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Technical report: biological remains from excavations at Bridge Road, Brompton on Swale, North Yorkshire (site code: BRB02)

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by

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Summary

Fourteen sediment samples, together with a small quantity of hand-collected shell, and over 9,000 hand-collected bones, were submitted for analysis. However, it must be noted that the integrity of many of the contexts was very poor and that this, together with extensive fragmentation, rendered much of the vertebrate assemblage of little value.

Samples from seven Roman contexts were examined for their content of plant remains. Charred plant material was present in all the samples, though the concentrations were very low. The results are consistent with a pattern becoming apparent at sites of Roman and Romano-British date in the Vale of York generally, in which there is evidence for the use of heathland resources (and specifically for turves) often with a small component of charred cereal remains. No ancient invertebrate remains were recovered from the samples. Three subsamples examined for microfossils were devoid of useful remains being composed almost entirely of inorganic grains.

The hand-collected shell was too little and far too poorly preserved to be of any interpretative value beyond indicating the importation of coastal food resources to the site.

The animal economy throughout the represented periods was based almost wholly on the main domestic mammals. Evidence for the utilisation of wild resources was scarce, with very few wild mammals and birds identified. Some exploitation of river resources was hinted at by the presence of fish remains in two of the samples. On the basis of fragment counts, the proportions of the major domesticates suggest that caprovids were the most numerous species present in the earliest period, with a change in the later periods to a predominance of cattle. In general, the vertebrate assemblages from Brompton show similarities with material already recovered from other excavations in the vicinity; the earliest phase retaining the character of the pre-Roman dietary preferences, with the increase of cattle through time being a feature of the 'Romanisation' process.

KEYWORDS: BRIDGE ROAD; BROMPTON ON SWALE; NORTH YORKSHIRE; TECHNICAL REPORT; ROMAN; ROMANO-BRITISH; PLANT REMAINS; CHARRED PLANT REMAINS; CHARRED GRAIN; INVERTEBRATE REMAINS; SHELLFISH; VERTEBRATE REMAINS; HEATHLAND RESOURCES; TURVES; 'ROMANISATION'

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Introduction

Archaeological trial trenching and excavation was carried out by Northern Archaeological Associates at Bridge Road, Brompton on Swale, North Yorkshire (NGR SE 2245 9943), between March and May 2002.

This intervention was undertaken in advance of new construction in an area of the site that had escaped ground-reduction during earlier works in the late 1960s. The area investigated was contiguous with the northern boundary of the scheduled area of the Roman town of *Cataractonium* and associated with the 2nd century defences. Evidence of earlier prehistoric activity was limited to several pits, a number of flints and a piece of pottery, although there was also a panel of rock art found re-used in a Roman structure. The Dere Street Roman road crossed part of the site, and the initial Romano-British activity identified was associated with the construction of this and a related side road. Structures were identified to the north of the side road which subsequently went out of use. There followed an episode of abandonment and then, in the later period (4th century), there was a further phase of structures, surfaces and burials.

Overall, the pottery, together with provisional analysis of the stratigraphic relationships between archaeological features and layers, suggested 12 principal chronological phase groups.

Phase 1 – ‘natural’
Phase 2 – prehistoric features
Phase 3 – buried soil
Phase 4 – establishment of Dere Street
Phase 5 – initial roadside activity
Phase 6 – establishment of side road
Phase 7 – primary structural phase
Phase 8 – temporary abandonment
Phase 9 – secondary structural phase and burials
Phase 10 – final structural phase
Phase 11 – post-Roman
Phase 12 – modern

The examined samples and recorded hand-collected remains were from the following ‘Romano-British’ phases, the suggested dates for which are extremely tentative and based on the pottery assessment (Didsbury 2003) and the excavator’s notes:

Phase 4 – ?late 1st/early 2nd century
Phase 5 – broadly contemporary with Phase 4
Phase 6 – ?2nd century
[Phase 6b] – ?mid 2nd century
Phase 7 – ?3rd century
Phase 8 – ?4th century
Phase 9 – ?4th century

During the excavations, large numbers of artefacts and faunal remains were recovered, mostly pottery and animal bone, but also coins, metal objects, glass, stone, worked bone and building materials. However, it should be noted that the integrity of many of the contexts was very poor. Time constraints placed on the excavation (and that the archaeological sequence proved more complex than the original trial trenching had indicated), resulted in the contamination of a number of deposits with material from later contexts. Deposits were graded on the basis of their integrity. Grade 1 deposits represent conventional contexts, e.g. sealed layers, whilst those of Grade 2 were probably contaminated with material from other deposits. Contexts assigned to Grade 3 were deposits that were unstratified or very disturbed.

Fourteen sediment samples (‘GBA’/‘BS’ *sensu* Dobney *et al*. 1992), together with a small quantity of hand-collected shell (from

10 contexts) and over 9,000 hand-collected bones, (representing 89 deposits), were submitted to PRS for analysis.

The interpretative value of material from the Grade 2 and 3 contexts would be rather limited and a strong selection bias away from these deposits has been adopted. In particular, selection of vertebrate material for detailed recording was strongly influenced by the uncertainty surrounding the integrity of some of the deposits. The assessment of the pottery recovered from the site (Didsbury *op. cit.*) suggested that many deposits contained material representing a wide chronological range. Over half of the fragments (4389) were recovered from just such deposits. For example, pottery from Context 52 indicated a time span for the deposit from late 1st to mid 4th century. The bones from this context were recovered from 'hollows in surface 51, a pebble and tile floor surface'. It is highly likely that the vertebrate remains were being used as levelling material to fill in the hollows and this infilling could have happened over a long period of time. There can be no knowing exactly when the bones were deposited or if the deposition occurred as a single event or many. Traditionally, such assemblages have been reported upon under the broad category of 'Roman' but this diminishes the value of the information retrieved. The relative importance of different species is established for a period spanning four centuries and thus detailed interpretations regarding changes in frequency, age-at-death and variation in size of the main domesticates through time cannot be determined with any degree of precision. These variations and changing frequencies can be used to identify, for instance, differing husbandry practises, the introduction of new/improved stock and changing dietary preferences during a crucial period of considerable change and innovation.

Methods

Sediment samples

The submitted sediment samples were inspected in the laboratory. Seven, representing a range of feature types (including pit fills, burnt layers and one associated with the flue of a ?corn drier), were selected for assessment and their lithologies were recorded using a standard *pro forma*. Subsamples were taken for processing, following the procedures of Kenward *et al*. (1980; 1986), for the recovery of plant and invertebrate macrofossils.

The washovers resulting from processing were examined for plant and invertebrate macrofossils. The residues were examined for larger plant macrofossils and other biological and artefactual remains.

Three subsamples (from Contexts 21, 169 and 189) were examined for microfossil survival using the method of Dainton (1992). Those from Context 169 and 189 were investigated primarily for the eggs of intestinal parasites, whilst the subsample from Context 21 was to determine pollen survival.

Hand-collected shell

The small amount of hand-collected shell was too poorly preserved to warrant detailed recording but was examined and a brief record made.

Hand-collected vertebrate remains

Where applicable, fragments were identified to species or species group, using the reference collection at Palaeoecology Research Services. Only vertebrate remains that could be identified to these categories were recorded. Unidentified remains (those which could only be assigned to broad categories such as large or medium-sized mammal) did not warrant recording in this instance because of the extensive fresh breakage encountered.

For the vertebrate remains, both from hand-collection and from the samples, data were recorded electronically directly into a series of tables using a purpose-built input system and *Paradox* software. Subjective records were made of the state of preservation, colour of the fragments, and the appearance of broken surfaces ('angularity'). Additionally, semi-quantitative information was recorded for each context concerning fragment size, dog gnawing, burning, butchery, and fresh breaks. Selected skeletal elements were recorded using the diagnostic zones method described by Dobney and Rielly (1988).

Measurements were taken where possible; all measurements followed those outlined by von den Driesch (1976). Withers heights were estimated using calculations devised by Foch (1966)

Caprovid tooth wear stages were recorded using those outlined by Payne (1973; 1987), and those for cattle and pig followed the scheme set out by Grant (1982). Cattle, caprovid and pig mandibles and isolated teeth were assigned to the general age categories outlined by O'Connor (1989) and Payne (1973; 1987). Mandibles with incomplete tooth rows were assigned to age groups on the basis of comparison with the more complete aged mandibles from the assemblage. The same was true for loose deciduous 4th pre-molars (dp4) and third molars (M3).

Mammal bones were described as 'juvenile' if the epiphyses were unfused and the associated shaft fragment appeared spongy and porous. They were recorded as 'neonatal' if they were also of small size. Epiphysial fusion data are presented using the categories of O'Connor (1988).

Results

Sediment samples

Samples from seven Roman contexts were examined for their content of plant remains via 'washovers', which were briefly examined wet then dried for closer inspection. Charred plant material was present in all the samples, though the concentrations were very low; some uncharred plant remains in the washovers, including roots and rootlets, are thought to be of recent origin (some small leguminous seeds, for example, were certainly not ancient and the remains of the burrowing snail *Cecilioides acicula* (Müller) in three samples is also indicative of some intrusive material). No insect remains were recovered.

The results of the analyses are given in Tables 1 to 4. Clearly all the contexts received some burnt material, with ash probably making up a large proportion of the deposit in Contexts 95 and 130, where small whitish 'ash concretions' were rather frequent. In most samples, these concretions were accompanied by glassy 'beads' thought to result from burning of plant material. The charred plant material consisted of charcoal and a small range of more or less identifiable remains, of which ?heather (*Calluna*) basal twig/root fragments were the most frequent. That these remains probably *were* heather is indicated by the presence in several samples of traces of charred twig, shoot or flower of this plant. Whilst this material may have originated in heather used for a variety of purposes, not least as fuel in its own right, the presence in several samples of remains thought likely to indicate the presence of cut heathland turves may mean that this was the actual source of the heather debris. This group of plants comprises sedge (*Carex*) nutlets, fragments of monocotyledonous rhizome (included in the category 'root/rhizome' in Table 4), and probably also the charred moss stems seen in some samples. Some fragments of charred amorphous organic material in samples from Contexts 95 and 99 may well be 'mor' humus from heathland turves. Other charred plant material clearly originated in cereal crops: there were traces of wheat (*Triticum*) and barley (*Hordeum*) grains, a little spelt wheat (*Triticum spelta*) chaff (glume-bases), and some seeds or fruits likely to have arrived from cornfield weeds—brome (*Bromus*) and wild radish (*Raphanus raphanistrum*). One further component in some samples was a trace of hazel (*Corylus*) nutshell.

