raises a number of interesting questions about the inter-dependence of rural and urban settlements

Conclusion

This small assemblage of vertebrate material has given an indication of the diet and local economy of the late Roman occupation at Brough. It has provided an interesting comparison with the larger urban assemblage from Lincoln, showing both similarities and some differences. These have been interpreted as the result of the inter-play of variations in the regional economy and cultural similarities.

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References

Boessneck, J. A., von den Driesch, A., Meyer-Lempennau, U. and Weschler-von Ohlen, E. (1971). Das Tierknochenfunde aus dem Oppidum von Manching. *Die Ausgrabungen in Manching* **6**. Wiesbaden.

Brothwell, D., Dobney, K. and Ervynck, A. (1996). On the cause of perforations in archaeological domestic cattle skulls. *International Journal of Osteoarchaeology* **6**, 471-87.

Carrott, J., Dobney, K., Hall, A., Issitt, M., Jaques, D., Johnstone, C., Large, F. and Milles, A. (1994). Assessment of biological remains from excavations at Welton Road, Brough, North Humberside (site code: 1994.294). *Reports from the Environmental Archaeology Unit, York* 94/50, 6 pp.

Davis, S. J. M. (1992). A rapid method for recording

information about mammal bones from archaeological sites. *Ancient Monuments Laboratory Report* **19/92**. London.

Dobney, K., Hall, A. R., Kenward, H. K. and Milles, A. (1992). A working classification of sample types for environmental archaeology. *Circaea, the Journal of the Association for Environmental Archaeology* **9** (for 1991), 24-6.

Dobney, K., Jaques, D. and Johnstone, C. (in preparation). [Protocol for recording animal bone from Flixborough]. *Reports from the Environmental Archaeology Unit, York.*

Dobney, K., Jaques, D. and Irving, B. (1996a). Of butchers and breeds. Report on vertebrate remains from various sites in the City of Lincoln. *Lincoln Archaeological Studies* **5**, vi + 215 pp.

Dobney, K., Jaques, D., Carrott, J., Hall, A., Issitt, M. and Large, F. (1996b). Biological remains from excavations at Carr Naze, Filey, N. Yorkshire: Technical Report. *Reports from the Environmental Archaeology Unit, York* **96/26**, 71 pp. + 31 pp. Appendices.

Dobney, K. and Rielly, K. (1988). A method for recording archaeological animal bones: the use of diagnostic zones. *Circaea* **5**, 79-96.

Fock, J. (1966). *Metrische Untersuchungen an Metapodien einiger europäischer Rinderrassen.* Unpublished dissertation, University of Munich.

Grant, A. (1982). *The use of tooth wear as a guide to the age of domestic ungulates,* pp. 91-108 in Wilson, B., Grigson, C. and Payne, S. (eds.), Ageing and sexing animal bones from archaeological sites. *British Archaeological Reports, British Series* **109**. Oxford.

Grant, A. (1984). *Animal Husbandry*, pp. 496-548 in Cunliffe, B. (ed.), Danebury, an Iron Age Hillfort in Hampshire. *Council for British Archaeology Research Report* **52**. London.

Hamshaw-Thomas, J. and Bermingham, N. (1993). *The faunal remains*, pp. 167-210 in Hands, A. (ed.), The Romano-British Roadside settlement at Wilcote. *British Archaeological Reports, British Series* **232**. Oxford.

King, A. C. (1978). A comparative survey of bone assemblages from Roman sites in Britain. *Bulletin of the Institute of Archaeology, University of London* **15**, 207-232.

King, A. (1984). *Animal bones and the dietary identity of military and civilian groups in Roman Britain, Germany and Gaul*, pp. 187-217 in Blagg, T. C. and King, A. C. (eds.), Military and civilian Roman Britain: cultural relationships in a frontier province. *British Archaeological Reports, British Series* **136**. Oxford.

Maltby, J. (1979). *Faunal studies from urban sites*: *The animal bones from Exeter 1971-1975.* Exeter Archaeological Reports **2**. Sheffield.

Maltby, M. (1989). *Urban rural variations in the butchery of cattle in Romano-British Hampshire*, pp. 75-107 in Serjeantson, D. and Waldron, T. (eds.), Diet and crafts in towns. *British Archaeological Reports, British Series* **199**. Oxford.

Noddle, B. (1984). *A comparison of the bones of cattle, sheep and pigs from ten Iron Age and Romano-British sites* pp. 105-123 in Clutton-Brock, J. and Grigson, C. (eds.), Animals and archaeology 4. *British Archaeological Reports, International Series* **227**. Oxford.

O'Connor, T. P. (1988). Bones from the General Accident site, Tanner Row. *The Archaeology of York* **15** (2), 61-136 + plates III-VII + Fiche 1. London: Council for British Archaeology.

O'Connor, T P. (1991). Bones from 46-54 Fishergate. *The Archaeology of York* **15** (4), 209-298 + plates XIIa-XVc. London: Council for British Archaeology.

Payne, S. (1972). Partial recovery and sample bias: the result of some sieving experiments, pp. 49-65 in Higgs, E. (ed.), *Papers In Economic Prehistory.* Cambridge University Press.

Payne, S. (1973). Kill-off patterns in sheep and goats: the mandibles from Asvan Kale. *Anatolian Studies* **23**, 281-303.

Silver, I. (1969). The ageing of domestic animals, pp. 283-302 in Brothwell, D. and Higgs, E. (eds.), *Science and Archaeology* **2**. Thames and Hudson.

