

Technical Report: Biological remains from a site south of Ganstead, East Riding of Yorkshire (site code: TSEP901)

by

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Summary

A series of sediment samples, two boxes of hand-collected bone, and a very small quantity of hand-collected shell, from Iron Age and Romano-British deposits revealed by excavations at a site south of Ganstead, north-east of Kingston-upon-Hull, were initially submitted for an evaluation of their bioarchaeological potential. The sediment samples did not warrant much further analysis, but subsamples from two of the contexts examined during the evaluation, and from one not previously seen, were investigated in the main post-excavation phase to provide additional fossil material. The small assemblages of (mainly charred) plant remains pointed to the presence of burnt material such as turves and perhaps also straw or cut wetland vegetation in a few Romano-British ditch fills, whilst the uncharred remains were either mainly weeds or indicators of wetland, the latter perhaps simply reflecting the nature of the features in which the deposits formed.

The very few hand-collected shell remains were of no interpretative value and did not warrant further work.

Vertebrate remains amounting to 463 fragments, were recovered from 35 deposits of Late Iron Age and Romano-British date, the later deposits dating primarily to the 1st-2nd century AD. The assemblage was rather poorly preserved and heavy fragmentation of the bones was noted throughout. Some reworking of the deposits was suggested by the presence of human remains in deposits in Trench 2, and the variability of preservation in material from Trench 4. A restricted range of species, primarily domestic mammals, was recovered from this site. Within the Late Iron Age deposits, caprovid remains appeared to be more prevalent, whilst the later, Romano-British deposits showed a shift towards cattle. A mixture of refuse, representing both butchery and domestic activities, was present within the deposits at all periods. It is likely that the people at this settlement were rearing animals for their own consumption.

Immature caprovid remains (from a single individual) and horse skull fragments from Context 2072 (the primary fill of ditch 2050) may represent a 'special' deposit. The deliberate placing of skulls, skeletons, part skeletons and articulated limbs in pits and ditches is a well known phenomenon from the Iron Age and Romano-British period (Green 1998; Grant 1984).

Five radiocarbon dates were obtained on biological material, all falling within the Iron Age.

Keywords: GANSTEAD; EAST RIDING OF YORKSHIRE; LATE IRON AGE; ROMANO-BRITISH; PLANT REMAINS; INVERTEBRATES; VERTEBRATE REMAINS

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Introduction and methods

A series of sediment samples ('GBA'/'BS'/'SPOT' *sensu* Dobney *et al.* 1992), two boxes (each of approximately 16 litres) of hand-collected bone, and a very small quantity of hand-collected shell, were recovered from the deposits. All of the material was submitted to the EAU for an initial evaluation of its bioarchaeological potential.

Sediment samples

The sediment samples were inspected in the laboratory. Sixteen of the samples (from 11 contexts) were selected for investigation and their lithologies were recorded, using a standard *pro forma*, prior to processing, following the procedures of Kenward *et al.* (1980; 1986), for recovery of plant and invertebrate macrofossils. The washovers and residues were examined for plant remains. The washovers were also examined for invertebrate remains, and the residues were examined for other biological and artefactual remains. One 'SPOT' sample (Sample 90, Context 2072) of charcoal was identified. Material from five contexts (2003, 2072, 2121, 4030 and 4074) was submitted to Beta Analytic Inc., Miami, Florida, USA, for radiocarbon dating.

Table 1 shows a list of the examined samples with notes on their treatment.

Hand-collected shell

Brief notes were made on the preservational condition of the shell and the remains identified to species where possible.

Vertebrate remains

For the vertebrate remains, data were recorded electronically directly into a series of tables using a purpose-built input system and *Paradox* software. For each context (or sample) containing more than ten fragments, 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 concerning fragment size, dog gnawing, burning, butchery and fresh breakage.

Identifications to species or species group were carried out using the PRS modern comparative reference collection. Detailed recording of the assemblage followed the protocol outlined by Dobney *et al.* (forthcoming). Selected elements were recorded using the diagnostic zones method described by Dobney and Rielly (1988), whilst remaining elements which could be identified to species were only counted. Other fragments (classified as 'unidentified') were, where possible, grouped into categories: large mammal (assumed to be horse, cow or large cervid), medium-sized mammal 1 (assumed to be sheep, pig or small cervid) and totally unidentified. Minimum numbers of individuals (MNI) were determined using the zone system devised by Dobney and Rielly (1988). Unidentifiable fragments were recorded and quantified separately. As well as counts of fragments, total weights were recorded for all identifiable and unidentifiable categories.

Caprovid tooth wear stages were recorded using those outlined by Payne (1973; 1987), and those for cattle followed the scheme set out by Grant (1982). Where possible, cattle and caprovid mandibles were assigned to the general age categories outlined by O'Connor (1988) whilst, in addition, caprovid mandibles and isolated teeth were assigned to the age categories detailed by Payne (1973; 1987).

Where present, epiphyseal fusion data was recorded. 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. Measurements followed von den Driesch (1976) unless otherwise specified. Additional measurements, not detailed by von den Driesch, followed those described by Dobney *et al.* (1996). Withers heights for cattle were estimated using calculations devised by Foch (1966).

Results

A complete list of remains recorded is given in Table 2 and individual lists for plant remains and other components of residues and washovers from the sediment samples, recorded during analysis of plant material, in Table 3. Tables 4-7 and the appendix provide data concerning the vertebrate remains.

Sediment samples

The results are presented by trench and in context number order within phases. Archaeological information, provided by the excavator, is presented in square brackets.

Trench 2

Phase 2, Late Iron Age

Context 2034 [secondary fill of enclosure ditch 2036]

Sample 61/T (5 kg sieved to 300 microns with washover)

Just moist, mid reddish grey-brown, crumbly (working very sticky and slightly plastic), slightly sandy, slightly silty clay with some flint gravel and charcoal present.

There was a large residue of about 1200 cm³ of sand and coarse concreted sediment, perhaps iron pan; the small washover of a few cm³ was of charcoal and a very little charred herbaceous detritus.

Context 2044 [primary fill of enclosure ditch 2023]

Sample 84/T (5 kg sieved to 300 microns with washover)

Moist, light orange-brown, sticky to crumbly (working soft then plastic), sandy, silty clay to clay silt. Stones (2 to 60 mm), including flint, were present in the sample.

There was a tiny washover of modern roots and fine (<2 mm) charcoal; the large residue of about 850 cm³ was mainly sand and gravel.

Context 2121 [fill of ditch 2122]

Sample 82 (3 kg sieved to 300 microns with washover)

Dry, mid to dark grey to light to mid orange-brown, crumbly (working somewhat soft), slightly sandy, slightly clay silt. Stones (2 to 60 mm), charcoal and small lumps (to 25 mm) of modern contaminant 'straw' were present in the sample.

The small washover consisted of a few cm³ of modern roots and charcoal (to 10 mm); the large residue of about 500 cm³ was mainly sand and ?iron pan fragments with some gravel.

A radiocarbon date was obtained on charcoal and ?other charred plant material from this sample: Cal. BP 2270±40 (cal BC 400 to 340 and cal. BC 320 to 210, Beta-158372).

Phase 3, Late Iron Age

Context 2003 [fill of shallow rectangular pit 2004]

Sample 32/T (2 kg sieved to 300 microns with washovers)

Moist, mid to dark grey-brown, crumbly (working soft and slightly plastic), slightly sandy clay silt with stones (6 to 60 mm) present.

There was a large residue of about 350 cm³ of sand and gravel with some concreted sediment, perhaps iron pan; the tiny washover contained traces of fine (<2 mm) charcoal.