The sample residues were mostly of stones (to 70 mm), gravel and sand. Biological remains were restricted to small quantities of charred plant material (mostly fine charcoal) as recorded from the washovers and a little bone. Most samples produced moderate assemblages of bone which, overall, showed reasonable preservation, although some fragments had a rather battered appearance. Burnt fragments were noted throughout, but only a few fragments were affected within each assemblage, with the exception of material from

Context 130. Most bones from this deposit were scorched. Overall, very few bones were greater than 20 mm in any dimension. Generally, the remains represented small fragments of larger bones, probably representing medium-sized mammals; most were not identifiable to species. However, fish bone (in very small amounts) was noted in the samples from Contexts 94, 99 and 179, which included vertebrae of eel (*Anguilla anguilla* (L.)) and pike (*Esox lucius* L.). Several small mammal remains were present, of which one tooth fragment (Context 99) was identified as water vole (*Arvicola terrestris* L.). A pelvis from Context 94 may have been from a mouse (*Mus* sp.) rather than a vole. Summary information for the residues is presented as Table 2.

The 'squash' subsamples from Contexts 21 and 189 contained no recognisable microfossils, consisting entirely of inorganic mineral grains. The subsample from Context 169 was also devoid of useful remains being composed of inorganic grains, with only traces of fungal hyphae.

Hand-collected shell

For each shell-bearing context (10 in total), the excavator had recorded the number of fragments and an approximate total weight of material. Most of the shell was of extremely heavily fragmented and eroded marine shellfish and was continuing to disintegrate in its bags. Context 36 (Phase 8) gave remains of three land snails, one of which was identified as *Trichia hispida*. One Phase 9 deposit (Context 114) contained a little eggshell as well as oyster and mussel. A summary of the hand-collected shell is presented as Table 5.

Hand-collected vertebrate remains

Vertebrate material was recorded from the 33 deposits which appeared to be, from the stratigraphy and from the artefacts, fairly securely and tightly dated. These were largely, though not exclusively, contexts with integrity of Grade 1. Some Grade 2 deposits and those described as cleaning layers were included. Some Grade 1 material was not recorded because there were no identified remains within a particular context or because the animal bone was likely to be of a secondary nature, e.g. recovered from grave fills.

The identified vertebrate remains recorded from this site amounted to 662 fragments. Unidentified remains from these deposits (amounting to 2939 fragments) were not recorded in any detail, but some notes were made concerning the composition of the assemblages. Additionally, several of the larger assemblages from the site, for which only very broad dating was available, were scanned. Generally, material from Phases 4-6 (including 6b) was amalgamated being of a similar date (i.e. late 1st/2nd centuries) for the purpose of increasing the assemblage size.

Overall, preservation of the remains was quite good, although variability of the colour of the fragments was recorded for the material from thirteen of the deposits. Heavy fragmentation of the remains was widespread and characteristic of much of the vertebrate assemblage from the site. For the material from some contexts this could be attributed partly to fresh breakage during excavation and/or post-excavation processes. However, it was apparent from the nature of the broken surfaces of many of the bones that some fragmentation had occurred in the past. Unfortunately, this damage substantially reduced the number of elements that could provide useful biometrical information.

Some fragments showed areas of scorching. Heating or burning bone renders it more brittle, thus facilitating the breaking of bones into pieces, in this instance, perhaps, for the extraction of marrow.

Species representation

A range of domestic and wild mammals was represented in the assemblage, but, as might be expected, the bulk of the remains were cattle, sheep/goat and pig (Table 6). Very few fragments of other species were present; however, these included a number of dog bones from Phases 7, 8 and 9, and a cat ulna from Phase 8. Wild mammals were represented by a rat tibia (assumed to be black rat) from Phase 7 (Context 24) and a single roe deer radius was identified from Phase 9 (Context 122).

Birds were rather scarce, their remains dominated by chicken. Several goose fragments were also identified and a single crane tibiotarsus was recorded from Context 45 (Phase 8). The former were of a size consistent with that of grey-lag geese, but this does not necessarily imply that the bones were from wild individuals, although, bones from domestic geese do tend to be larger than all the wild species.

When comparing the relative abundance (using fragment counts) of the four main domesticates (cattle, caprovid, pig and horse) in more detail, it is apparent that in the earliest period (amalgamating fragment counts from Phases 4, 6 and 6b), caprovid remains predominated (Figure 1). From Phase 7 onwards, however, cattle were the most frequently occurring species, and this prevalence gradually increased through time. Pigs were less abundantly represented, but their frequency stayed fairly constant throughout—between 14% and 16%—with the exception of Phase 7. Here, the percentage of pig remains dipped to 11%. The proportion of horse remains was similar for Phases 7 and 8 at 9% and 8% respectively, but both the earliest phase (Phase 4-6b) and the latest phase (Phase 9) produced significantly fewer horse bones (2% and 3% of the main domesticates). It is worth noting, however, that both these assemblages were smaller than those from Phases 7 and 8.

When MNI frequencies are plotted a somewhat different pattern is seen (Figure 2), although the overall trend, i.e. the dominance of caprovids in the earliest period (Phases 4-6b), and the rise in the importance of cattle in Phase 7, stay the same. It is in the later phases that the patterns differ. Cattle, instead of gradually increasing in frequency (as seen in the values produced by the fragment counts), decrease in Phases 8 and 9, whilst sheep, having declined from 57% to 29% from Phases 4-6 through to 8, increase to 36 % in Phase 9, equalling the frequency for cattle in this phase. This is at odds with the frequencies produced from the fragment counts which showed cattle dominating in Phase 9, with 58%.

MNI figures also raised the importance of pigs which showed a marked increase from Phase 4 to 8 and then a relatively sharp decline in Phase 9. Regardless of the method of quantification, the frequency of pig remains is high.

Skeletal element representation

Skeletal element representation was clearly affected by the extensive fragmentation, whether of recent occurrence or as a result of ancient butchery techniques. Some elements, particularly the meat-bearing bones of cattle, had been subjected to a higher degree of fragmentation—split for marrow extraction etc—than bones of smaller mammals (such as caprovids and pigs) and hence were less easily recognisable and could not always be confidently identified to species. This can create a bias in favour of smaller, denser bones which remain intact and are, therefore, more readily identifiable. In the assemblage from Brompton, there was some evidence for this provided by the numerous cattle phalanges, calcanea and astragalii recorded. When considering the smaller mammals (caprovids and pigs), the very same skeletal elements appeared to be under-represented; these are the small bones which are often overlooked during hand collection.

Tables 7-10 show the fragment counts for individual species by phase and by element. Figures 3 and 4 show MNI values for individual skeletal elements for cattle and caprovids expressed as a proportion of the most frequent element (shown as 100%).

Cattle

Overall, a range of skeletal elements representing all parts of the body were present for cattle throughout Phases 4-9. Figure 3 suggests that in Phase 7, meat-bearing elements were prevalent, humerii and radii in particular, however, the frequencies for lower limb elements (e.g. astragali, calcanea and metapodials) were not insignificant. Phase 8 material had a greater proportion of head (mandibles) and terminal limb elements, but meat-bearing bones were still relatively numerous. Interpretation of the occurrence of different skeletal elements in Phase 9 is somewhat limited by the small size of the assemblage, but humerii and scapulae were common, and primary butchery waste, in the form of head and lower limb bones (in this case mainly phalanges), was again represented.

Large mammal remains from all phases cannot be ignored. Scanning these bones suggests that rib and shaft fragments, together with small numbers of vertebrae form a large proportion of this fraction of the assemblage.

Cattle remains represent a mixture of waste, chiefly refuse from primary and secondary carcass preparation, together with some domestic rubbish. There were no concentrations of remains that were clearly indicative of craft activities such as tanning or hornworking.

Caprovids

With the exception of the earliest phase (Phase 4-6b), mandibles were the most commonly occurring skeletal element, with metapodials (and calcanea in Phase 7) also being strongly represented (Figure 4). Material from Phase 4-6b showed a prevalence of humerii, whilst other meat-bearing elements also had relatively high frequencies. Most parts of the body were represented, and as for cattle, these remains were waste from butchery and food consumption. The assemblages from each phase were too small to enable changes through time to be identified.

Pigs

Pig remains were rather too scant to provide much information regarding body part representation. Where more data were available, i.e. from Phase 8 deposits, mandibles and isolated teeth were predominant, whilst Phase 7 material included humerii and radii fragments (see Table 8).

Horses

Horses were represented by a range of elements, with teeth predominating in Phases 7 and 8 deposits (Tables 8 and 9). Metapodials and phalanges were also quite numerous. Remains of horses appeared to be treated in much the same way as those of cattle or sheep and their bones were found in all context types.

Butchery

Evidence of butchery was noted throughout the assemblage, particularly in the material from Contexts 44, 45, 93 and 94 (all of probable 4th century date) and included several distinctive features associated with the organised, large scale processing of cattle carcasses recorded from other sites dated to this period (Dobney *et al.* 1996; Maltby 1989; Smith 1996). Processing of cattle carcasses was achieved by the use of a heavy chopper, although knife marks were recorded on some humerus shaft fragments, scapulae blades and phalanges. Knife marks were more commonly noted on pig and sheep bones. Characteristic of the assemblage was the numerous cattle shaft fragments that had been split longitudinally; most being radii, tibiae and metapodials. Distal humerii were subjected to similar treatment—typically one side of the articulation was removed. The intensive butchery was for the systematic reduction of the carcass into smaller joints and subsequently, certain long bones were chopped longitudinally for the extraction of marrow.