Smith, I. (1996). A fourth century faunal assemblage from the Roman road side settlement at Wilcote, Oxfordshire. Unpublished Msc dissertation. University of Sheffield.

van Mensch, P. (1974). A Roman soup kitchen at Zammerdam? *Berichten van de Rijksdienstvoor het Oudheidkundig Bodemonderzoek* **24**, 159-165.

von den Driesch, A. (1976). A guide to the measurement of animal bones from archaeological sites. *Peabody Museum Bulletin* **1**. Cambridge Mass.: Harvard University.

Table 1. Welton Road, Brough: Number and frequency of main domestic mammals using NISP (number of identified specimens) and MNI (minimum number of individuals) counts. (MNI counts calculated using the zones method outlined by Dobney and Rielly 1988).

Species	NISP	NISP %	MNI	MNI %
Cattle	215	57	12	26
Caprovid	143	38	28	61
Pig	20	5	6	13

Table 2. Welton Road, Brough. Fragment counts for all recorded taxa by phase.

	Phase 1		**Phase 2**		**Total**	
Species	No.	%	No.	%	No.	%
Cattle	94	56	121	52	215	54
Caprovid	55	32	88	38	143	36
Pig	10	6	10	4	20	5
Horse	7	4	10	4	17	4
Dog	1	0.6	2	0.8	3	0.75
Roe deer	1	0.6	0	0	1	0.2

Table 3. Welton Road, Brough: Skeletal element counts for all identified taxa.

Element	**Cattle**	**Caprovid**	**Pig**	**Horse**	**Dog**	**Roe deer**
Horncore	2	1	-	-	-	-
Mandible	22	50	8	-	-	-
Scapula	4	6	-	4	1	-
Humerus	9	10	2	-	-	-
Radius	4	4	2	-	1	-
Metacarpal	16	4	-	3	-	-
Pelvis	6	10	1	-	-	-
Femur	1	3	1	-	-	-
Tibia	6	31	2	2	1	1
Metatarsal	15	6	1	1	-	-
Metapodial	1	2	-	1	-	-
Calcaneum	12	2	1	1	-	-
Astragalus	15	4	-	1	-	-
Phalanx 1	78	5	2	4	-	-
Phalanx 3	18	-	-	-	-	-
M3	4	2	-	-	-	-
Dp4	2	3		-	-	-
Total	215	143	20	17	3	1

Table 4. Welton Road, Brough: Body weight ratios of main domesticates. Key: NISP = number of identified specimens; MNI = minimum number of individuals.

	NISP	%	MNI	%
Cattle	59125	91	3300	75
Caprovid	5362	8	1050	24
Pig	170	1	51	1

Table 5a. Welton Road, Brough: MNI (minimum number of individuals) for caprovids by anatomical elements. Key: % = frequency of an element expressed in relation to the most common one. (MNI values have been calculated by assuming there are equal numbers of left and right elements, i.e. major skeletal elements have been divided by 2 and phalanges by 8.)

Element	No. of fragments	MNI	%
Horncore	1	1	4
Mandible	50	25	100
Scapula	6	3	12
Humerus	10	5	20
Radius	4	2	8
Metacarpal	4	2	8
Pelvis	10	5	20
Femur	3	2	8
Tibia	31	16	64
Metatarsal	6	3	12
Calcaneum	2	1	4
Astragalus	4	2	8
Phalanx 1	5	1	4
Phalanx 3	0	0	0
M3	2	1	4
Dp4	3	2	8

Table 5b. Welton Road, Brough: MNI (minimum number of individuals) for cattle by anatomical elements. Key: % = frequency of an element expressed in relation to the most common one. (MNI values have been calculated by assuming there are equal numbers of left and right elements, .i.e. major skeletal elements have been divided by 2 and phalanges by 8.)

Element	No. of fragments	MNI	%
Horncore	2	1	9
Mandible	22	11	100
Scapula	4	2	18
Humerus	9	5	45
Radius	4	2	18
Metacarpal	16	8	73
Pelvis	6	3	27
Femur	1	1	9
Tibia	6	3	27
Metatarsal	15	8	73
Calcaneum	12	6	55
Astragalus	15	8	73
Phalanx 1	78	10	91
Phalanx 3	18	2	18
M3	4	2	18
Dp4	2	1	9

Table 6. Summary of cattle mandible age data from Welton Road, Brough.

Age	**No.**	**%**
Juvenile	3	12
Sub-adult	1	4
Adult	6	23
Elderly	16	61

Table 7. Welton Road, Brough: Summary of caprovid mandibular age data.

Age stage	% mandibles	% survival	No.
A (0-2 months)	0	100	0
B (2-6 months)	2	98	1
C (6-12 months)	17	81	9
D (1-2 years)	12	69	6
E (2-3 years)	39	30	20
F (3-4 years)	16	14	8
G (4-6 years)	10	4	5
H (6-8 years)	4	0	2

Table 8. Welton Road, Brough: Summary of caprovid fusion data.

> 1 year		**1.5-2.5 years**		**3-3.5 years**	
fused	unfused	fused	unfused	fused	unfused
24	2	30	13	2	7
%	8		30		77

Table 9. Welton Road, Brough: Summary of compared average measurements from sites of similar dates.