Samples 29-31 and 33-35 (total of 30.4 kg sieved to 300 microns with washovers)

These samples were processed in an attempt to recover charred remains of use for radiocarbon dating of the deposit. Although small amounts of fine (<2 mm) charcoal were recovered from the samples no substantial charred remains were recovered and, consequently, a small part of the hand-collected bone assemblage was submitted for dating.

A small quantity of hand-collected bone from this context gave a radiocarbon date of 2140±40 BP (cal BC 360 to 290 and BC 230 to 50, Beta-149716).

Phase 4, Romano-British, late 1st-mid 2nd C AD

Context 2062 [upper fill of trackside ditch 2063]

Sample 76/BS (10 kg sieved to 300 microns with washover)

Moist, light to mid grey to light to mid orange-brown (?oxidation), crumbly and slightly sticky (working plastic), sandy silty clay. Stones (2 to 20 mm), ?charcoal and large mammal bone were present in the sample.

The tiny washover consisted of a few cm³ of sand, gravel and concreted sediment with a little coal and bone; the rather large residue of about 1.2 litres was mostly sand with two large bone fragments representing a single cow pelvis.

Context 2069 [secondary fill of enclosure ditch 2050]

Sample 71 (2 kg sieved to 300 microns with washover)

Moist, light to mid grey-brown (with some orange-brown ?oxidised patches), stiff (working slightly sticky and soft and somewhat plastic), sandy silty clay. Stones (2 to 20 mm) and freshwater molluscs (including planorbids) were present in the sample.

The very small washover consisted mainly of rather variably preserved planorbid snails (more than 25 individuals with the more complete remains all appearing to be of *Planorbis leucostoma*) with many duckweed (*Lemna*) seeds and some other indicators of clean fresh water. The large residue was sand with chalk and other gravel (to 35 mm).

Context 2072 [primary fill of ditch 2050]

Sample 90/SPOT

Part of this spot sample of hazel (*Corylus*) roundwood charcoal was submitted for radiocarbon dating: and the following result was obtained: 2060±40 BP (cal. BC 180 to AD 30).

Context 2076 [primary fill of enclosure ditch 2083]

A small quantity of hand-collected bone from this context was submitted for radiocarbon dating but the attempt was unsuccessful.

Sample 73 (5 kg sieved to 300 microns with washover)

Moist, mid grey-brown (locally more grey and more orange-brown), sticky (working plastic), very sandy clay. Freshwater molluscs and fragments of ?rotted marl were present in the sample.

The large residue comprised clean quartz sand with some gravel; the very small washover contained freshwater snails and modern rootlets, seeds of elder (*Sambucus nigra*), rush (*Juncus* sp.) and duckweed seeds (plus traces of a few other taxa of no interpretative significance), a few insect fragments, some coal, and a little charcoal. Most of the seeds were rather decayed, though the *Lemna* were well preserved. The snails were fairly numerous with preservation ranging from almost complete shells to tiny fragments. All of the identifiable shells were of planorbids—the more intact remains being of *Planorbis planorbis*, a species typically found in ditches and small ponds and preferring hard water. Other invertebrates were very poorly preserved, the insects in particular being represented mostly by tiny scraps of cuticle, extremely rotted and beyond recognition. The few remains which could be recognised even to family were of robust forms typical of highly decayed assemblages.

The material had no interpretative value, although it may be suspected that the deposit initially had anoxic waterlogging but was subsequently oxygenated.

Trench 4 (all contexts dated as Roman-British)

Context 4003 [upper fill of enclosure ditch 4005 near terminal]

Sample 9/BS2 (8.5 kg sieved to 300 microns with washover)

There was a moderate-sized residue of clean quartz sand with some gravel (to 30 mm), including flint (to 15 mm) and a little ?iron pan. The tiny washover consisted of a few cm³ of charcoal (to 5 mm) and some charred seeds (perhaps representing wetland turf and cereal weeds), as well as modern fruits of the arable weed black bindweed, *Bilderdykia convolvulus*. Also present were some tiny (<3 mm) charred root/rhizome fragments perhaps representing burnt turves and one or a few charred 'bread/club' wheat

(*Triticum aestivo-compactum*) grains.

Context 4004 [lower fill of enclosure ditch 4005 near terminal]

Sample 7/T (2 kg sieved to 300 microns with washover)

Moist, mid grey-brown, crumbly (working soft), slightly sandy clay silt with stones (2 to 20 mm), charcoal and fragments of shell present.

The large residue of about 375 cm³ consisted of sand and gravel with ?iron pan and a few fragments of snail shell. The small washover yielded a little charcoal (to 10 mm) and some more snail shell fragments.

Sample 11/BS2 (8 kg sieved to 300 microns with washover)

There was a moderate-sized residue of about 1150 cm³ of clean quartz sand with some gravel and ?iron pan; in contrast to the other subsample examined from this context, the small washover consisted of about 50 cm³ of small wood flakes (which all seemed to be from a conifer but were too rotted to be able to observe the finer critical characters), along with some charcoal and small numbers of mostly rather decayed seeds. The latter were mainly weeds (primarily stinging nettle) but there were also moderate numbers of rush seeds, of which the bulk appeared to be *Juncus compressus*, a species of damp meadows. Several other taxa were consistent with short grassy vegetation on seasonally damp land. There were, amongst the charred remains, also small fragments of root/rhizome suggesting the presence of material originating in burnt turves, for example.

Context 4030 [upper fill of enclosure ditch 4031]

A small quantity of hand-collected bone from this context was submitted for radiocarbon dating but the attempt was unsuccessful.

Sample 63/T (5 kg sieved to 300 microns with washover)

Moist, mid to dark grey-brown, crumbly (working soft), slightly sandy clay silt with patches of yellow-brown sandy clay. Stones (2 to 60 mm) and ?pot fragments were present in the sample.

There was a very large residue of about 1150 cm³ of clean quartz sand with some gravel, including flint, and a trace of burnt bone. The small washover of about 20 cm³ consisted of coal, charcoal and sand with several different kinds of charred root/rhizome fragments, some charred herbaceous detritus and other possible indicators of burnt turves (charred sedge and spike-rush nutlets, and moderate numbers of seeds of blinks, *Montia*), and perhaps also burnt straw (charred wild radish pod segments, grass/cereal culm-nodes, cereal awn fragments and a hulled wheat glume fragment).

A radiocarbon date was obtained on charcoal and charred cereal grains from this sample: 2130±40 BP (cal BC 350 to 300 and cal. BC 220 to 50, Beta-158373).

Sample 62/T2 (5 kg sieved to 300 microns with washover)

This subsample yielded a moderate-sized to large residue of about 850 cm³ of clean quartz sand and gravel with some pottery (to 60 mm); there was a small washover of a few cm³ of charcoal and modern roots with traces of charred cereals (barley, including a hulled form, and ?wheat grains). The presence of charred sedge nutlets, herbaceous detritus and root/rhizome fragments perhaps points to the presence of material originating in burnt turves.

Context 4074 [fill of linear ditch 4080]

Sample 65 (10 kg sieved to 300 microns with washover)

Moist, vari-coloured (a jumbled mix of light grey to light grey-brown to light to mid brown to mid grey to black), crumbly and slightly sticky (working soft and sticky), slightly sandy clay silt. Stones (2 to 60 mm) including chalk and ?rotted charcoal (mostly as smears) were present in the sample.

The large residue of about 1800 cm³ was mostly sand with some coarse gravel and ?iron pan and two fragments (to 35 mm) of ?daub. The washover comprised about 30 cm³ of sand and charcoal (to 15 mm) with a little bone, including amphibian and a few charred seeds which were mainly from plants likely to have grown as waste ground or arable weeds but which included a few wetland taxa which may have been burnt in, for example, thatch.