Several cattle scapulae were recovered, mainly from Phases 8 and 9 (Contexts 45 and 93), some of which had been trimmed around the glenoid cavity. Evidence for the removal (or partial removal) of the spinus and small nicks or shaving marks on the margo thoracalis were also apparent on some specimens. Similar damage was noted on scapulae from 1st and 4th century deposits in Lincoln (Dobney *et al*. 1996) and from 1st and 2nd century deposits in York (O'Connor 1988). It has been suggested (O'Connor *op. cit.*; Dobney *et al. op. cit.*) that these scapulae represent the remains of cured shoulder joints, possibly brined or smoked. The trimming around the glenoid cavity possibly allowed access for the salt into the muscle mass. Undertaken correctly, meat salted in this way would be preserved and could be stored for some considerable time.

Other distinctive features were the knife and shallow chop marks noted just below the proximal articulation of first phalanges of cattle. These were apparent on phalanges from six deposits (Contexts 44, 93, 94, 95, 103 and 122). A recent study on butchery techniques (Seetah 2002) involving the replication of some of the butchery marks identified from Romano-British material has suggested that these characteristic 'nicks' found on phalanges represent the skinning of the foot to retrieve the metapodial for possible processing for bone working. Elsewhere (e.g. Stallibrass 2002), these marks are thought to be indicative of hide removal.

Butchery marks were also noted on several horse bones, mainly from Phases 7 and 8. Two metatarsals (Contexts 45 and 122) appeared to have been split longitudinally, butchered in much the same way as the cattle long bones which had been chopped for marrow extraction. Evidence for the possible skinning of a dog was noted on a femur from Context 103.

Age-at-death

Cattle

Dental attrition for cattle was restricted to data from a small number of mandibles and isolated teeth. The data suggest that in all three phases represented (Phases 7, 8 and 9; see Table 11) cattle reached maturity before being slaughtered and that most of the cattle could be assigned to the general age categories of adult or elderly suggested by O'Connor (1988). None were juvenile or sub-adult. No evidence was available from the earliest phase group.

Fusion data corroborate this general pattern, although there are a small number of bones (6) which represent individuals less than two years of age, whilst several represent animals between the ages of two and three. A single metatarsal fragment was from a foetus.

Caprovids

Data from caprovid mandibles and isolated teeth were assigned to broad age categories outlined by O'Connor (1989), whilst the same data were also categorised according to a system suggested by Payne (1973; 1987). No clear patterns were evident but animals with a wide range of ages were represented (Tables 12 and 13). Whereas no young individuals were identified from the cattle mandibles, over half of the caprovid mandibles (and isolated teeth) represented animals that were two years old or younger when they were culled. Most of the older individuals were recovered from Phase 8 deposits, all of which were aged four years or over. The mandible representing the oldest individual (an animal aged between 8 and 10 years) was identified from a Phase 7 context.

Epiphyseal fusion data was somewhat limited but, in general, supported the dental evidence. All but material from Phase 7 included bones indicating the presence of animals which had died before the age of 10 months. In all phases, 50% or more animals survived beyond the age of three. Late fusing bones (those which fuse at 3-3.5 years) were few, with most in Phase 7 being unfused, whilst the reverse was true for Phase 8. This may suggest a trend towards culling sheep at an older age but the sample size is rather too small to be conclusive.

Pigs

Pig mandibles were mainly recovered from Phase 8 and included juvenile, immature and sub-adult individuals. Only one adult individual was represented from a Phase 9 deposit, whilst a single mandible from Phase 7 was assigned to the sub-adult category. Evidence from epiphyseal fusion correlates well with data from the mandibles, in that only bones in the 'early fusing' category (i.e. those which fuse at approximately 12 months) were fused. Most other bones represented animals that were killed before reaching the age of two years. The primary function of pigs was for the provision of meat, so it is not surprising that very few adult individuals were represented. The pigs at Brompton were killed at the optimum age for consumption.

Horses

Most horses represented within the assemblage were adult, isolated incisors generally suggesting ages of between three and eight years. A mandible was recorded from Context 150 (Phase 7) with deciduous premolars, representing an individual of less than two and a half years old. All of the bones recorded were fused.

Biometrical analysis

As a consequence of the extensive fragmentation, measurable bones were scant. A record of the measurements taken can be found in the Appendix.

A single withers height of 1.22 m was calculated from a complete cattle metacarpal from a Phase 9 deposit (Context 93). When compared with heights estimated from cattle metapodials from other sites in the Catterick area (Stallibrass 2002), it falls within a group of larger individuals from 3^{rd}-4^{th} century deposits (ranging from 1.22m to 1.31m). Stallibrass tentatively suggests that these larger outliers may represent new livestock, perhaps imported to improve the local animals. The single value for Brompton may be evidence of this too, but more data would be required to determine this conclusively.

Discussion

For the plant remains, the results of these analyses are consistent with a pattern becoming apparent at sites of Roman and Romano-British date in the Vale of York generally (A. R. Hall, unpublished data and Hall and Huntley, in prep.) in which there is evidence for the use of heathland resources, and specifically for turves, often with a small component of charred cereal remains, including spelt chaff. Other examples of sites with a regular occurrence of small amounts of ?heather root/twig and other remains of the kinds noted at Bridge Road are 66 Burringham Road, Scunthorpe, North Lincolnshire (Hall *et al*. 2003c), Billingley Drive, Thurnscoe, near Barnsley, South Yorkshire (Rackham *et al.* 2001), and several sites along the line of the BP Teesside-Saltend Ethylene Pipeline, e.g. at West Lilling, North Yorkshire (Hall *et al.* 2002), and near High Catton and Goodmanham, East Riding of Yorkshire (Jaques *et al.*, 2002; Hall *et al.* 2003a). This kind of material has even been noted recently from a single Roman context from a site close to one of the roads leaving York and only a few hundred metres from the NW corner of the fortress (Hall *et al*. 2003b). These results may have implications for our understanding both of the use of resources at this period and for the nature of the vegetation over wide tracts of lowland Central Yorkshire.

No interpretatively valuable microfossil were seen in the examined subsamples. No pollen survived in Context 21 (a pre-Roman buried soil horizon sealed by the first phase of Dere Street) and no eggs of intestinal parasites were noted in the subsample from the abdominal area of Skeleton 170 (Context 169, Grave 171) or the slightly concreted areas of Context 189.

The hand-collected shell was too little and far too poorly preserved to be of any interpretative value beyond indicating the importation of coastal food resources to the site.

Although the recorded bone assemblage from this site is small, there are a number of useful conclusions which can be drawn from analysis of the vertebrate remains.

The animal economy throughout the represented periods was based almost wholly on the main domestic mammals. Evidence for the utilisation of wild resources was scarce, with very few wild mammals and birds identified. Some exploitation of river resources was hinted at by the presence of fish remains (eel and pike) in two of the samples.

On the basis of fragment counts, the proportions of the major domesticates suggest that caprovids were the most numerous species present in the earliest period (late 1^{st}-2^{nd} century), with a change in the later periods (Phases 7, 8 and 9) to a predominance of cattle. In general, the MNI figures support this picture but reduce the importance of cattle somewhat in Phase 9. The MNI method is less affected by taphonomic and recovery biases and may be reflecting a more accurate pattern. It must be stressed, however, that the number of fragments of use for this analysis was not particularly large.

If this pattern of animal exploitation truly reflects the significance of the different species, then it appears to show a trend common to many sites during the Roman period. The shift in emphasis to a diet based on beef is seen as an adoption of ideas associated with the incoming Roman military population; the cultural and dietary traditions represented being more characteristic of the Low Countries and Germany from where most of the army based in Britain originated (Dobney 2001). King (1978), in his extensive survey of vertebrate remains from Romano-British sites, suggests that very high frequencies of cattle (70% and over) are more likely to be encountered at military sites, whilst 'unromanised' rural settlements typically have higher percentages of caprovid remains. Urban sites, villas and vici have proportions that fall between the two. Relatively high proportions of pig remains, as seen at Brompton, have also been interpreted as an indication of more 'Romanised' settlement. King (1978) also suggested that assemblages with 10% or more pig bones tended to be either from villa sites or 'Roman' settlement sites. Some researchers have argued (King 1978; 1984, Dobney 2001) that higher proportions of pig remains provide evidence of higher status occupation or could be related to occupancy by people of Mediterranean origin. When one considers the location of the excavated site at Brompton within the northern suburbs of the Roman town of *Cataractonium*, and closely associated with military occupation, it is not surprising that the bones reflect a higher degree of Romanisation than might be found on, for example, a rural site.

Where enough data were available, the age-at-death profiles suggested that cattle were not bred specifically for any one product. Most were mature or elderly when they were slaughtered and were probably valued for milk, breeding and for traction. For sheep, production of meat was of some importance, as suggested by the presence of animals culled between the ages of 6 months and 2 years. However, the older individuals, more numerous in Phase 8, are likely to have been used primarily for providing wool and then subsequently for meat.

Observations of the skeletal element representation for the major domesticates indicates that all parts of the carcass were represented, including waste representing primary and secondary carcass preparation and also refuse of a more domestic nature. The type of the deposits excavated and the comparatively large concentrations of material suggests that these remains may have been deliberately collected and used for the purposes of levelling uneven surfaces or for filling hollows where the surfaces had become worn. This is not unlike material recovered from the 4^{th} century waterfront deposits at Lincoln (Dobney *et al.* 1996), although the quantities of bones from Brompton are somewhat smaller.

Overall, a high degree of fragmentation was apparent, which was partly the result of the systematic breaking up of cattle bones, probably for the extraction of marrow. Extensive chopping of all major elements and the splitting of long bones is typical of vertebrate assemblages from many Roman sites throughout Britain, e.g. Tanner Row, York (O'Connor 1988); Welton Road, Brough (Hamshaw-Thomas and Jaques 2000); Elms Farm, Heybridge, Essex (Johnstone and Albarella 2002); Lincoln (Dobney *et al*. 1996). The remains here clearly indicate the centralised large scale butchery of cattle, with the purpose of utilising the carcass to its fullest extent.