Site	Cattle astragalus	Caprovid humerus
	GLl	BT
Welton Road, Brough	62.8	26.0
Lincoln (4th C)	61.5	27.0
Wilcote (4th C)	63.0	-
Tanner Row, York	61.9	-
Carr Naze, Filey	-	25.0

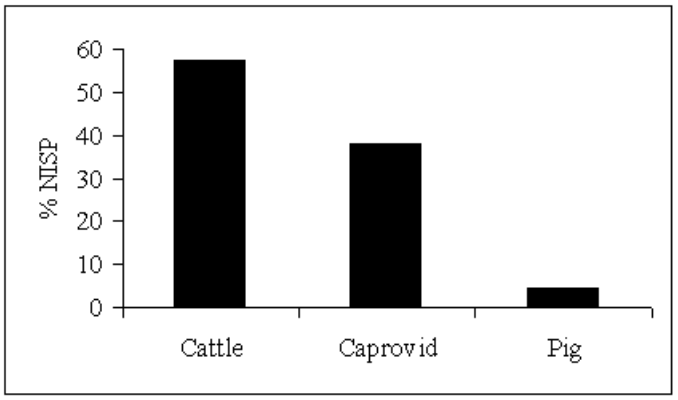

Figure 1. Welton Road, Brough: Frequency of the main domesticates.

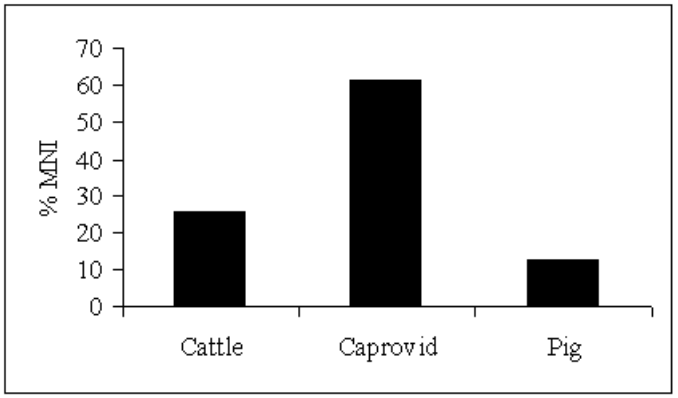

Figure 2. Welton Road, Brough: Frequency of main domesticates using MNI (minimum number of individuals) counts.

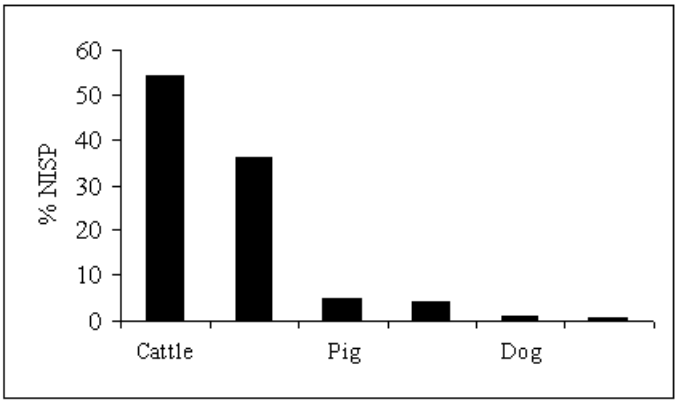

Figure 3. Welton Road, Brough: Frequency of all the identified species.

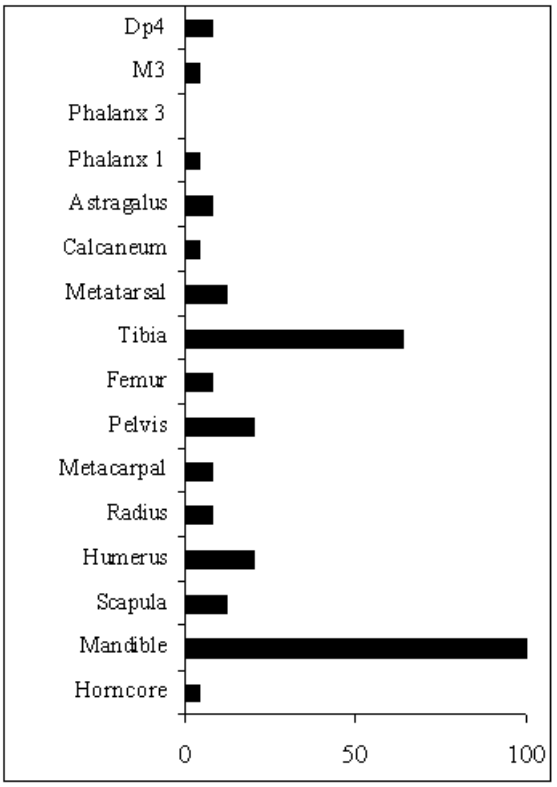

Figure 4. Welton Road, Brough: Caprovid MNI by anatomical element (see Table 5a for data).

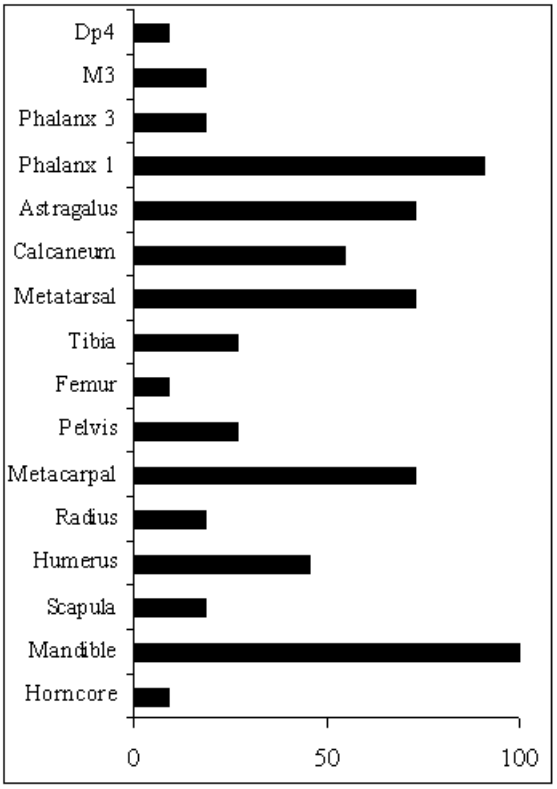

Figure 5.Welton Road, Brough: Cattle MNI by anatomical element (see Table 5b for data).