A radiocarbon date was obtained on charcoal and ?other charred plant remains from this sample: 2050±40 BP (cal BC 170 to AD 40, Beta-158374).

Hand-collected shell

A very small quantity of, mostly poorly preserved, hand-collected shell, comprising remains from five contexts (1009, 2066, 2076, 4003 and 4004), was recovered. With the exception of three freshwater snails (planorbids, but not identifiable to species) from Context 2066, the remains amounted to a few or single representatives of *Cepaea/Arianta* sp. and were of no interpretative value.

Hand-collected vertebrate remains

Although too small for detailed interpretation, some information was gleaned from the vertebrate assemblage. The poor preservation of the bones and the consequent bias in favour of the survival of larger and denser fragments and teeth must be borne in mind. Table 4 lists the contexts from which bone was recorded and the numbers of fragments from each context. Data from material from Phases 2 and 3 (both Late Iron Age) have been amalgamated in the tables.

In total, 463 bone fragments were recovered from 35 deposits of Late Iron Age and Romano-British date, the later deposits dating primarily to the 1st-2nd century AD. Deposits from Trench 2 produced over three-quarters (77%) of the entire assemblage. Archaeological features from which bone was recovered included a number of ditches, pits and slots, some associated with metalled trackways. The excavated features provide evidence for the presence of two possible Iron Age enclosed farmsteads, the enclosures of which appeared to have been redefined during the Roman period.

Preservation

Preservation of the vertebrate remains was, generally, rather poor, with the exception of bones from Context 2072, which were fairly well preserved. Many deposits contained fragments that were very battered in appearance or whose surfaces were eroded to varying degrees. Bones from Contexts 2012, 2015, 2020 and 4030 were of a rather fragile nature and many had been damaged by fresh breakage. Most of the assemblage was quite fragmented and extensive fresh breakage damage was recorded on bones from 30% of the contexts. Fragmentation resulting from damage caused in antiquity was also noted. In many cases, evidence for dog gnawing and butchery marks could not be confidently determined because of the poor condition of the bones. A number of abraded human long bone fragments were identified from Context 2012.

Species and skeletal element representation

A limited range of species was identified (from both periods), which included the major domesticates, i.e. cattle, caprovid, pig and horse (Table 5). The only additional species to be identified was red deer (*Cervus elaphus*), represented by a single fragment of antler from Context 4003 (Romano-British pit fill).

Over half (54%) of the identified remains from the Late Iron Age deposits were caprovids, whilst cattle formed 29% of the assemblage. Horse and pig remains were relatively uncommon in this period. Fragment counts suggest an increase in both cattle and horse remains in the later period, with cattle increasing to 41% and horse to 33% of the identified fragments. This appears to follow the general trend at certain sites in the Roman period for an increase in the importance of cattle (King 1984; Dobney 2001).

For the main domestic species, teeth were the most commonly occurring element (Tables 6 and 7). Overall, teeth constituted 62% of the horse remains from both periods. This is likely to reflect the tendency of teeth to preserve better where unfavourable soil conditions prevail rather than indicate any specific disposal patterns.

Cattle and caprovid remains from the Late Iron Age deposits were mainly composed of non-meat-bearing parts of the skeleton such as the head and the lower limbs. Assemblages from Romano-British deposits included both meat-bearing elements (i.e. scapulae, humeri, radii and pelves) and non-meat-bearing (mandibles, metapodials and phalanges), although cattle remains showed a slight emphasis towards the bones which would have been discarded during initial carcass preparation (head and lower limb bones). The 'unidentified' fraction for both periods, however, included moderate numbers of large and medium-sized mammal shaft fragments, which presumably represent the domestic refuse from food preparation and consumption.

Spatial distribution

Vertebrate remains, although thinly distributed throughout the site, showed higher concentrations in a number of features. However, no discernible differences were noted in the proportions of species or elements between the features: most of the ditches and pits appeared to have been used for the disposal of a mixture of refuse from a number of different activities. One exception may be material from the primary fill (Context 2072) of Ditch 2050. Whilst the remains from the upper fills (Contexts 2068 and 2069) were fragile, dog-gnawed, and had eroded surfaces, those from Context 2072 (the primary fill) were rather better preserved, although badly damaged by fresh breakage. The upper fills contained cattle isolated teeth, metapodials and large mammal shaft fragments - refuse similar to that from other features on site. Bones from Context 2072, however, mostly represented the skull and upper teeth of a horse and the limb elements of a juvenile caprovid. This group showed some similarities to assemblages from other sites which have been described as 'special' deposits.

Age-at-death

Remains providing age-at-death data were sparse for all the main domesticates, regardless of period, and only very little information could be obtained.

A single cattle mandible (Romano-British) and three isolated teeth (representing both periods) were assigned to the general age categories of adult or elderly as suggested by O'Connor (1988). Epiphyseal fusion data, mainly from Romano-British material, also suggested that most cattle were slaughtered once

they had reached maturity. Only one bone, a first phalanx, was unfused and was described as being from a neonatal/juvenile individual. As this element is one which fuses 'early', this individual must have been less than a year old when it died.

Two caprovid mandibles, both from Late Iron Age deposits, were classified as representing adult individuals, one aged between three and four years and one between four and six years (Payne 1973). Some of the caprovid skeletal elements present were fused, but those from Context 2072, almost certainly from the same individual, represented an immature caprovid of less than two years.

Too few data were available to provide any information regarding the age at which pigs were slaughtered.

Horse incisors from Contexts 2070 and 4004 indicated that the horses kept at this settlement were fairly long-lived and were at least 10 years old before they died.

Biometrical data

Poor preservation and heavy fragmentation of the vertebrate remains has resulted in few measurable fragments. An archive of all measurement taken can be found in the Appendix.

A single cattle metatarsal of Late Iron Age date provided an estimated withers height of 1.06m. Data from cattle bones from Late Iron Age/Early Romano-British deposits at Dragonby, North Lincolnshire (Harman 1996) provided withers height estimates ranging from 0.95-1.26m, with means of 1.06, 1.09 and 1.13 m (using data from three different elements). The individual from Ganstead was, therefore, of a similar small size.

Discussion

Sediment samples

There were few remains in most of the samples examined but in a few cases (all Romano-British ditch fills) there were small but distinctive groups of charred remains which suggested the presence of material from turves and perhaps sometimes straw or other cut herbaceous vegetation. The few invertebrate remains from the sediment samples pointed to the presence of water in the ditches but were otherwise of small interpretative value.

Hand-collected shell

The very few recovered remains were of no interpretative value.

Hand-collected vertebrate remains

Unfortunately, only a very small assemblage of rather poorly preserved bone was recovered, producing little clear information regarding the economy at the site. A comparison of the relative importance of different species through time was difficult to undertake because of the possible bias created by the size of the sample and the condition of the bone. The following comments on the patterns observed must be read with these caveats in mind.

A restricted range of species, mostly limited to the main domestic mammals was recovered from this site.

Within the Late Iron Age deposits, caprovid remains appeared to be more prevalent, whilst the later (Romano-British) deposits showed a shift towards cattle. This may reflect a general trend, already observed, where the evidence from most Iron Age vertebrate assemblages suggests an emphasis on caprovids (Rackham 1985; Gidney 1999). Typically, assemblages from early Romano-British rural sites show a similar pattern (Mainland 1988), but here, the apparent shift towards a greater reliance on cattle is a trend more characteristic of Roman military sites or large civilian centres (King 1978; 1984). However, taphonomic factors, whereby the larger denser bones and teeth survive better in adverse burial conditions, could be responsible for this pattern. This can be seen from the horse remains, which are almost exclusively represented by teeth, probably over emphasising their importance within the Romano-British assemblage. Pigs were extremely poorly represented in deposits dated to both periods.