A comparison of the frequencies of the major domestic mammals from the various phases at Brompton with those from other sites in the vicinity can be seen in Figure 5. The high proportion of sheep noted from the Phase 4-6b assemblage from Brompton is not replicated at any of the sites outlined in Stallibrass's review (Stallibrass 2002) of vertebrate remains from sites in and around Catterick. Numbers of fragments for this phase are very limited, but the early date of the material may suggest that this pattern is reflecting the pre-Roman conquest preferences for the consumption of lamb and mutton. King (1991) has found that material from early Roman military bases frequently shows dietary patterns more akin to the local 'native' diet; a consequence of availability.

Values for the later phases, 7 and 8, show similarities with the frequencies recorded for late 2nd-3rd century deposits at Bainesse (a roadside settlement to the south of Catterick) and late 3rd-4th century material from Thornbrough Farm (an area associated with the fort(s) (2nd-3rd century) and small town (3rd-4th century). None of the material from Brompton shows the very high cattle frequencies seen from all phases at Catterick Bridge (a civilian settlement in the northern suburbs).

Figure 6 shows the combined data for the major domesticates from the various sites around Catterick by period and site type (i.e. military or civilian). From this the gradual increase of the importance of cattle through time is clearly visible. Material from late 2nd - 3rd century military deposits, however, has similar frequencies for cattle and caprovids where one might expect cattle to be dominant. Stallibrass suggests that this may represent requisition by the army of provisions from the indigenous population and this may be similar to the pattern seen from the earliest phase at Brompton. The later phases at Brompton fit well with the frequencies from the Late 3rd -4th century civilian material.

In general, the vertebrate assemblages from Brompton show similarities with material already recovered from other excavations in the vicinity; the earliest phase retaining the character of the pre-Roman dietary preferences, with the increase of cattle through time being a feature of the 'Romanisation' process (King 1991).

Archive

All material is currently stored by Palaeoecology Research Services (Unit 8, Dabble Duck Industrial Estate, Shildon, County Durham), along with paper and electronic records pertaining to the work described here.

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Table 1. Bridge Road, Brompton on Swale: Summary information and sediment descriptions for the processed samples. Key: CN = Context number; S = NAA sample; PRS = PRS sample; Wt = weight of processed subsample (kg); Rm = approximate volume of unprocessed sediment remaining (litres).

CN	S	PRS	Context description	Sediment description	Wt	Rm	Processing
94	AA	9401	Romano-British fill of a large pit	Just moist, mid greyish-brown, crumbly to unconsolidated, slightly clay sandy silt. Charcoal (or other fine charred material) was present.	3	14	sieved to 300 microns with washover
95	AA	9501	Romano-British fill of a large pit	Moist, light to mid brown to mid to dark grey-brown, crumbly (working soft), slightly clay sandy silt. Stones (6 to 20 mm), fragments of rotted ?brick/tile, ?charcoal (or other fine charred material) and bone were present.	18	5	3 kg sieved to 300 microns with washover. 15 kg sieved to 1 mm for bone
99	AB	9901	Romano-British deposit lying over the floor of an earlier building	Moist, mid to dark grey-brown (with a slight purplish cast), crumbly to unconsolidated (working more or less soft), slightly clay sandy silt. Stones (2 to 60 mm), large mammal bone and modern rootlets were present.	15	5	sieved to 300 microns with washover
103	AB	10301	Romano-British pit fill	Just moist, mid grey-brown, unconsolidated to crumbly, slightly clay sandy silt. Stones (6 to 60 mm) and charcoal (and possibly other fine charred material) were present.	9	10	sieved to 300 microns with washover
130	AA	13001	Romano-British ash deposit within the flue of a burnt stone structure (?corn drier)	Just moist, light to mid grey-brown to mid to dark grey-brown to black, unconsolidated to crumbly, slightly clay sandy silt, with mid brown clay sand in casts of up to 15 mm. Fine charred material, including ?charcoal (resulting in the 'black' colour) was common to abundant.	7	10	sieved to 300 microns with washover
179	AA	17901	earlier Romano-British ashy fill of slot - sealed beneath earliest recognised phase of structures	Moist, mid to dark brown to dark grey-brown, crumbly to unconsolidated (working more or less soft), slightly clay, silty sand to sandy silt. Stones (2 to 60 mm) and charcoal were present.	5	14	sieved to 300 microns with washover
189	AA	18901	earlier Romano-British burnt area on top of buried soil	Moist, mid brown to mid to dark grey-brown, crumbly and slightly layered (in places) to unconsolidated (working more or less soft), slightly clay, silty sand to sandy silt, with occasional lumps of slightly orange-brown clay. Stones (6 to 60 mm) and ?charcoal were present.	3	14	sieved to 300 microns with washover

Table 2. Bridge Road, Brompton on Swale: Summary information for the residues from the processed samples. Key: CN = Context number; S = NAA sample; PRS = PRS sample; Wt = approximate residue dry weight (kg); Other components show an approximate weight in grammes – b/t/pot = brick/tile/pot; Fe/slag = iron object (mostly nails) or slag and associated mineral concreted sediment; ?Cu = possible copper object/fragment; ch = charred plant remains (mostly fine charcoal).

				Other components								
CN	**S**	**PRS**	**Wt**	**?daub**	**b/t/pot**	**mortar**	**Fe/ slag**	**?Cu**	**glass**	**coal/ cinder**	**ch**	**bone**
94	AA	9401/T	0.68		6			2		6	<1	4
95	AA	9501/T	0.45		10		35			2	1	3
95	AA	9501/BS	0.85		3		2	<1		4	10	21
99	AB	9901/T	3.30		56	27	9	<1	<1		<1	59
103	AB	10301/T	3.23		14						<1	21
130	AA	13001/T	0.75	50	10		7		4		2	5
179	AA	17901/T	1.45	72			2				<1	6
189	AA	18901/T	0.50		6		14				1	5

Table 3. Bridge Road, Brompton on Swale: Plant taxa from deposits (nomenclature and taxonomic order follow Tutin et al. *1964-80). Taxa marked * were present as uncharred remains and are likely to be of recent origin.*

Corylus avellana L. (hazel)	charred nut(s) and/or nutshell fragment(s)
**Urtica dioica* L. (stinging nettle)	achene(s)
**Polygonum aviculare* agg. (knotgrass)	fruit(s)
Rumex sp(p). (docks)	charred fruit(s)
**Chenopodium album* L. (fat hen)	seed(s)
**Atriplex* sp(p). (oraches)	seed(s)
**Fumaria* sp(p). (fumitories)	seed(s)
Raphanus raphanistrum L. (wild radish)	charred pod segments and/or fragment(s)
**Rubus fruticosus* agg. (blackberry/bramble)	seed(s)
Crataegus monogyna Jacq. (hawthorn)	charred pyrene(s)
*Leguminosae (pea family)	waterlogged seed(s)
Calluna vulgaris (L.) Hull (heather, ling)	charred capsule(s), flower(s), shoot fragment(s), twig fragment(s)
cf. *C. vulgaris*	charred root and/or basal twig fragment(s)
Galium aparine L. (goosegrass, cleavers)	charred fruit(s)
**Myosotis* sp(p). (forget-me-nots)	nutlet(s)
**Lamium* Section *Lamiopsis* (annual dead-nettles)	nutlet(s)
Plantago cf. *media* L. (?hoary plantain)	charred seed(s)
Sambucus nigra L. (elder)	seed(s)
Gramineae (grasses)	charred caryopsis/es
cf. Gramineae (?grasses)	charred culm fragment(s)
Cerealia indet. (cereals)	charred caryopsis/es
Bromus sp(p). (bromes, etc.)	charred caryopsis/es
Triticum spelta L. (spelt wheat)	charred glume-base(s)
Triticum sp(p). (wheats)	charred caryopsis/es
Hordeum sp(p). (barley)	charred caryopsis/es
Avena sp(p). (oats)	charred caryopsis/es
Carex sp(p). (sedges)	charred nutlet(s)

Table 4. Bridge Road, Brompton on Swale: Plant remains and other components of the samples recorded on a four-point semi-quantitative scale of abundance from 1 (one or a few specimens or fragments) to 4 (abundant remains or a major component of the sample). Key to abbreviations: caps—capsules; ch—charred; fgts—fragments; fls—flowers; glb—glume-base(s); inc—including; min—mineral replaced; rt-tw—root/basal twig; segs—segments; spr—sprouting; st—stem; tw—twig.