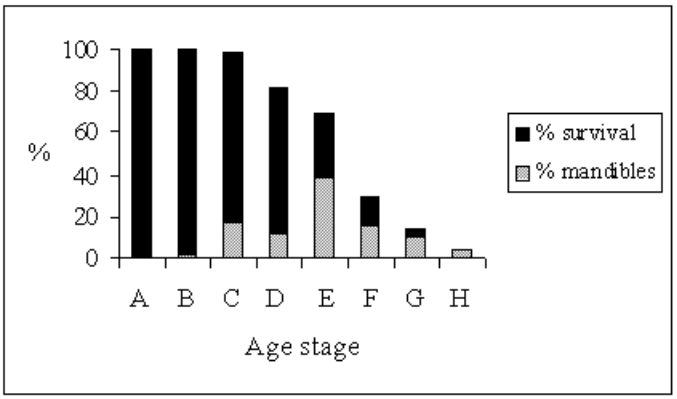

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Figure 6. Welton Road, Brough: Caprovid kill off pattern

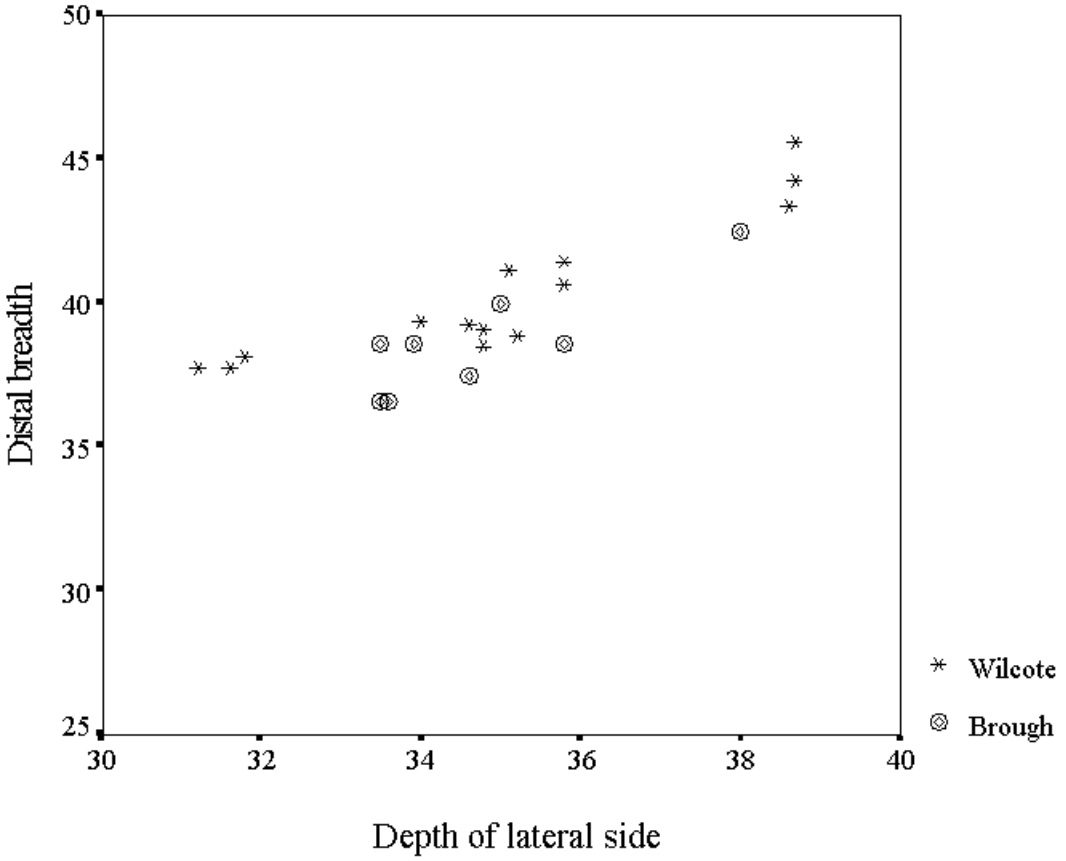

Figure 7. Welton Road, Brough: Bivariate plot of cattle astragalus measurements.