A mixture of refuse, representing both butchery and domestic activities is present within the deposits from this site. It is likely that the people at this settlement were rearing animals for their own consumption.

Immature caprovid remains (from a single individual) and horse skull fragments from Context 2072 (the primary fill of ditch 2050) may represent a 'special' deposit. The deliberate placing of skulls, skeletons, part skeletons and articulated limbs in pits and ditches is a well known phenomenon from the Iron Age and Romano-British period (Green 1998). Extensive analysis (Grant 1984; Wait 1985) has been conducted into the possible significance of these remains and it is generally agreed that they represent some form of ritual deposit. Examples from the North of England, include horse teeth representing single individuals which were recovered from Iron Age roundhouse ditches at Crankleys Lane, near Easingwold, North Yorkshire (Carrott *et al.* 1993). These were interpreted as the remains of isolated horse skulls which may have originally been deliberately placed within the roundhouses themselves for some ritual or religious purpose. Excavations at Newton Bewley, Hartlepool, another site along the TSEP (ASUD 2001), produced loose horse teeth in association with a Late Roman building. Here, it was also suggested that they may represent horse skulls kept for use in pagan ritual activities. At Ganstead, the poor preservation limits the interpretation and there is no conclusive evidence for ritual activity.

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Table 1. List of sediment samples examined from excavations at a site south of Ganstead (TSEP901), with notes on their treatment. Samples marked * were examined subsequent to the evaluation of this material.

Context	Sample	Notes
2003	32	2 kg sieved to 300 microns with washover
2003	29-31 & 33-35	various weights (total 32.4 kg) sieved to 300 microns with washovers
2034	61	5 kg sieved to 300 microns with washover
2044	84	5 kg sieved to 300 microns with washover
2062	76	10 kg sieved to 300 microns with washover
2069	71	2 kg sieved to 300 microns with washover
2072	90	'spot' sample of hazel (<i>Corylus</i>) roundwood charcoal
2076	73	5 kg sieved to 300 microns with washover
2121	82	3 kg sieved to 300 microns with washover
4003	9*	8.5 kg sieved to 300 microns with washover
4004	7	2 kg sieved to 300 microns with washover
	11*	8 kg sieved to 300 microns with washover
4030	63	5 kg sieved to 300 microns with washover
	62*	5 kg sieved to 300 microns with washover
4074	65	10 kg sieved to 300 microns with washover

Table 2. Complete list of taxa recorded from deposits at a site south of Ganstead (TSEP901). Nomenclature and taxonomy for plant remains follow Tutin et al. (1964-80) and Smith (1978). All plant material was uncharred unless otherwise indicated; modern or probably modern material has been excluded.

Taxon	Vernacular name	Remains recorded
Vascular plants		
Coniferae	conifer	wood fragment(s)
<i>Corylus avellana</i> L.	hazel	charred nut(s) and/or nutshell fragment(s)
<i>Quercus</i> sp(p).	oak	charcoal fragment(s)
<i>Urtica dioica</i> L.	stinging nettle	achene(s)
<i>Polygonum lapathifolium</i> L.	pale persicaria	charred fruit(s)
<i>Rumex acetosella</i> agg.	sheep's sorrel	charred fruit(s)
Chenopodiaceae	goosefoot family	charred seed(s)
<i>Chenopodium album</i> L.	fat hen	charred and uncharred seed(s)
<i>Atriplex</i> sp(p).	oraches	charred and uncharred seed(s)
<i>Montia fontana</i> ssp. <i>chondrosperma</i> (Fenzl) Walters	blinks	charred and uncharred seed(s)
<i>Stellaria media</i> (L.) Vill.	chickweed	seed(s)
<i>Stellaria</i> sp(p).	stitchworts/chickweeds	charred seed(s)
<i>Spergula arvensis</i> L.	corn spurrey	seed(s)
<i>Ranunculus</i> Subgenus <i>Batrachium</i>	water crowfoots	achene(s)
<i>Papaver rhoeas</i> L./ <i>P. dubium</i> L.	field/long-headed poppy	seed(s)
<i>Raphanus raphanistrum</i> L.	wild radish	charred pod segments and/or fragment(s)
Leguminosae	pea family	charred seed(s)
<i>Vicia</i> sp(p).	vetches, etc.	charred seed(s)
<i>Hippuris vulgaris</i> L.	mare's-tail	charred seed(s)
cf. <i>Marrubium vulgare</i> L.	?white horehound	nutlet(s)
<i>Mentha</i> sp(p).	mints	nutlet(s)
<i>Hyoscyamus niger</i> L.	henbane	seed(s)
<i>Plantago major</i> L.	greater plantain	seed(s)
<i>Sambucus nigra</i> L.	elder	seed(s)
<i>Carduus/Cirsium</i> sp(p).	thistles	charred and uncharred achene(s)
<i>Alisma</i> sp(p).	water-plantains	carpel(s) and/or seed(s)
<i>Juncus</i> cf. <i>compressus</i> Jacq.	?round-fruited rush	seed(s)
<i>J. cf. gerardi</i> Loisel.	?mud rush	seed(s)
<i>J. bufonius</i> L.	toad rush	seed(s)
<i>Juncus</i> sp(p).	rushes	seed(s)
Gramineae	grasses	charred and uncharred caryopsis/es
Gramineae/Cerealia	grasses/cereals	charred culm node(s)
Cerealia indet. cereals	charred awn(s)/awn fragment(s),	charred caryopsis/es
<i>Triticum 'aestivo-compactum'</i>	bread/club wheat	charred caryopsis/es
<i>Triticum</i> sp(p).	wheats	charred glume-base(s)
<i>Hordeum</i> sp(p).	barley	charred caryopsis/es
cf. <i>Avena</i> sp(p).	?oats	charred caryopsis/es
<i>Danthonia decumbens</i> (L.) DC. in Lam. & DC.	heath grass	charred caryopsis/es
<i>Lemna</i> sp(p).	duckweeds	seed(s)

<i>Scirpus maritimus/lacustris</i>	sea club-rush/bulrush	charred nutlet(s)
<i>Eleocharis palustris sensu lato</i>	common spike-rush	charred and uncharred nutlet(s)
<i>Carex</i> sp(p).	sedges	charred and uncharred nutlet(s)

Mosses

<i>Sphagnum imbricatum</i> Hornsch. ex Russ.		shoot fragment(s)
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Crustacea: Cladocera

Daphnia sp.

Molluscs

Planorbis leucostoma Millet

Planorbis planorbis (L.)

Cepaea/Arianta

Vertebrates

Equus f. domestic

Sus f. domestic

Cervus elaphus L.

Bos f. domestic

Caprovid

Ovis f. domestic

Homo sapiens Linnaeus

Large mammal

Medium-sized mammal

Indeterminate bone

Table 3. Complete lists of plant remains and other components of samples recorded during examination of plant material from a site south of Ganstead (TSEP901). Samples are presented in context and sample order and within each list components are listed by decreasing abundance, using a semi-quantitative four-point scale.

Abbreviations: ch—charred; c/n—culm-nodes; dec—decayed; embs—embryos; fgts—fragments; glb—glumes, glume-bases; inc—including; max—maximum dimension; segs—segments; sht(s)—shoot(s); spec—specimen; v—very.