Phase 5
Context 189 (area of burning on soil)
Sample 18901 (3 kg)

Corylus avellana (ch)	1	
Rumex sp(p). (ch)	1	
cf. *Calluna vulgaris* (ch rt-tw fgts)	1	maximum dimension 5 mm
Triticum sp(p).	1	
Triticum spelta (glb)	1	
Hordeum sp(p).	1	
Cecilioides acicula	1	
ash concretions	1	maximum dimension 2 mm
charcoal	1	maximum dimension 10 mm
coal	1	maximum dimension 5 mm
moss (ch st fgts)	1	
root/rhizome fgts (ch)	1	maximum dimension 5 mm

Phase 6
Context 179 (fill of slot)
Sample 17901 (5 kg)

Calluna vulgaris (ch tw fgts)	1	maximum dimension 10 mm
cf. *Calluna vulgaris* (ch rt-tw fgts)	1	maximum dimension 10 mm
cf. Gramineae (ch culm fgts)	1	maximum dimension 5 mm
Cerealia indet.	1	
Bromus sp(p).	1	
Avena sp(p).	1	
Carex sp(p). (ch)	1	
'ash beads'	1	maximum dimension 5 mm
ash concretions	1	maximum dimension 2 mm
charcoal	1	maximum dimension 10 mm
cinders	1	maximum dimension 10 mm
fly puparia	1	modern
herbaceous detritus (ch)	1	maximum dimension 5 mm

Phase 7
Context 103 (lower fill of pit 102)
Sample 10301 (9 kg)

Urtica dioica	1	modern
Atriplex sp(p).	1	?modern
Fumaria sp(p).	1	modern
cf. *Calluna vulgaris* (ch rt-tw fgts)	1	maximum dimension 15 mm
Sambucus nigra	1	modern
Gramineae (ch)	1	
Triticum sp(p).	1	
'ash beads'	1	maximum dimension 5 mm
beetles	1	?modern
bone fgts	1	maximum dimension 10 mm
charcoal	1	maximum dimension 15 mm
coal	1	maximum dimension 5 mm
fish bone	1	maximum dimension 3 mm

herbaceous detritus (ch)	1	maximum dimension 3 mm
root/rhizome fgts (ch)	1	maximum dimension 3 mm
root/rootlet fgts (modern)	1	

Context 130 (fill of construction cut/pit 125)
Sample 13001 (7 kg)

Corylus avellana (ch)	1	
Chenopodium album	1	?modern
Calluna vulgaris (ch fls)	1	
Calluna vulgaris (ch sht fgts)	1	
Calluna vulgaris (ch tw fgts)	2	maximum dimension 5 mm
cf. *Calluna vulgaris* (ch rt-tw fgts)	1	maximum dimension 15 mm
Plantago cf. *media* (ch)	1	
Bromus sp(p).	1	
Triticum sp(p).	1	
Triticum spelta (glb)	1	
Hordeum sp(p).	1	
Avena sp(p). (inc spr)	1	
Carex sp(p). (ch)	1	
'ash beads'	1	maximum dimension 1 mm
Cecilioides acicula	1	
ash concretions	2	maximum dimension 2 mm
charcoal	1	maximum dimension 5 mm
herbaceous detritus (ch)	1	maximum dimension 15 mm
moss (ch st fgts)	1	

Phase 8
Context 99 (layer inside Building B)
Sample 9901 (15 kg)

Corylus avellana (ch)	1	
Urtica dioica	1	?modern
Polygonum aviculare agg.	1	
Atriplex sp(p).	1	?modern
Caltha palustris (?min)	1	a single specimen
Rubus fruticosus agg.	1	?modern
Crataegus monogyna (ch)	1	
Leguminosae (w/l)	1	modern
Calluna vulgaris (ch tw fgts)	1	maximum dimension 5 mm
cf. *Calluna vulgaris* (ch rt-tw fgts)	1	maximum dimension 10 mm
Myosotis sp(p).	1	?modern
Lamium Section *Lamiopsis*	1	?modern
Sambucus nigra	1	modern
Gramineae (ch)	1	
Triticum sp(p).	1	
Carex sp(p). (ch)	1	
beetles	1	?modern
bone fgts	1	maximum dimension 5 mm
charcoal	1	maximum dimension 5 mm
cinders	1	maximum dimension 10 mm
coal	1	maximum dimension 5 mm
fish scale	1	maximum dimension 2 mm
root/rhizome fgts (ch)	1	maximum dimension 5 mm
root/rootlet fgts (modern)	1	
small vertebrate bones	1	

Phase 9
Context 94 (fill of pit 96 (?cess layer))
Sample 9401 (3 kg)

Chenopodium album	1	modern
Fumaria sp(p).	1	modern
Raphanus raphanistrum (ch pod segs/fgts)	1	
Calluna vulgaris (ch caps)	1	
cf. *Calluna vulgaris* (ch rt-tw fgts)	1	maximum dimension 10 mm
Bromus sp(p).	1	a single fragment
Triticum spelta (glb)	1	
'ash beads'	1	maximum dimension 2 mm
Cecilioides acicula	1	
charcoal	1	maximum dimension 10 mm
cinders	1	maximum dimension 5 mm
coal	1	maximum dimension 5 mm
herbaceous detritus (ch)	1	maximum dimension 5 mm
moss (ch st fgts)	1	
root/rootlet fgts (modern)	1	
small vertebrate bones	1	a single specimen

Context 95 (fill of pit 96 (ash layer))
Sample 9501 (3 kg)

Rumex sp(p). (ch)	1	
Calluna vulgaris (ch fls)	1	
Calluna vulgaris (ch sht fgts)	1	
Calluna vulgaris (ch tw fgts)	1	maximum dimension 10 mm
cf. *Calluna vulgaris* (ch rt-tw fgts)	2	maximum dimension 15 mm
Galium aparine (ch)	1	
Hordeum sp(p).	1	
Carex sp(p). (ch)	1	
?burnt peat/mor humus	1	maximum dimension 5 mm
ash concretions	2	maximum dimension 10 mm
burnt bone fgts	1	maximum dimension 10 mm
charcoal	1	maximum dimension 5 mm
cinders	1	maximum dimension 5 mm
herbaceous detritus (ch)	1	
moss (ch st fgts)	1	
root/rhizome fgts (ch)	1	maximum dimension 10 mm
root/rootlet fgts (modern)	1	

Table 5. Bridge Road, Brompton on Swale: summary information for the hand-collected shell.

Context	**Phase**	**Frags**	**Wt (g)**	**Notes**
12	7	107	12	fragments of mussel (*Mytilus edulis* L.) shell
36	8	3	<1	1 *Trichia hispida* (L.) and 2 other unidentified land snail fragments
83	8	54	4	?fragments of oyster (*Ostrea edulis* L.) shell
95	9	5	5	?fragments of mussel shell and 1 piece of burnt bone
114*	9	109	94	mostly fragments of oyster and mussel shell with a little ?eggshell
133	7	1	0	unidentified
137	7	1	0	unidentified
184	4	1	2	fragments of mussel shell
186	5	1	2	fragments of oyster shell
193	8	5	13	fragments of oyster shell

* - weight of shell for Context 114 includes some lumps of concreted sediment containing fragments of ?eggshell

Table 6. Bridge Road, Brompton on Swale: hand-collected bone by phase.

Species		**4**	**6**	**6b**	**7**	**8**	**9**	**Total**
Rattus rattus (L.)	black rat	-	-	-	1	-	-	1
Canid	dog family	-	-	-	-	1	1	2
Canis f. domestic	dog	-	-	-	2	3	-	5
Felis f. domestic	cat	-	-	-	-	1	-	1
Equus f. domestic	horse	1	-	-	20	22	3	46
Sus f. domestic	pig	-	5	2	23	42	14	86
Capreolus capreolus (L.)	roe deer	-	-	-	1	-	-	1
Bos f. domestic	cattle	2	11	1	107	136	59	316
Caprovid	sheep/goat	3	10	3	58	59	21	154
Capra f. domestic	goat	-	-	-	-	1	-	1
cf. Capra f. domestic	?goat	-	-	-	-	1	-	1
Ovis f. domestic	sheep	-	3	5	9	9	4	30
Anser sp.	goose	-	-	-	2	-	-	2
cf. *Anser* sp.	?goose	-	-	-	-	-	1	1
Gallus f. domestic	chicken	-	2	1	6	3	1	13
Grus sp.	crane	-	-	-	-	1	-	1
Homo sapiens	human	-	-	-	1	-	-	1
Total		**6**	**31**	**12**	**230**	**279**	**104**	**662**

Table 7. Bridge Road, Brompton on Swale: MNI values for individual skeletal element for the main domestic mammals for Phase 4-6b.

element	**cow**	**horse**	**pig**	**sh/g**	**Total**
horncore	-	-	-	-	0
mandible	-	-	2	2	4
isolated teeth	2	-	2	2	6
scapula	-	-	-	2	2
humerus	3	-	-	5	8
radius	-	-	-	2	2
ulna	-	-	-	1	1
metacarpal	1	-	-	1	2
pelvis	1	-	1	2	4
femur	-	-	-	-	0
tibia	-	-	-	3	3
astragalus	2	-	-	1	3
calcaneum	2	-	1	1	4
metatarsal	1	-	-	2	3
metapodial	-	-	-	-	0
phalanx 1	-	-	-	-	0
phalanx 2	2	-	-	-	2
phalanx 3	-	1	-	-	1
carpal/tarsal	-	-	-	-	0
patella	-	-	-	-	0
Total	**14**	**1**	**6**	**24**	**45**

Table 8. MNI values for individual skeletal element for the main domestic mammals for Phase 7, from Bridge Road, Brompton.

element	**cow**	**horse**	**pig**	**sh/g**	**Total**
horncore	1	-	-	-	1
mandible	6	1	1	10	18
isolated teeth	6	4	3	17	30
scapula	3	-	1	4	8
humerus	13	1	3	2	19
radius	10	-	4	3	17
ulna	4	-	-	3	7
metacarpal	8	1	-	3	12
pelvis	6	-	-	3	9
femur	-	1	1	-	2
tibia	2	1	2	5	10
astragalus	7	2	1	-	10
calcaneum	6	-	-	6	12
metatarsal	8	1	1	5	15
metapodial	1	2	1	1	5
phalanx 1	14	1	-	4	19
phalanx 2	4	1	-	-	5
phalanx 3	3	4	1	-	8
carpal/tarsal	5	-	-	-	5
patella	-	-	-	-	0
Total	**107**	**20**	**19**	**66**	**212**

Table 9. Bridge Road, Brompton on Swale: MNI values for individual skeletal element for the main domestic mammals for Phase 8.

element	**cow**	**horse**	**pig**	**sh/g**	**Total**
horncore	1	-	-	3	4
mandible	15	-	13	13	41
isolated teeth	27	6	14	18	65
scapula	3	1	5	3	12
humerus	6	1	1	4	12
radius	6	-	2	6	14
ulna	2	-	-	2	4
metacarpal	11	1	-	8	20
pelvis	10	1	2	3	16
femur	2	2	-	2	6
tibia	3	1	1	1	6
astragalus	3	1	-	-	4
calcaneum	8	-	1	-	9
metatarsal	11	1	-	1	13
metapodial	1	2	-	-	3
phalanx 1	15	1	-	2	18
phalanx 2	5	3	-	-	8
phalanx 3	3	-	-	-	3
carpal/tarsal	2	-	-	-	2
patella	-	1	-	-	1
Total	**134**	**22**	**39**	**66**	**261**

Table 10. Bridge Road, Brompton on Swale: MNI values for individual skeletal element for the main domestic mammals for Phase 9.

element	**cow**	**horse**	**pig**	**sh/g**	**Total**
horncore	1	-	-	-	1
mandible	1	-	1	9	11
isolated teeth	4	1	3	1	9
scapula	3	-	1	1	5
humerus	4	-	-	3	7
radius	3	-	-	-	3
ulna	-	-	1	2	3
metacarpal	5	-	-	4	9
pelvis	4	-	3	1	8
femur	1	-	1	-	2
tibia	3	1	-	1	5
astragalus	2	-	-	-	2
calcaneum	1	-	-	1	2
metatarsal	1	1	-	2	4
metapodial	1	-	2	-	3
phalanx 1	14	-	1	-	15
phalanx 2	3	-	-	-	3
phalanx 3	1	-	-	-	1
carpal/tarsal	6	-	-	-	6
patella	-	-	-	-	0
Total	**58**	**3**	**14**	**25**	**99**

Table 11. Bridge Road, Brompton on Swale: number of cattle mandibles or isolated teeth which could be assigned to the various age categories (after O'Connor 1989).