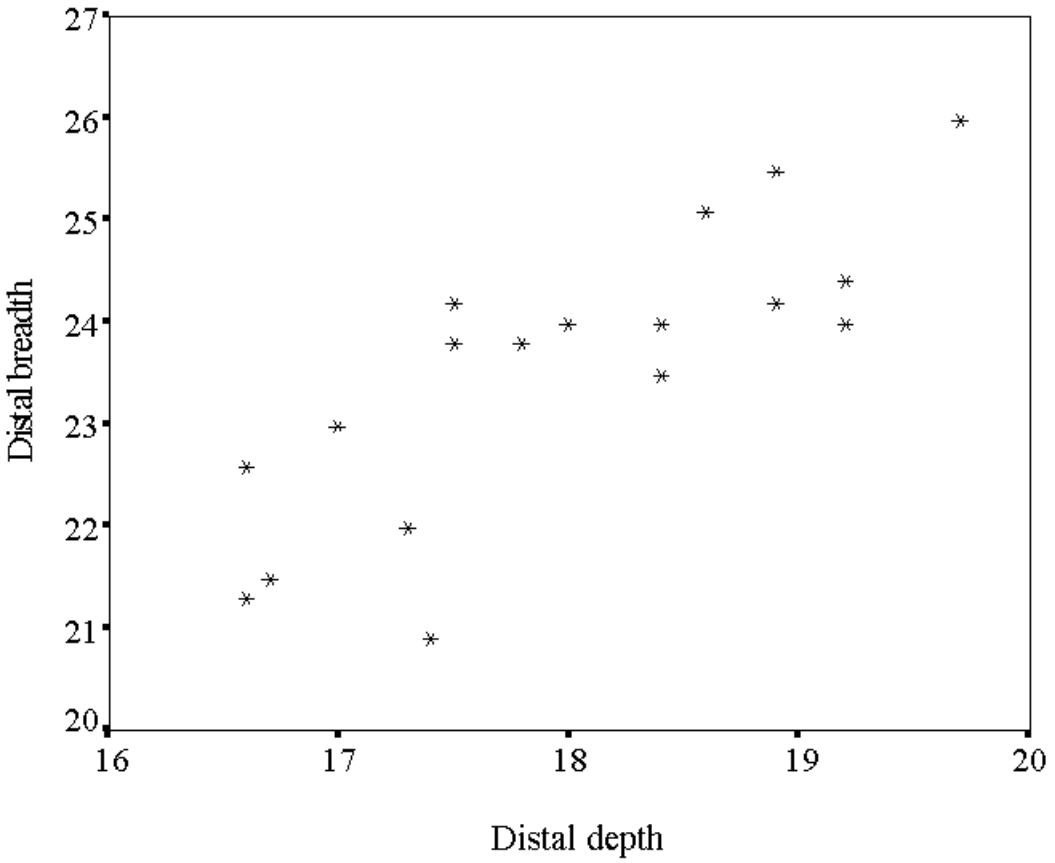

Figure 8. Welton Road, Brough: Bivariate plot of caprovid distal tibia measurements.

Appendix 1

Welton Road, Brough: Biometrical archive for caprovid, cattle, horse, dog, chicken and goose (measurements following von den Driesch 1976).

Caprovid tibia

Context	Phase	Bd	Dd	GL	SD
1033	1	24.2	18.9	-	-
1040	1	23.5	18.4	-	-
1061	1	24.0	18.0	-	-
1061	1	24.4	19.2	-	-
1084	1	23.8	17.5	-	-
1147	1	25.1	18.6	-	-
2069	1	25.5	18.9	-	-
2077	1	24.2	17.5	-	-
2104	1	24.0	18.4	-	-
1008	2	21.5	16.7	-	-
1008	2	22.6	16.6	-	-
1019	2	24.0	19.2	-	-
1022	2	23.0	17.0	-	-
1029	2	26.0	19.7	-	-
1031	2	23.8	17.8	-	-
1043	2	21.3	16.6	-	-
1119	2	22.0	17.3	183.2	10.1
2079	2	20.9	17.4	-	-

Caprovid astragalus

Context	Phase	GLl	Bd	Dl
1022	2	27.9	18.5	15.4
1119	2	24.4	15.7	13.3

Caprovid calcaneum

Context	Phase	GL	DS	C	C+D
1119	2	45.8	16.6	10.9	19.1

Caprovid radius

Context	Phase	GL	SD
2069	1	-	13.8
1119	2	132.4	12.7

Caprovid humerus

Context	Phase	BT	HTC	GL	SD
1038	1	25.4	12.8	-	-
1084	1	24.5	10.8	-	11
2081	1	24.0	12.0	-	-
1008	2	28.5	13.3	-	-
1019	2	25.6	12.8	-	-
1029	2	28.9	13.8	-	-
1119	2	25.1	11.6	127.8	13.1

Caprovid metacarpal (MC) and metatarsal (MT)

Context	Phase	MC/MT	GL	SD	BFp	DFp	BFd	Dd	Dem	Dvm
1037	1	MT	127	9.5	17.4	17.8	20.1	13.5	7.9	13.3
1019	2	MC	-	-	18.9	14.8	-	-	-	-

Cattle astragalus

Context	Phase	Bd	Dl	GLl
1061	1	38.6	33.9	-
1061	1	36.6	33.6	-
1006	2	42.5	38.0	67.4
1019	2	38.6	33.5	61.2
1019	2	40.0	35.0	61.0
1022	2	38.6	35.8	62.5
1022	2	37.5	34.6	62.7
1030	2	36.6	33.5	62.1

Cattle calcaneum

Context	Phase	C	C+D	DS
1006	2	25.4	46.6	43.4
1008	2	26.8	48.1	-
1008	2	25.8	46	40.2
1021	2	22.9	42.8	-

Cattle tibia

Context	Phase	Bd	Dd
1006	2	59.8	43.6

Cattle humerus

Context	Phase	BT	HTC
1031	1	69.9	35.3

Cattle metacarpal

Context	Phase	GL	SD	BFd	Dd	DFp	Dem	Dvm
1045	1	185	31.7	60.3	32.3	58.3	26.2	32.3
1061	1	-	-	65.8	32.3	-	23.3	31.0
2084	1	-	-	51.5	29.7	-	24.2	30.2
1018	2	-	-	53.5	29.3	-	22.0	29.4
1034	2	-	-	48.5	-	-	20.5	27.0
1034	2	-	-	52.6	30.2	-	22.1	30.2
1043	2	-	-	45.0	28.0	-	21.4	28.0