Context 2003, Sample 32/T		bone fgts	1 max 5 mm
?iron pan fgts	3 max 5 mm	chalk	1 max 35 mm
sand	3	gravel	1 max 35 mm
Montia fontana ssp.		?iron pan fgts	1 max 5 mm
chondrosperma	1 single fgt		
charcoal	1 max 2 mm		
flint	1 max 30 mm		
gravel	1 max 30 mm		
Pre-Quaternary megaspores	1		
Context 2034, Sample 61/T		Context 2076, Sample 73/T	
sand	4	sand	3
?iron pan fgts	3 max 35 mm	Juncus cf. gerardi	2
charcoal	1 max 15 mm	Lemna sp(p).	2
flint	1 max 35 mm	gravel	2 max 35 mm
gravel	1 max 35 mm	Alisma sp(p).	1 embs only
herbaceous detritus (ch)	1	Carduus/Cirsium sp(p).	1
root/rootlet fgts (modern)	1	Cerealia indet.	1 1 v worn spec
		Gramineae	1
		Hyoscyamus niger	1
		cf. Marrubium vulgare	1
		Mentha sp(p).	1
		Sambucus nigra	1
		Sphagnum imbricatum (shts)	1 single spec
		cf. Stellaria media	1
		Urtica dioica	1 v dec
Context 2044, Sample 84/T		bone fgts	1 max 5 mm
gravel	3 max 50 mm	chalk	1 max 30 mm
sand	3	charcoal	1 max 5 mm
charcoal	1 max 2 mm	coal	1 max 5 mm
?iron pan fgts	1 max 5 mm	flint	1 max 25 mm
root/rootlet fgts (modern)	1	freshwater snails	1
		Pre-Quaternary megaspores	1
		root/rootlet fgts (modern)	1
		wood fgts	1 v dec, max 5 mm
Context 2062, Sample 76/BS			
bone fgts	2 max 120 mm	Context 2121, Sample 82/T	
coal	1 max 2 mm	sand	3
concreted sediment	1 max 5 mm	?iron pan fgts	2 max 15 mm
gravel	1 max 40 mm	charcoal	1 max 10 mm
?iron pan fgts	1 max 5 mm	gravel	1 max 15 mm
sand	1	root/rootlet fgts (modern)	1
Context 2069, Sample 71/T		Context 4003, Sample 9/BS2	
sand	3	sand	3
Lemna sp(p).	2	?iron pan fgts	2 max 5 mm
snails	2	Eleocharis palustris sl (ch)	1
Juncus sp(p).	1	Gramineae/Cerealia (ch c/n)	1
Ranunculus Subgenus Batrachium	1	Leguminosae	1 max 2 mm
Sambucus nigra	1		
Bilderdykia convolvulus	1 modern		
Carex sp(p). (ch)	1		
Chenopodium album	1 ?modern		

Montia fontana ssp. chondrosperma	1 inc fgts	Polygonum lapathifolium (ch)	1 fgt(s) only
Raphanus raphanistrum (ch pod segs/fgts)	1	Quercus sp(p). (charcoal)	1 max 10 mm
Spergula arvensis	1 ?modern	Sambucus nigra	1 v dec, inc fgts
Triticum aestivo-compactum	1	Stellaria media	1 v dec
bone fgts	1 max 10 mm	Stellaria sp(p). (ch)	1
charcoal	1 max 5 mm	amphibian bone	1
flint gravel	1 max 15 mm	beetles	1
gravel	1 max 30 mm	chalk gravel	1 max 30 mm
herbaceous detritus (ch)	1 max 4 mm	charcoal	1 max 10 mm
?pottery	1 max 25 mm	coal	1 max 1 mm
root/rhizome fgts (ch)	1 max 3 mm	earthworm egg caps	1 v dec
root/rootlet fgts (modern)	1	flint gravel	1 max 20 mm
		fly puparia	1 fgts only
		herbaceous detritus (ch)	1
		iron-rich concretions	1 max 25 mm
		Pre-Quaternary megaspores	1
		root/rhizome fgts (ch)	1 max 5 mm
		snails	1
		wood fgts	1 v dec, max 5 mm
Context 4004, Sample 7/T		Context 4030, Sample 62/T2	
sand	3	sand	3
?iron pan fgts	2 max 5 mm	gravel	2 max 40 mm
charcoal	1 max 10 mm	Bilderdykia convolvulus	1 modern
flint	1 max 20 mm	Carex sp(p). (ch)	1
gravel	1 max 20 mm	Chenopodium album	1 ?modern
snails	1	Hordeum sp(p). (inc hulled)	1
		Montia fontana ssp. chondrosperma	1 ?modern
		Spergula arvensis	1
		cf. Triticum sp(p).	1
		charcoal	1 max 10 mm
		earthworm egg caps	1 ?modern
		flint gravel	1 max 25 mm
		herbaceous detritus (ch)	1 max 5 mm
		?iron pan fgts	1 max 5 mm
		pottery	1 max 60 mm
		root/rhizome fgts (ch)	1 max 5 mm
		root/rootlet fgts (modern)	1
		Context 4030, Sample 63/T	
		sand	4
		Montia fontana ssp. chondrosperma (ch)	2
		Atriplex sp(p). (ch)	1
		Bilderdykia convolvulus	1 ?modern
		Carex sp(p). (ch)	1
		Cerealia indet.	1 v worn
		Cerealia indet. (awns)	1
		Chenopodium album (ch)	1
		Raphanus raphanistrum (ch pod segs/fgts)	1
		Rumex acetosella agg. (ch)	1
		Spergula arvensis	1 ?modern
		Stellaria media	1 ?modern
Context 4004, Sample 11/BS2			
sand	3		
Juncus cf. compressus	2		
Urtica dioica	2 v dec		
gravel	2 max 40 mm		
Alisma sp(p).	1 'embs' only		
Atriplex sp(p).	1		
cf. Avena sp(p).	1		
Carduus/Cirsium sp(p).	1		
Carduus/Cirsium sp(p). (ch)	1		
Carex sp(p).	1 v dec		
Carex sp(p). (ch)	1		
Cerealia indet.	1		
Chenopodium album	1		
Coniferae (wood fgts)	1 v dec, max 5 mm		
Danthonia decumbens (ch)	1		
Eleocharis palustris sl	1		
Eleocharis palustris sl (ch)	1		
cf. Glechoma hederacea	1		
Gramineae (ch)	1		
cf. Hordeum sp(p).	1		
Hyoscyamus niger	1		
Juncus bufonius	1		
Montia fontana ssp. chondrosperma	1 inc fgts		
Papaver rhoeas/dubium	1 v dec		
Plantago major	1 v dec		
Daphnia (ephippia)	1		
Eleocharis palustris sl (ch)	1		
Gramineae	1 modern		
Gramineae (ch)	1		
Gramineae/Cerealia (ch c/n)	1		

Triticum sp(p). (glb)	1	single spec	Context 4074, Sample 65/BS	
Vicia sp(p).	1	max 2 mm	sand	3
'ash beads'	1		?daub	1 max 50 mm
bone fgts	1	max 2 mm	?iron pan fgts	1 max 30 mm
burnt bone fgts	1	max 15 mm	Atriplex sp(p). (ch)	1
charcoal	1	max 15 mm	Carduus/Cirsium sp(p).	1
fish bone	1	max 5 mm	Cerealia indet.	1 1 v worn spec
flint	1	max 25 mm	Chenopodiaceae (ch)	1
gravel	1	max 30 mm	Chenopodium album (ch)	1
herbaceous detritus (ch)	1		Corylus avellana (ch)	1
nematodes (modern)	1		Hippuris vulgaris (ch)	1
root/rhizome fgts (ch)	1	max 5 mm	Montia fontana ssp.	
root/rootlet fgts (modern)	1		chondrosperma (ch)	1
twig fgts (ch)	1	max 5 mm	Sambucus nigra	1
			Scirpus maritimus/lacustris (ch)	1
			amphibian bone	1
			bone fgts	1 max 5 mm
			charcoal	1 max 15 mm
			coal	1 max 5 mm
			flint	1 max 20 mm
			gravel	1 max 60 mm
			herbaceous detritus (ch)	1
			Pre-Quaternary megaspores	1
			root/rootlet fgts (modern)	1
			snails	1 fgts only

Table 4: Number of identified and unidentified bone fragments from deposits from a site south of Ganstead (TSEP901).