Age	**Phase 7**	**Phase 8**	**Phase 9**
Juvenile	0	0	0
Subadult	0	0	0
Adult1	0	1	0
Adult2	1	0	0
Adult3	2	4	1
Elderly	1	3	1

Table 12. Bridge Road, Brompton on Swale: number of sheep/goat mandibles and isolated teeth for age categories outlined by Payne (1973; 1987).

Age category	**Phase 4-6b**	**Phase 7**	**Phase 8**	**Phase 9**
A (0-2 months)	-	-	-	-
B (2-6 months)	-	-	-	1
C (6-12 months)	-	-	2	1
C/D (6 months -2 years)	-	1	1	-
D (1-2 years)	1	1	2	3
E (2-3 years)	-	1	-	-
F (3-4 years)	-	1	1	-
G (4-6 years)	-	-	-	-
G/H (4-8 years)	-	-	2	1
H (6-8 years)	-	-	1	-
I (8-10 years)	-	1	-	-

Table 13. Bridge Road, Brompton on Swale: number of sheep/goat mandibles and isolated teeth for age categories outlined by O'Connor (1989).

Age category	**Phase 4-6b**	**Phase 7**	**Phase 8**	**Phase 9**
Neonatal	-	-	-	-
Juvenile	-	-	-	1
Immature	-	-	2	1
Immature/subadult	-	1	1	-
Subadult	1	1	2	3
Adult 1	-	1	-	-
Adult 2	-	-	-	-
Adult 3	-	1	4	1
Elderly	-	1	-	-

Figure 1. Bridge Road, Brompton on Swale: proportions of the major domestic mammals using fragment counts by phase.

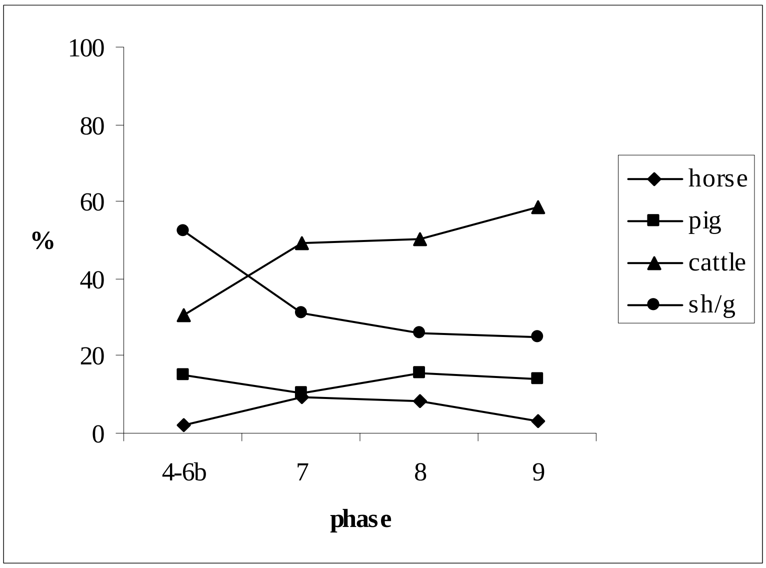


Figure 2. Bridge Road, Brompton on Swale: Proportions of the major domestic mammals using MNI values by phase.

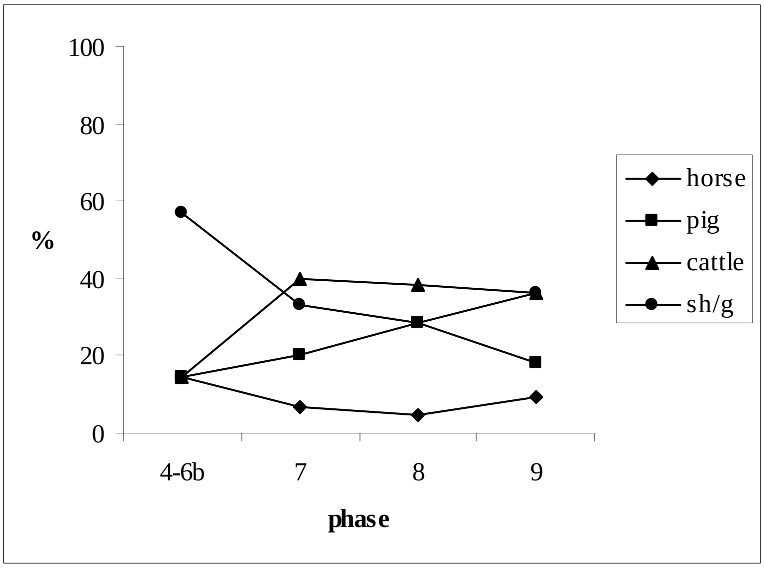
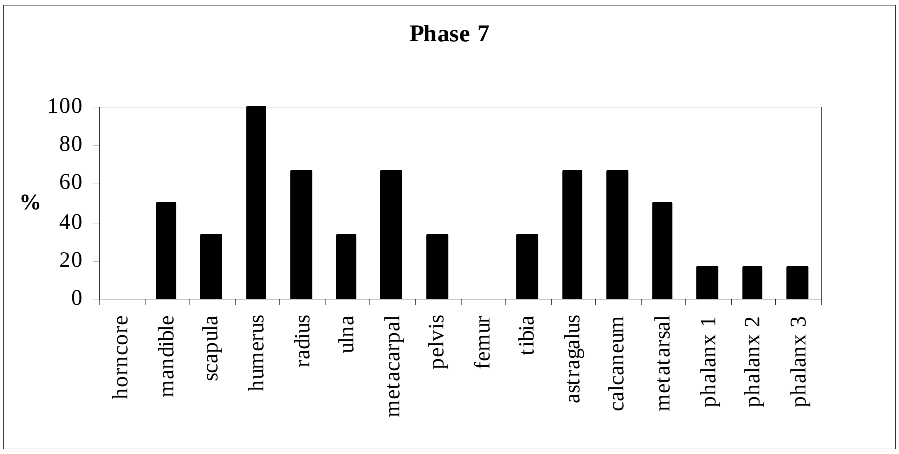
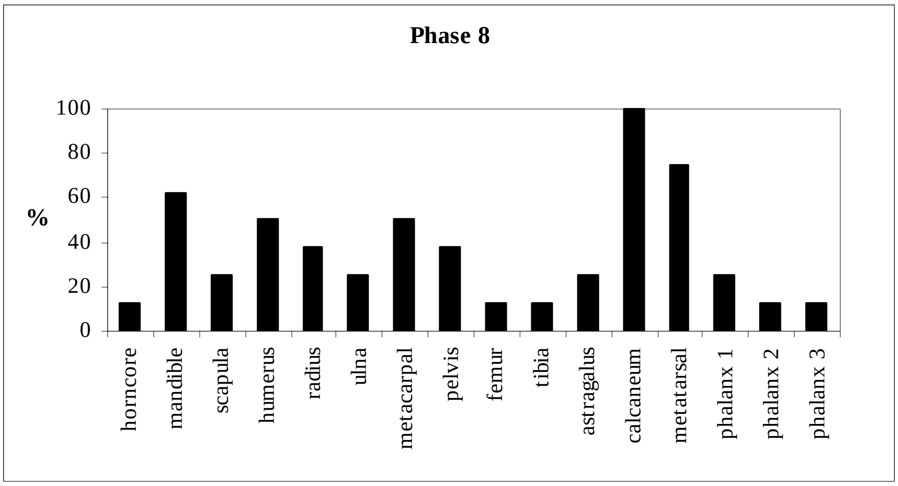


Figure 3. Bridge Road, Brompton on Swale: skeletal element representation for cattle (where MNI values for individual skeletal elements are expressed as a proportion of the most frequent element). Values for the combined Phase 4-6b were insufficient for useful interpretation.





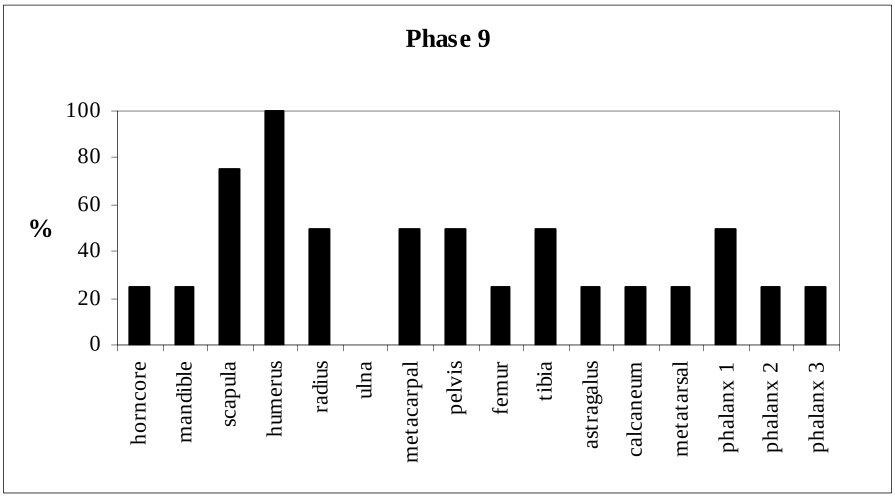


Figure 4. Bridge Road, Brompton on Swale: skeletal element representation for sheep/goat (where MNI values for individual skeletal elements are expressed as a proportion of the most frequent element).