Cattle metatarsal

Context	Phase	BFd	Dd	Dem	Dvm	BFp	DFp	SD
1061	1	51.4	30.2	22.1	30.2	42.6	41.6	24.2
1148	1	50.2	31.0	23.7	30.8	-	-	-
1148	1	50.1	30.5	-	30.3	-	-	-
2033	1	51.7	-	-	-	-	-	-
1008	2	55.5	39.8	-	-	-	-	-
1008	2	49.2	29.5	22.8	29.7	-	-	-
1019	2	52.4	29.1	19.0	27.9	-	-	-
1019	2	49.1	29.5	20.1	28.7	-	-	-
1029	2	52.2	29.5	24.1	29.6	-	-	-

Horse metacarpal

Context	Phase	Bp	Bd	SD	GL
1008	2	48.4	48.5	34.5	230.0

Dog tibia

Context	Phase	Bd	Dd
1128	1	18.5	13.9

Dog radius

Context	Phase	Bp	Bd
1043	2	11.0	7.2

Chicken measurements

Element	Context	Phase	Bp	Bd	Dp	Dd	GL	SC	Dip	Did
ulna	1038	1	10.1	-	-	-	79.1	4.8	10.1	11.8
tibiotarsus	1038	1	-	11.5	-	11.0	-	-	-	-
humerus	1006	2	16.6	12.8	-	-	61.5	5.7	-	-
femur	1006	2	-	12.7	9.1	11.5	73.5	5.6	-	-
femur	1009	2	-	-	-	10.6	-	-	-	-
tibiotarsus	1021	2	-	-	-	-	-	-	13.6	-
tarsometatarsus	1008	2	12.6	-	-	-	-	-	-	-

Appendix 2

Welton Road, Brough: Lithological descriptions for the sediment samples (in context number order).

Context 1006 Sample 1 [dump - 1.12.6]

Moist, mid to dark brown (internally mid to dark grey brown), crumbly to unconsolidated, sandy silt, with very small to medium-sized (2-60 mm) stones present. Modern rootlets were also noted.

Context 1019 Sample 2 [dump - 1.12.7]

Moist, mid to dark grey-brown, crumbly, slightly sandy, clay silt, with clasts/lenses of light buff sand. Very small stones (2-6 mm) and modern rootlets were present.

Context 1044 Sample 6 [backfill - 1.27.22]

Just moist, mid to dark grey (with brown-ish tinges in places), unconsolidated (working crumbly and soft), silty sand.

Context 1045 Sample 5 [backfill - 1.11.2]

Moist, mid to dark grey-brown, crumbly (working soft), slightly sandy, clay silt, with very small to large-sized (2->60 mm) stones present. Modern roots and rootlets were also present.

Context 1050 Sample 7 [backfill; natural - 1.27.22]

Moist, mid brown -ish grey, with lighter mottles (to 1 mm), unconsolidated to crumbly (working soft), slightly clay, silty sand. A few dark reddish brown lumps of ?iron pan and very small (2-6 mm) stones were present.

Context 1055 Sample 9 [backfill - 1.11.2]

Moist, mid to dark brown -ish grey, crumbly (working soft), slightly stony, sandy silt, with very small to large (2->60 mm) stones. Fragments of charcoal, oyster shell and rootlets were also present.

Context 1061 Sample 10 [backfill - 1.11.2]

Moist, light to mid grey, unconsolidated (working crumbly), slightly sandy, clay silt. Very small to large (2->60 mm) stones and large mammal bone were present.

Context 1094 Sample 11 [grave fill - 1.9.12]

Wet, light brown, light grey, mid to dark grey, dark grey, unconsolidated (working plastic), moderately stony sandy clay, with inclusions of buff and orange sand. Very small (2-6 mm) stones were abundant; fragments of burnt bone were present. Modern rootlets were also noted.

Context 1103 Sample 13 [natural - 1.27.15]

Moist, light to mid grey-brown (with lighter/darker orange mottles to 1 mm), unconsolidated (working soft), silty sand, with small (6-20 mm) stones present.

Context 1106 Sample 14 [natural fill - 1.27.15]

Moist, light to mid slightly grey-ish brown (with mid grey to orange mottles to 10 mm), crumbly, slightly brittle and soft sand.

Context 1113 Sample 15 [natural fill - 1.8.6]

Moist, light to mid grey-brown, crumbly to unconsolidated, silty sand, with small (6-20mm) present.

Context 1118 Sample 16 [natural - 1.27.15]

Moist, buff, orange, grey-brown (in equal amounts), unconsolidated to crumbly (working just soft), silty sand, with fragments of charcoal present.

Context 1132 Sample 19 [natural backfill - 1.6.8]

Moist, mid grey-brown, unconsolidated to soft, silty sand.

Context 1137 Sample 22 [natural backfill 1.6.8]

Moist, light to mid grey-brown, unconsolidated (working soft), slightly clay, sandy silt. Very small (2-6 mm) and medium-sized (20-60 mm) stones, and fragments of pottery were present.

Context 1187 Sample 25 [backfill, natural - 1.6.6]

Moist, light brown and light grey (in equal amounts), crumbly to unconsolidated, slightly clay

sand. Medium-sized (20-60 mm) stones, charcoal and medium mammal bone were present.

Context 1194 Sample 28 [levelling - 1.21.5]

Moist, mid brown to mid grey-brown, crumbly to unconsolidated, slightly clay, silty sand.