Key: LIA = Late Iron Age; RB = Romano-British; Ct = Context number; No. id frags = total number of identified fragments; No. unid frags = total number of unidentified fragments.

Phase	Ct	No. id frags.	No. unid frags.	Context type
RB	2002	1	0	subsoil sealing all features except ridge and furrow
LIA	2003	9	74	fill of rectangular pit 2004
LIA	2004	5	11	rectangular pit
LIA	2006	1	10	clay layer, ?occupation surface
LIA	2012	3	6	compacted pebble and cobble surface
LIA	2015	1	15	clay layer, ?occupation surface = 2006
RB	2020	1	12	fill of ditch 2021
LIA	2034	2	17	upper fill of ditch 2036
LIA	2039	0	11	fill of slot 2040
LIA	2041	0	5	2ndary fill of ditch 2023
LIA	2044	4	7	primary fill of ditch 2023
RB	2049	2	5	layer sealing upper fills of gully 2074 and ditch 2071
RB	2057	0	1	same as 2062
RB	2062	1	0	upper fill of trackside ditch 2063
RB	2064	2	0	compact cobble surface adjacent to possible trackway ditches
RB	2065	1	10	upper fill of ditch 2067
RB	2066	1	1	lower fill of ditch 2067
RB	2068	2	5	upper fill of ditch 2050
RB	2069	2	17	2ndary fill of ditch 2050
RB	2070	3	4	layer below 2060 which seals part of cobbles 2064
RB	2072	13	46	primary fill of ditch 2050
RB	2073	3	4	fill of slot 2074
RB	2076	3	9	fill of ditch 2083
RB	2078	1	1	dumping into edge of ditch 2083 to provide base for cobble surface

Phase	Ct	No. id frags.	No. unid frags.	Context type
LIA	2121	1	19	fill of ditch 2122
LIA	2139	1	1	fill of ditch 2140
LIA	2143	0	2	fill of curvilinear slot 2144
RB	4003	10	36	upper fill of rectangular pit feature 4005
RB	4004	10	18	lower fill of rectangular pit feature 4005
RB	4006	0	1	top fill of ditch 4012
RB	4011	1	2	2ndary fill of ditch 4012
RB	4024	1	0	fill of ditch 4026
RB	4030	0	26	upper fill of enclosure ditch 4031
LIA	4032	1	0	fill of L-shaped slot 4033
LIA	4069	0	1	possible levelling dump over natural gravels
Total		86	377	

Table 5. Hand-collected vertebrate remains from deposits from a site south of Ganstead (TSEP901).

Species		LIA	R/B	Total
<i>Equus f. domestic</i>	horse	2	19	21
<i>Sus f. domestic</i>	pig	3	3	6
<i>Cervus elaphus</i> L.	red deer	-	1	1
<i>Bos f. domestic</i>	cattle	8	24	32
Caprovid	sheep/goat	15	10	25
<i>Ovis f. domestic</i>	sheep	-	1	1
<i>Sub-total</i>		28	58	86
Large mammal		66	161	227
Medium mammal 1		59	20	79
Unidentifiable		54	17	71
<i>Sub-total</i>		179	198	377
Total		207	256	463

Table 6. Skeletal element representation for the main domesticates from Late Iron Age deposits from a site south of Ganstead (TSEP901).

Element	Cow	Caprovid	Horse	Pig
horncore	1	-	n/a	n/a
mandible	1	3	-	-
isolated teeth	4	8	2	2
scapula	-	-	-	-
humerus	1	-	-	-
radius	-	-	-	-
ulna	-	-	-	-
metacarpal	-	-	-	-
pelvis	-	-	-	-
femur	-	-	-	-
tibia	-	-	-	-
astragalus	-	-	-	-
calcaneum	-	-	-	-
metatarsal	1	2	-	-
metapodial	-	1	-	-
phalanx 1	-	1	-	1
phalanx 2	-	-	-	-
phalanx 3	-	-	-	-
cuboid-navicular	-	-	-	-
	8	15	2	3

Table 7. Skeletal element representation for the main domesticates from Romano-British deposits from a site south of Ganstead (TSEP901).

Element	Cow	Caprovid	Horse	Pig
horncore	1	-	n/a	n/a
mandible	4	-	2	-
isolated teeth	4	2	11	-
scapula	2	-	-	-
humerus	1	3	1	-
radius	1	1	-	-
ulna	-	-	-	1
metacarpal	2	-	1	-
pelvis	1	2	-	-
femur	-	1	2	-
tibia	1	1	-	-
astragalus	-	-	-	-
calcaneum	2	-	-	-
metatarsal	2	-	1	-
metapodial	-	-	1	-
phalanx 1	1	1	-	1
phalanx 2	-	-	-	1
phalanx 3	1	-	-	-
cuboid-navicular	1	-	-	-
	24	11	19	3

Appendix

Table A1. Archive of (a) identified and (b) unidentified bone fragments from a site south of Ganstead (TSEP901).

Key: LIA = late Iron Age; RB = Romano-British; sh/g = sheep/goat; Id. No. = unique identification number for each bone; No. frags = number of fragments; LT50 = less than 50% of the zone represented; GT50 = greater than 50% of the zone represented; P/F = proximal fusion data; D/F = distal fusion data; df = distal fused; pf = proximal fused; pu = proximal unfused; a = adult; j = juvenile.

(a)

Date	Context	Id. No.	Species	Element	No. frags	Side	LT50	GT50	P/F	D/F	Notes
R/B	2002	52	horse	isolated teeth	1	i					eroded and fragile mandibular tooth. Abnormally worn
LIA	2003	31	cattle	horncore	1	i		1			
LIA	2003	32	sh/g	mandible	1	r		127			
LIA	2003	33	sh/g	isolated teeth	2						upper molars
LIA	2003	34	sh/g	metapodial	1	i	5	37		df	
LIA	2003	35	sh/g	metatarsal	1	l	56	12			
LIA	2003	37	horse	incisor	1	r					between 2.5 and 8 yrs in age.
LIA	2003	38	horse	isolated teeth	1	l					lower tooth
LIA	2003	36	pig	maxilla + teeth	1	l					male canine

Date	Context	Id. No.	Species	Element	No. frags	Side	LT50	GT50	P/F	D/F	Notes
LIA	2004	54	sh/g	M1/M2	1	r					
LIA	2004	55	sh/g	isolated teeth	2						upper molars
LIA	2004	56	sh/g	phalanx 1	1	i					very eroded bone surface with damaged edges
LIA	2004	53	pig	incisor	1						adult tooth
LIA	2006	50	cattle	M3	1	l					enamel slightly damaged - rather eroded and 'leached' appearance
LIA	2012	6	cattle	humerus	1	r	5	678		df	extremely eroded and fresh breakage
LIA	2012	7	cattle	metatarsal	1	l		12356 78		df	extremely eroded and fresh breakage
LIA	2012	8	cattle	isolated teeth	1	r					upper molar
LIA	2015	51	sh/g	mandible	1	l		12			
R/B	2020	12	cattle	mandible	1	l		1456			very eroded and poorly preserved bone - made up of many fragments (fresh breakage)
LIA	2034	28	cattle	M1/M2	1	l					
LIA	2034	27	sh/g	metatarsal	1	i	12	5678			rather eroded and rounded edges
LIA	2044	1	cattle	mandible	1	l		1356			porous, battered and has black staining