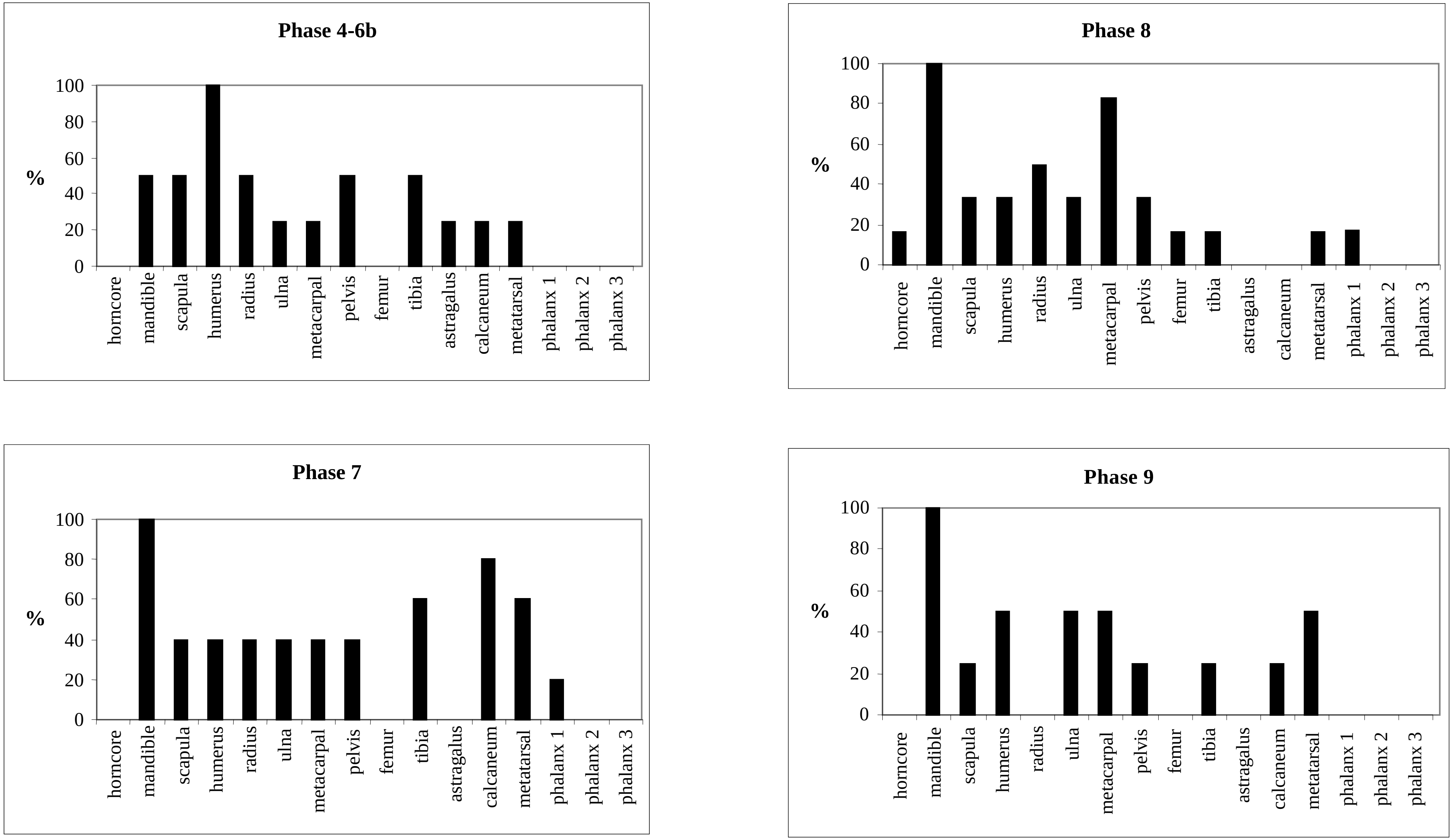


Figure 5. Frequencies of the major domestic mammals from Bridge Road, Brompton on Swale, and various other sites around Catterick. Key: ThornL2-3 = vertebrate remains from Late 2nd -3rd century deposits from excavations at Thornborough Farm; CatBL2-3 = vertebrate remains from late 2nd -3rd century deposits at Catterick Bridge; BainL2-3 = remains from Late 2nd -3rd century deposits from excavations at Bainesse; ThornL3-4 = remains from Late 3rd -4th century deposits from excavations at Thornborough Farm; CatBL3-4 = vertebrate remains from Late 3rd -4th century deposits at Catterick Bridge; Site 434L3-4 = vertebrate remains from Late 3rd -4th century deposits at Site 434; BRB4-6/7/8/9 = Bridge Road, Brompton – numbers represent various phases. Data taken from Stallibrass 2002.

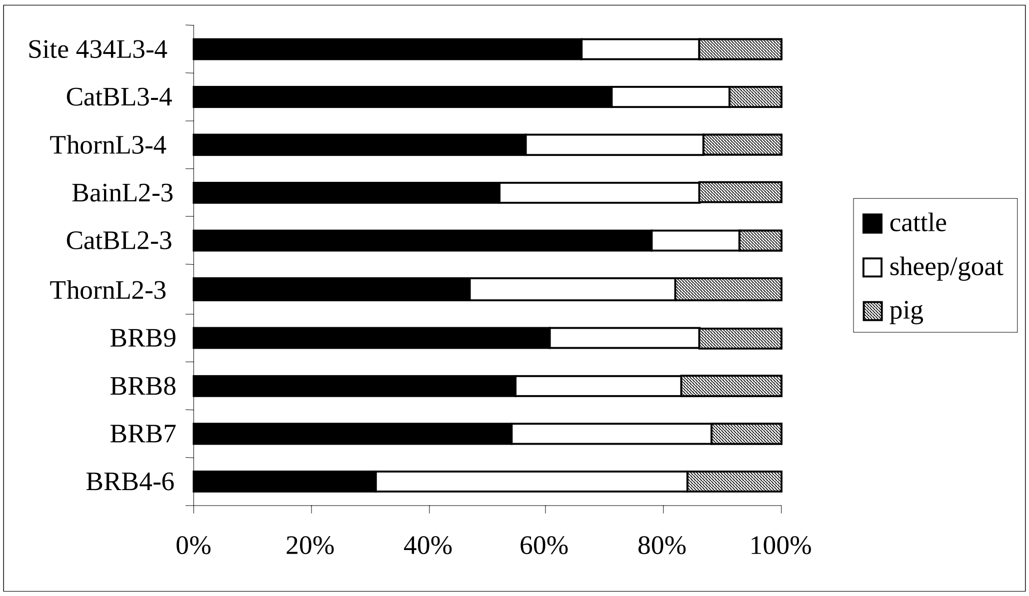
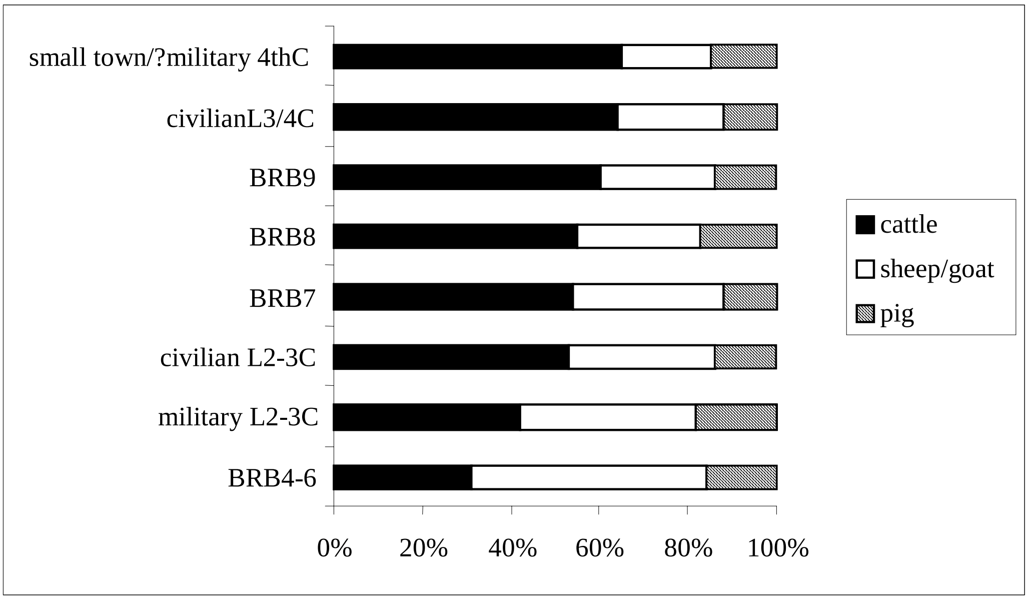


Figure 6. Frequencies of the major domestic mammals from Bridge Road, Brompton on Swale, compared with data from different site types at different periods. All data from sites around Catterick (Stallibrass 2002).



Appendix

Bridge Road, Brompton on Swale: biometrical data for the recorded vertebrate remains.