Context 1194 Sample 28 [levelling - 1.21.5]

Moist, mid brown to mid grey-brown, crumbly to unconsolidated, slightly clay, silty sand.

Context 1197 Sample 27 [backfill, natural - 1.6.4]

Moist, light yellow-brown and light grey (equal amounts), unconsolidated, slightly silty sand, with very small (2-6 mm) stones.

Context 1206 Sample 31 [natural, backfill - 1.20.14]

Moist, mid grey, unconsolidated to crumbly (working soft), slightly clay, silty sand, with clasts of buff sand (to 1 mm). Fragments of ?mortar and charcoal were present.

Context 1207 Sample 34 [natural fill - 1.20.16]

Wet, grey-brown (with orange mottles), soft, sand.

Context 1235 Sample 39 [natural fill - 1.20.12]

Moist, light to mid grey-brown, crumbly to unconsolidated, silty sand.

Context 1247 Sample 43 [backfill - 1.36.8]

Moist, mid to dark grey-brown, crumbly to unconsolidated sandy silt. Fragments of snail shells and ?modern roots and rootlets were present.

Context 1249 Sample 41 [backfill - 1.27.17]

Wet, mid to dark grey (with mottles of orange and black) soft sand, with flint stones present. Modern roots were also noted.

Context 1252 Sample 44 [backfill - 1.36.8]

Moist, mid to dark purplish grey, soft to crumbly (working slightly plastic), slightly sandy, silty clay, with traces of very rotted shell. Modern rootlets were also noted.

Context 1254 Sample 45 [natural, backfill - 1.20.8]

Moist, light to mid grey-ish yellow-orange, with some grey patchiness, unconsolidated and soft (?originally layered in field, but lost through trowelling) sand. Medium-sized and large- (20->60 mm) stones were present.

Context 1255 Sample 46 [grave fill - 1.9.21]

Moist, yellowish grey-brown, with lighter and darker mottles (to 10 mm), unconsolidated, silty sand. Charcoal and burnt bone were present.

Context 1261 Sample 47 [undisturbed natural - 1.1.2]

Moist, light yellow-grey to light orange-yellow, unconsolidated sand, with clasts of ?burnt orange-red sand.

Context 1277 Sample 49 [backfill - 1.36.8]

Moist, shades of grey, from light grey to black, with chalk flecks (to 1 mm), brittle to crumbly (working plastic to soft), clay silt, with fine and coarse herbaceous detritus. Very small (2-6 mm) stones were present.

Context 1288 Sample 50 [natural - 1.34.4]

Moist, light buff to light-mid grey-brown to mid grey-brown, with a small amount of mid orange-brown, unconsolidated to crumbly, silty sand. Very small (2-6 mm) stones were present.

Context 1321 Sample 62 [levelling, dump - 1.23.1]

Moist, mid to dark grey-brown, unconsolidated (working soft), slightly clay, silty sand, with very small to medium-sized (2-60 mm) stones.

Context 1327 Sample 70 [grave fill - 1.31.70]

Moist, dark grey, with yellowish cast, brittle (working crumbly and soft), silty sand. Roots, ?ash, charcoal (perhaps much fine charcoal) and an iron object were present.

Context 1385 Sample 75 [grave fill - 1.29.28]

Dry, light brown, unconsolidated, slightly sandy silt, with modern rootlets. Burnt animal bone was abundant.

Context 1440 Sample 77 [natural fill - 1.18.4]

Moist, mid greyish-yellow, crumbly and soft, sand, with areas of more pure yellow sand and greyish (?humic) patches. Modern seedlings were present.

Context 1474 Sample 78 [use - 1.30.30]

Moist, light to mid grey-brown, crumbly, slightly clay, sandy silt, with areas of dark grey sandy silt, light brown sand, buff silty sand (?burnt stone) and buff sandy silt. Very small and small (2-20 mm) stones were present.

Context 1484 Sample 80 [hearth - 1.30.29]

Moist, black, brittle to crumbly (working sticky), ?humic, clay silt, with patches of light grey clay, light buff sandy clay, flecks of yellow ?clay and white flecks of chalk. Very small (2-6 mm) stones and modern rootlets were present.

Context 1485 Sample 79 [backfill 1.18.6]

Moist, light orange -yellow sand with traces of light yellowish grey clay sand.

Context 1500 Sample 81 [grave fill - 1.30.44]

Moist, unconsolidated to soft (working crumbly), light yellow-brown sand and light to mid grey-brown sandy silt (in equal amounts). Burnt animal bone was present.

Context 1509 Sample 82 [backfill, natural fill - 1.18.6]

Waterlogged, light to mid brown, unconsolidated sand, with black flecks (?manganese). Small (6-20 mm) stones were present.

Context 2017 Sample 24 [levelling, natural soil - 2.3.1]

Moist, mid yellow-ish grey, crumbly and soft, sand, with very small to medium-sized (2-60 mm) stones, and fragments of pottery present.

Context 2069 Sample 55 [dump, levelling - 2.8.3]

Moist, grey-brown, crumbly and soft, slightly silty sand, with flint and flecks of chalk (to 2 cm) present.

Context 2075 Sample 51 [occupation, floor - 2.11.2]

Moist, mid to dark grey-brown, unconsolidated to crumbly, slightly sandy silt. Very small to medium-sized (2-60 mm) stones, fragments of brick/tile and modern roots and rootlets were present.