Date	Context	Id. No.	Species	Element	No. frags	Side	LT50	GT50	P/F	D/F	Notes
LIA	2044	2	sh/g	M1/M2	1	r					
LIA	2044	3	sh/g	M1/M2	1	l					
LIA	2044	4	sh/g	M1/M2	1						
R/B	2049	29	cattle	calcaneum	1	r	1	23	pf		very eroded bone surface
R/B	2049	30	cattle	metacarpal	1	r		1256			
R/B	2062	9	horse	isolated teeth	1						upper molar - broken
R/B	2064	41	cattle	humerus	1	l		5678		df	shaft layered - fragile
R/B	2064	42	horse	isolated teeth	1	i					upper tooth - enamel root etched and eroded
R/B	2065	59	sh/g	humerus	1	l		3456		df	burnt and slightly damaged
R/B	2066	5	cattle	scapula	1	l		12345		df	
R/B	2068	10	cattle	metacarpal	1	l	78	1256	a		well preserved
R/B	2068	11	cattle	isolated teeth	1						upper molar - broken
R/B	2069	39	cattle	radius	1	l		12567			surface of bone fragile and layered, lots of fresh breaks. Edges of articulation rather battered
R/B	2069	40	cattle	metatarsal	1	l	12	5678	a		proximal articulation damaged by dog gnawing. Distal articulation probably

											destroyed by dog
R/B	2070	43	horse	metapodial	1	i		3478		df	really tiny. Gnawed
R/B	2070	44	horse	incisor	1	r					?upper - 10+ years
R/B	2070	45	horse	canine	1						
R/B	2072	24	cattle	horncore	1	r		1			
R/B	2072	25	cattle	isolated teeth	1	l					upper molar
R/B	2072	16	sh/g	humerus	1	r		34567 89XY		df	immature individual - porous bone. Probably represents same individual as other sh/g frags (id. 17-20)
R/B	2072	17	sh/g	radius	1	r	8	12567	pf		immature individual - porous bone. Probably represents same individual as other sh/g frags (id. 16-20)
R/B	2072	18	sh/g	humerus	1	l		Y	pu		immature individual - porous bone. Probably represents same individual as other sh/g frags (id. 16-20)
R/B	2072	19	sh/g	femur	1	l		23567 8	pu		immature individual - porous bone. Probably represents same individual as other sh/g frags (id. 16-20)
R/B	2072	20	sh/g	pelvis	1	r		157X			immature individual - porous bone. Probably represents same individual as other sh/g frags (id. 16-20)
R/B	2072	21	sh/g	phalanx 1	1	r		123	pf		
R/B	2072	22	horse	metacarpal	1	r		1256	a		

R/B	2072	23	horse	isolated teeth	3						upper teeth. Unidentified contains lots of freshly broken cranium fragments which are horse, including maxilla
R/B	2072	26	pig	phalanx 1	1	r		23	pu		
R/B	2073	46	cattle	mandible	1	r		12			freshly broken into many fragments - porous
R/B	2073	48	sh/g	pelvis	1	r		1457 X	j		acetabulum unfused
R/B	2073	47	horse	P2	1						lower tooth
R/B	2076	13	cattle	calcaneum	1						removed for C14 dating
R/B	2076	14	cattle	scapula	1	l		12345		df	unidentified material includes other scapula fragments which are probably same bone - fresh breakage
R/B	2076	15	cattle	M3	1	r					
R/B	2078	49	horse	femur	1	r	X	789Y		df	?gnawed or mostly fresh damage? Are some gnaw marks on distal articulation
LIA	2121	57	pig	deciduous incisor	1						
LIA	2139	82	sh/g	mandible	1	l		12			
R/B	4003	75	cattle	mandible	1	r		27			no teeth
R/B	4003	76	cattle	phalanx 1	1	l		23	pu		neo/juvenile
R/B	4003	77	cattle	isolated teeth	1	r					upper premolar

R/B	4003	78	cattle	metatarsal	1	1	1	57	a		
R/B	4003	72	sh/g	M1/M2	1	r					
R/B	4003	73	sh/g	DP4	1						may be goat.
R/B	4003	79	red deer	antler	1						small tine fragment from very tip of tine
R/B	4003	80	horse	mandible	1	b		27			rather poor fragment
R/B	4003	71	sheep	tibia	1	1					?distal articulation slightly damaged by dog gnawing
R/B	4003	74	pig	phalanx 2	1	n		123	pf		eroded bone surface - may be acid etched
R/B	4004	67	cattle	mandible	1	1	1				M3 only
R/B	4004	68	cattle	pelvis	1	1	5Y	12346 8	a		acetabulum fused
R/B	4004	69	cattle	phalanx 3	1	1		12			?immature, rather porous
R/B	4004	62	horse	humerus	1	r		56789 XY	pu	df	
R/B	4004	63	horse	femur	1	1	6	789X Y	df		
R/B	4004	64	horse	mandible	1	b	1	27			full set if incisors and P2 on left side. Probably over 10 years in age
R/B	4004	65	horse	isolated teeth	2						mandibular teeth

R/B	4004	66	horse	metatarsal	1	i					shaft fragment
R/B	4004	70	pig	ulna	1	r	D	BC			rather eroded fragment
R/B	4011	81	cattle	tibia	1	l		56X		df	
R/B	4024	61	cattle	cuboid- navicular	1						reduced 3rd cusp
LIA	4032	60	cattle	M3	1						

(b)

Date	Context	Species group	Element type	No. fragments	Notes
LIA	2003	Medium-sized mammal	mandible	1	
LIA	2003	Large mammal	vertebrae	1	
LIA	2003	Large mammal	mandible	2	
LIA	2003	Large mammal	rib	5	
LIA	2003	Medium-sized mammal	rib	5	
LIA	2003	Large mammal	shaft	15	including humerus fragments
LIA	2003	Medium-sized mammal	shaft	21	including humerus, radius and femur fragments
LIA	2003	Unidentifiable	unidentified	24	
LIA	2004	Large mammal	shaft	5	
LIA	2004	Medium-sized mammal	shaft	6	
LIA	2006	Unidentifiable	unidentified	10	very eroded and poorly preserved

Date	Context	Species group	Element type	No. fragments	Notes
LIA	2012	Large mammal	shaft	2	
LIA	2012	Unidentifiable	unidentified	4	
LIA	2015	Large mammal	shaft	6	small and eroded fragments – fresh breaks
LIA	2015	Medium-sized mammal	shaft	9	small and eroded fragments – fresh breaks
R/B	2020	Medium-sized mammal	shaft	1	Burnt
R/B	2020	Large mammal	rib	3	small fragments
R/B	2020	Large mammal	shaft	8	including femur and tibia
LIA	2034	Medium-sized mammal	mandible	1	possibly pig - zone 6 fragment
LIA	2034	Medium-sized mammal	shaft	2	
LIA	2034	Unidentifiable	unidentified	5	
LIA	2034	Large mammal	shaft	9	including humeri
LIA	2039	Large mammal	mandible	1	
LIA	2039	Large mammal	shaft	2	immature humerus and another immature shaft, eroded and very poorly preserved
LIA	2039	Unidentifiable	unidentified	8	
LIA	2041	Large mammal	rib	1	
LIA	2041	Large mammal	shaft	4	including cow metatarsal shaft
LIA	2044	Large mammal	axis	1	very eroded