All measurements are given in millimetres and follow von den Driesch (1976), with the exceptions noted below. Caprovid calcaneum measurements C and C+D and humerus HT, HTC and BT were taken as indicated in Dobney *et al*. (1996). Measurements on cattle and caprovid metapodials follow Dobney *et al*. (1999). Measurements for horncores are as follows: 45 = greatest diameter of horncore; 46 = smallest diameter of horncore; 47 = greatest dorsal distance from base to tip of horncore.

Cattle measurements

Astragalus

Phase	**Context**	**Bone id.**	**Bd**	**Dl**	**GLl**
6	148	412	47.25	-	-
7	26	42	42.19	36	62.84
7	103	337	35.97	33.23	
7	101	369	41.24	-	66.65
7	125	454	44.9	39.36	72.97
7	150	495	44.64	38.52	-
7	54	564	44.28	36.56	66.34
8	45	186	40.99	36	64.13
8	94	276	37.75	-	-
9	44	57	37.39	33.61	59.17
9	44	58	37.89	34.3	58.71

Calcaneum

Phase	**Context**	**Bone id.**	**C**	**C+D**	**DS**	**GL**
6	148	414	25.57	43.93	-	-
7	11	6	31.82	53.25	-	132.97
7	101	364	28.94	52.5	44.86	-
8	97	323	25.52	48.81	40.73	-

Humerus

Phase	**Context**	**Bone id.**	**BT**	**HT**	**HTC**
7	54	561	63.48	-	-
7	150	490	62.84	-	28.46
7	150	491	65.41	-	28.98
7	150	492	63.26	-	30.17
8	94	260	67.41	37.72	28.82
8	94	261	-	37.82	29.83
9	93	211	64.54	37.44	27.08
9	93	212	-	52.46	39.86

Horncore

Phase	**Context**	**Bone id.**	**45**	**46**	**BC**	**47**
7	174	506	42.59	32.36	129	101
8	97	328	49.25	36.11	-	-
9	93	222	56.28	44.36	171	-

Cattle measurements continued

Metacarpal

Phase	Context	Bone id.	GL	SD	Bp	Dp	Bd	Dd	Dem	Dvm	Dim
6	148	411	-	-	-	-	53.67	28.59	23.21	-	26.82
7	101	360	-	-	-	-	69.39	-	-	-	-
7	150	494	-	31.95	49.75	32.66	-	-	-	-	-
8	36	539	-	30.75	53.27	31.45	-	-	-	-	-
8	36	540	-	28.08	52.99	30.71	-	-	-	-	-
8	45	169	-	-	-	-	53.79	30.41	23.62	30.69	28.25
8	45	170	-	-	-	-	56.05	-	24.99	29.96	28.33
8	94	271	-	-	-	-	53.52	-	-	-	-
8	95	301	-	26.56	48.55	31.06	-	-	-	-	-
8	95	302	-	26.72	46.56	-	-	-	-	-	-
8	95	303	-	-	-	-	63.77	32.56			
8	104	397	-	-	-	-	63.57	30.7			
9	93	218	200	33.49	55.74	34.21	57.78				
9	93	219	-	-	-	-	53.7	29.4	22.27	29.4	27.24

Metatarsal

Phase	Context	Bone id.	SD	Bp	Dp	Bd	Dd
7	24	27	23.12	47.21	-	-	-
7	26	41		-	-	59.14	22.7
7	103	345	24.88	-	-	44.85	27.14
7	122	439	-	-	-	48.08	28.37
7	193	535	-	-	-	53.02	29.66
8	45	171	-	-	-	52.92	-
8	94	272	27.15	-	-	56.85	31.23
8	94	273		-	-	47.65	28.62
8	97	329	25.77	-	-	49.77	-
8	104	395	-	-	-	47.07	32.01
9	93	221	23.55	41.7	39.08	-	-

Radius

Phase	Context	Bone id.	SD	BFp	Bp	BFd	Bd
7	11	4	38.93	70	76.6	-	-
7	11	5	37.31	69.35	74.21	-	-
7	101	366	-	-	-	-	67.98
7	122	438	-	56.31	61.87	-	-
7	150	496	39.19	73.29	80.25	-	-
7	174	507	-	-	-	64.93	70.02
8	94	262	32.63	66.28	-	-	-
8	94	264	-	66.15	73	-	-
9	93	214	32.12	-	-	51.88	58.92

Tibia

Phase	Context	Bone id.	SD	Bd	Dd
7	24	26	35.52	57.86	47.34

7	101	367	-	55.38	44.25
8	36	554	-	58.79	-
8	97	322	-	52.03	39.12

Cattle measurements continued

Third lower molar (M3)

Phase	**Context**	**Bone id.**	**L**	**B**
7	103	330	39.5	14.62
8	45	158	31.95	12.8
8	45	159	37.6	15.72
8	45	149	37.1	16.37
8	94	255	38.07	16.07
8	94	256	36.2	12.2
9	93	232	34.99	13.47

Caprovid measurements

Calcaneum

Phase	**Context**	**Bone id.**	**C**	**C+D**	**DS**	**GL**
7	11	18	12	20.55	-	51.48
7	11	19	11.63	19.78	-	49.04
7	150	482	-	-	-	44.85
7	174	509	10.3	19.56	17.79	53.65
7	174	510	12.22	20.92	17.06	54.14
7	174	511	12.21	-	-	51.74
9	44	89	12.23	19.7	15.36	48.41

Humerus

Phase	**Context**	**Bone id.**	**BT**	**HT**	**HTC**
6	148	422	23.89	15.82	11.83
6b	86	582	28.84	18.22	13.66
6b	88	574	26.93	17.51	13.08
8	45	126	27.29	16.69	13.66
8	94	249	27.62	17.71	13.73
9	44	80	26.52	17.39	13.6
9	93	197	26	16.44	-

Phase	**Context**	**Bone id.**	**GL**	**SD**	**Bp**	**Dp**	**Bd**	**Dd**	**Dem**	**Dvm**	**Dim**
7	150	484	-	13.65	20.42	14.97	-	-	-	-	-
8	45	132	-	12.82	21.53	15.66	-	-	-	-	-
8	45	134	-	12.47	20.78	15.03	-	-	-	-	-
8	94	252	-	15.11	21.65	16.67	-	-	-	-	-
8	36	547	-	-	-	-	22.8	-	-	-	-
8	94	250	116.51	13.37	20.28	15.13	21.82	13.84	9.1	13.74	11.27
9	44	88	-	12.09	20.76	14.82					
9	93	199	-	13.99	20.85	14.75	-	-	-	-	-

Metatarsal

Phase	Context	Bone id.	SD	Bp	Dp
7	150	485	11.26	18.77	19.29
9	44	85	11.36	18.99	-

Caprovid measurements continued

Scapula

Phase	Context	Bone id.	GLP	SLC
7	103	351	33.22	21.52

Tibia

Phase	Context	Bone id.	SD	Bd	Dd
7	191	529	11.8	23.57	17.9
6	148	423	13.07	22.57	18.36
6	148	424	13.07	23.6	17.72
6b	88	576	13.33	24.33	19.83
7	24	34	13.85	24.6	19.47
7	150	483	12.28	21.51	17.16
8	36	548	14.04	22.85	-
9	93	198	12.5	22.73	17.45

Third lower molar (M3)

Phase	Context	Bone id.	Species	Element	L	B
8	45	120	sh/g	M3	25.16	9.52
8	94	242	sh/g	mandible	20.52	8.13

Horse measurements

Astragalus

Phase	Context	Bone id.	Species	BFd	GB	GH	LmT
7	24	32	horse	-	60.68	55.27	-
7	150	487	horse	56.47	-	58.81	59.17
8	45	143	horse	47.9	58.25	53.27	53.61

Humerus

Phase	Context	Bone id.	BT
7	122	444	75.17
8	95	295	71.07

Metacarpal

Phase	Context	Bone id.	Bp	Dp

7	125	470	44.37	31.99

Metatarsal

Phase	Context	Bone id.	Bp	Dp
7	122	446	45.74	43.51

Tibia

Phase	Context	Bone id.	Bd	Dd
7	125	472	71.04	45.04
8	45	142	65.49	41.14

Pig measurements

Mandibular teeth measurements

Phase	Context	Bone id.	2	3	4	5	6	7
8	45	104	10.44	10.94	-	-	-	-
8	45	105	9.66	10.67	-	-	-	-
8	45	106	9.12	10.28	-	-	-	-
8	45	107	9.57	10.16	-	-	-	-
8	94	236	-	-	11.48	12.53	13.31	12.86
8	97	312	-	-	12.97	14.12	-	-
8	97	313	-	-	9.58	10.68	-	-
8	97	314	9.32	7.87	-	-	-	-
9	93	203	9.12	9.92	11.67	11.88	-	-

Radius

Phase	Context	Bone id.	Bp
7	125	466	28.68
8	45	115	29.08

Bird measurements

Ulna

Phase	Context	Bone id.	Species	Element	GL	Dip	Did	Bp	SC
6	148	432	fowl	ulna	62.96	11.88	8.74	7.78	4.38
7	103	358	fowl	ulna	-	-	10.48	-	5.25
8	45	193	fowl	ulna	74.18	14.17	11.44	9.84	4.76

Tarsometatarsus

Phase	Context	Bone id.	Species	Element	SC	Bd
6b	137	450	fowl	tarsometatarsus	6.7	13.66
8	95	297	fowl	tarsometatarsus	6.99	14.96

Tibiotarsus

Phase	Context	Bone id.	Species	Element	Bd	Dd	La

7	101	390	fowl	tibiotarsus	10.63	10.76	98.74
8	45	192	crane	tibiotarsus	23.52	21.63	-

Humerus

Phase	Context	Bone id.	Species	Element	GL	SC	Bp	Bd
6	148	431	fowl	humerus	72.92	8.04	20.25	16.14

Femur

Phase	Context	Bone id.	Species	Element	GL	Bd	Dd	Bp	Dp
7	101	391	fowl	femur	-	-	-	10.48	9.96

Carpometacarpus

Phase	Context	Bone id.	Species	Element	Bp
7	150	488	goose	carpometacarpus	21.4