Context 2076 Sample 52 [levelling - 2.8.8]

Moist, mid to dark grey-brown, crumbly, slightly sandy, clay silt, with very small to medium-sized (2-60 mm) stones present. Fragments of pottery, mortar/plaster and rootlets were also noted.

Context 2077 Sample 61 [levelling, dump - 2.7.2]

Just moist, mid to dark brown, crumbly to unconsolidated, slightly clay, sandy, silt, with ?patches of light grey-brown indurated clay. Very small to medium-sized (2-60 mm) stones, rootlets and fragments of ?mortar/plaster were present.

Context 2081 Sample 54 [dump, levelling - 2.8.6]

Moist, mid to dark brown, crumbly to unconsolidated, slightly silty sand, with very small and small (2-20 mm) stones and ?pot present.

Context 2082 Sample 56 [levelling, natural soil - 2.3.5]

Moist, mid grey-brown, unconsolidated, slightly silty sand, with very small (2-6 mm) stones.

Context 2083 Sample 65 [levelling, natural soil 2.3.5]

Moist, light to mid brown-grey, unconsolidated, slightly stony, slightly clay, silty sand. Very small (2-6 mm) stones were present.

Context 2089 Sample 58 [backfill - 2.5.2]

Moist, mid brown, unconsolidated (working crumbly and soft), slightly clay, silty sand, with very small to medium-sized (2-60 mm) stones.

Context 2090 Sample 60 [levelling, natural soil - 2.2.4]

Moist, mid to dark grey-brown, with orange mottles (to 1 cm), soft sand.

Context 2091 Sample 57 [structure make up - 2.3.5]

Moist, mid to dark brown-grey, unconsolidated, slightly clay, silty sand, with lumps of light buff sand (which are internally layered in places), light brown clay and light to mid and mid grey clay sand. Very small and small (2-20mm) stones (some flint) and charcoal were present.

Context 2091 Sample 67 [structure make up - 2.3.5]

Moist, mid yellow-ish grey, unconsolidated and soft sand, with very small and small (2-20 mm) stones. Fragments of pot were also present.

Context 2094 Sample 64 [levelling, dump - 2.7.1]

Moist, mid to dark brown, crumbly (working sticky, slightly plastic when wet), slightly sandy, clay silt, with patches (to 1 mm) of dried buff clay. Very small to large (2->60 mm) stones, modern roots, fragments of ?mortar/plaster and shell were present.

Context 2099 Sample 69 [dump - 2.7.2]

Moist, mid to dark slightly greyish brown, crumbly silty, clay sand, with lumps of burnt sediment. Medium-sized (20-60 mm) stones, rotted mortar, fragments of pot, charcoal and marine molluscs were present.

Context 2100 Sample 68 [grave fill, packing - 2.5.6]

Moist, mid grey-brown, crumbly, unconsolidated and soft, very slightly humic, slightly clay, slightly silty sand, with small (6-20 mm) stones and rootlets. Burnt mammal bone was abundant.

Context 2105 Sample 72 [backfill - 2.5.4]

Dry, mid grey-brown, unconsolidated to crumbly (working crumbly and soft), slightly sandy, clay silt. Modern rootlets, very small (2-6 mm) stones, slag, fragments of brick/tile and coal were present.

Context 2107 Sample 66 [natural - 2.2.3]

Moist, light to mid orange-ish brown (slightly darker in places), unconsolidated silty sand.

Context 5010 Sample 37 [natural fill - 5.10.4]

Moist, light grey, crumbly (working plastic), clay with minor components of orangy-brown clay and orangy sandy clay. ?Modern rootlets were also present.

Appendix 3

Human remains

Context 1385
[grave fill - 1.29]

The cremation (Context 1385) formed the contents of a pottery vessel of a type consistent with a 3rd Century date. The pieces of bone were all calcined and heavily fragmented, and many had been crushed to dust. Several elements could be identified and these included skull fragments as well as part of a distal humerus. No indication of sex, age at death, or pathology could be recognised. There was no evidence of any other mammal species present, although, the fragmentary nature of the cremation does not preclude this possibility.

Context 1327
[grave fill - 1.31.70]

A second cremation, recovered from Context 1327 (described as a 'grave fill'), was also dated to the 3rd Century. Although most of the fragments were calcined, they were not burnt to such a high degree as those in the other cremation. The only fragments positively identified as human were several tooth roots and a phalanx. Again, there was no indication of sex or age at death.

Context 3004
[grave fill - 3.3.2]

A single inhumation dated no more closely than 'Roman' was excavated from Context 3004. The skeleton was reasonably complete, although the bones were rather broken. Preservation was poor, with the bones being fragile and battered and with 20-50% fresh breaks evident. The colour of the bones was fawn, with extensive black staining apparent on a number of elements.

In the lower jaw, the right M1 was worn down to the roots and the left M1 had been lost some time before death, as the alveolar bone showed extensive remodelling. In the upper jaw, the right M1 had also been lost *ante mortem* and the M2 was worn down to the roots. The left M1 was also extensively worn and caries was evident on P3 and P4. Most of the anterior and one of the posterior teeth showed enamel hypoplasia. The anterior teeth were fairly well worn and, unusually, the lower cheek teeth had very rounded and polished occlusal surfaces.

At some point the right fibula had been fractured but had healed well and remodelled extensively. Both tibiae had unusual pitted striations on their surfaces associated with a chronic, low level, inflammatory response. Small localised lesions may represent the occurrence of leg sores.

On the basis of attributes of the skull and pelvis, it was established that these remains represent a mature male. Analysis of the tooth wear and the pubic symphysis indicate an age of between 30 and 40 years.