Date	Context	Species group	Element type	No. fragments	Notes
LIA	2044	Large mammal	shaft	1	
LIA	2044	Medium-sized mammal	shaft	1	
LIA	2044	Large mammal	mandible	4	
R/B	2049	Medium-sized mammal	shaft	1	caprovid tibia shaft - immature
R/B	2049	Medium-sized mammal	mandible	2	
R/B	2049	Large mammal	shaft	2	
R/B	2057	Large mammal	isolated upper teeth	1	part of molar
R/B	2065	Unidentifiable	unidentified	4	
R/B	2065	Medium-sized mammal	shaft	6	
R/B	2066	Large mammal	cranium	1	lower orbit fragment
R/B	2068	Large mammal	rib	1	
R/B	2068	Medium-sized mammal	shaft	1	very gracile tibia shaft
R/B	2068	Large mammal	shaft	3	
R/B	2069	Large mammal	mandible	1	
R/B	2069	Large mammal	shaft	16	most are fragments that belong to cow radius
R/B	2070	Large mammal	mandible	1	
R/B	2070	Large mammal	shaft	1	

Date	Context	Species group	Element type	No. fragments	Notes
R/B	2070	Medium-sized mammal	shaft	2	1 radius shaft
R/B	2072	Large mammal	mandible	1	
R/B	2072	Large mammal	rib	1	
R/B	2072	Large mammal	shaft	1	
R/B	2072	Medium-sized mammal	thoracic vertebrae	1	
R/B	2072	Large mammal	cranium	42	all appears to be horse, same individual – fresh breaks
R/B	2073	Large mammal	pelvis	1	
R/B	2073	Large mammal	shaft	3	includes horse metapodial shaft fragment
R/B	2076	Large mammal	shaft	1	
R/B	2076	Unidentifiable	unidentified	3	
R/B	2076	Large mammal	scapula	5	probably part of cow scapula recorded in identified remains (id. 14)
R/B	2078	Medium-sized mammal	shaft	1	caprovid metacarpal - rounded edges and eroded shaft
LIA	2121	Unidentifiable	unidentified	2	
LIA	2121	Large mammal	cranium	3	
LIA	2121	Large mammal	mandible	4	
LIA	2121	Medium-sized mammal	shaft	10	includes several tibia shaft fragments representing juvenile individuals

Date	Context	Species group	Element type	No. fragments	Notes
LIA	2139	Unidentifiable	unidentified	1	
LIA	2143	Medium-sized mammal	shaft	2	2 very eroded radius shaft fragments - freshly broken - probably same bone
R/B	4003	Medium-sized mammal	mandible	1	
R/B	4003	Medium-sized mammal	cranium	2	
R/B	4003	Medium-sized mammal	rib	2	
R/B	4003	Large mammal	scapula	2	
R/B	4003	Large mammal	rib	3	
R/B	4003	Large mammal	vertebrae	3	1 sacrum fragment, 1 burnt
R/B	4003	Large mammal	mandible	5	
R/B	4003	Large mammal	shaft	9	including metapodial shaft fragment (one neonatal/juvenile) and some burnt fragments
R/B	4003	Unidentifiable	unidentified	9	
R/B	4004	Large mammal	rib	1	
R/B	4004	Large mammal	vertebrae	1	
R/B	4004	Large mammal	mandible	2	
R/B	4004	Large mammal	maxilla + teeth	3	1 fragment has a molar
R/B	4004	Large mammal	shaft	11	including humerus
R/B	4006	Unidentifiable	unidentified	1	

Date	Context	Species group	Element type	No. fragments	Notes
R/B	4011	Large mammal	axis	1	
R/B	4011	Large mammal	shaft	1	
R/B	4030	Large mammal	shaft	8	very fragmented, bone splitting into layers
R/B	4030	Large mammal	cranium	9	all cow and include some horncore - freshly broken, probably same individual
R/B	4030	Large mammal	isolated upper teeth	9	tooth enamel fragments - a little eroded
LIA	4069	Medium-sized mammal	shaft	1	tibia shaft

Table A2. *Butchery records*

Date	Context	Id. No.	Species	Element	Type	Zone	Notes
LIA	2003	31	cow	horncore	chop	1	horncore deliberately chopped off rest of skull
R/B	2049	30	cow	metacarpal	chops	56	series of chops in shaft
R/B	2072	24	cow	horncore	chop	1	horncore chopped from skull
R/B	4003	78	cow	metatarsal	split	157	split down shaft

Table A3. (a) Mandible and (b) teeth records (*after O'Connor (1988); **after Payne (1973; 1987))

(a)

Date	Context	Id. No.	species	element	DP4	P4	M1	M2	M3	General age category*	Detailed age category**
LIA	2003	32	sh/g	mandible		9A	9A	9A	7G	Adult 3	F (3-4 yrs)
LIA	2015	51	sh/g	mandible	14L		4A				
LIA	2044	1	cow	mandible	J		F				
LIA	2139	82	sh/g	mandible		14S	14 A	9A	11G	Adult 3	G (4-6yrs)
R/B	2020	12	cow	mandible		H	N	L			
R/B	2073	46	cow	mandible			E	A			
R/B	4004	67	cow	mandible					L	Elderly	

(b)

Date	Context	Id. No.	Species	Tooth	Wear stage	Age category
LIA	2004	54	sh/g	M1/M2	9A	
LIA	2006	50	cow	M3	G	Adult 3
LIA	2034	28	cow	M1/M2	M	
LIA	2044	2	sh/g	M1/M2	9A	

LIA	2044	3	sh/g	M1/M2	6A	
LIA	2044	4	sh/g	M1/M2	9A	
LIA	4032	60	cow	M3	G	Adult 3
R/B	2076	15	cow	M3	C	Adult 2
R/B	4003	72	sh/g	M1/M2	8A	
R/B	4003	73	sh/g	DP4	12+	

Table A4. Measurements.

Horncore							
Date	Context	Bone id	Species	Element	45	46	BC
R/B	2072	24	cow	horncore	38.41	30.74	111.36
Scapula							
Date	Context	Bone id	Species	Element	GLP	SLC	
R/B	2076	14	cow	scapula	58.13	44.41	
Humerus							
Date	Context	Bone id	Species	Element	BT	HT	HTC
R/B	2064	41	cow	humerus	66.64	40.12	-
R/B	2065	59	sh/g	humerus	24.78	16.22	11.9
R/B	4004	62	horse	humerus	62.86	41.48	31.51
Femur							
Date	Context	Bone id	Species	Element	Bd		
R/B	4004	63	horse	femur	75.24		
Metacarpal							
Date	Context	Bone id	Species	Element	SD	BFp	DFp
R/B	2068	10	cow	metacarpal	27.86	52.16	31.85
R/B	2072	22	horse	metacarpal	-	43.21	29.51
Metatarsal							

Date	Context	Bone id	Species	Element	GL	SD	BFp
LIA	2012	7	cow	metatarsal	195	20.66	40.64
Teeth							
Date	Context	Bone id	Species	Element	H_LP2	H_BP2	
R/B	2073	47	horse	P2	28.41	14.86	
R/B	4004	64	horse	mandible	30.28	14.79	
Tibia							
Date	Context	Bone id	Species	Element	SD	Bd	Dd
R/B	4003	71	sheep	tibia	10.02	21.7	18.07
R/B	4011	81	cow	tibia	-	52.54	44.81