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## **Reports from the Centre for Human Palaeoecology, University of York**

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**Technical Report: Biological remains from a site north-east of Goodmanham,  
East Riding of Yorkshire (site code: TSEP907)**

by

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**THE UNIVERSITY** *of York*

# Technical Report: Biological remains from a site north-east of Goodmanham, East Riding of Yorkshire (site code: TSEP907)

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## Summary

*A series of sediment samples, a small quantity of hand-collected shell, and seven boxes of hand-collected bone from deposits, mostly of Romano-British date (where phased), revealed by excavations north-east of Goodmanham, were initially submitted for an evaluation of their bioarchaeological potential. For four contexts, further material was examined subsequently, primarily for the recovery of bones, but offering an opportunity to investigate charred plant remains more fully.*

*Plant remains were, for the most part, sparse, but consistently suggested that material originating in burnt heathland turves might well have become incorporated into most of these various fills, along with charred cereal remains. The rich assemblage from Context 1516 was exceptional in consisting very largely of silicified chaff.*

*The small quantity of hand-collected shell and the snails recovered from the sediment samples were of only limited interpretative value.*

*A moderate-sized assemblage of vertebrate remains, amounting to 2065 fragments, was recovered from 73 ditch, pit and post-hole fills of Late Iron Age and Romano-British date. A large proportion (1348 fragments) of the assemblage was assigned to 'unidentified categories', whilst almost half of the identified remains, including complete and part skeletons, represented possible 'special deposits'. The assemblage was also characterised by much fresh breakage damage, which must have occurred during excavation and post-excavation processes.*

*Evidence from the vertebrate remains suggests that, the animal economy, throughout the represented periods, was based almost entirely on domestic mammals. The low species diversity and the predominance of the main domesticates over wild animals appear to be typical of sites of this period in the region. (Mainland 1988; Kenward et al. 2002). The limited utilisation of wild resources implies that the settlement was of low status (Grant 1989); however, it has also been suggested that the consumption of wild animals and birds was restricted by certain taboos and rituals (Hill 1995) and this could have continued throughout the Romano-British period.*

*At Goodmanham, the complete or part skeletons attributed to Phases 1 and 4 all appeared to have been carefully and deliberately placed in pits. As far as could be ascertained from information supplied by the excavator, other artefacts were absent from these deposits. With the exception of knife marks on one sheep bone, no evidence of butchery or cause of death was apparent. These skeletons may represent ritual deposition. In contrast, animals skeletons from Phase 3 deposits, tended to be less complete; most were recovered from post-hole fills and none of them were recognised during excavation as being articulated or representing single individuals. Moreover, bones, pottery, and other artefacts were also recovered from the same deposits. Butchery marks were recorded on the individual from Context 1198 and some of the bones from this skeleton had been burnt. These individuals and limbs from Phase 3, may merely be animals or parts of animals that had been casually discarded as refuse.*

*Although small, the assemblage of bones from Goodmanham showed a similar range of characteristics to other rural assemblages recovered from the region. The increasing significance of cattle within the*

*economy suggests the adoption of new husbandry practices, whilst the complete and part animal skeletons indicate the retention of long-held ritual traditions.*

KEYWORDS: GOODMANHAM; EAST RIDING OF YORKSHIRE; IRON AGE; ROMANO-BRITISH; OCCUPATION; CHARRED PLANT REMAINS; TURVES; CEREAL CHAFF; VERTEBRATE REMAINS; BONES

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# Technical Report: Biological remains from a site north-east of Goodmanham, East Riding of Yorkshire (site code: TSEP907)

## Introduction and methods

Excavations, undertaken within a single trench (425 metres in length), produced extensive evidence of rural, mainly Romano-British, settlement, including enclosures, pits and post-holes. Deposits from these excavations were assigned to four chronological periods on the basis of both ceramic evidence and stratigraphic analyses. They are as follows:

Phase 1: Late Iron Age to end of 2<sup>nd</sup> century AD

Phase 2: 3<sup>rd</sup> century AD (much of it perhaps earlier 3<sup>rd</sup> century)

Phase 3: mid 3<sup>rd</sup> century to mid 4<sup>th</sup> century AD

Phase 4: mid 4<sup>th</sup> century onwards

A series of sediment samples ('GBA' and 'BS' *sensu* Dobney *et al.* 1992), a small quantity of hand-collected shell, and seven boxes (each of approximately 20 litres) of hand-collected bone, were recovered from the deposits.

### *Sediment samples*

The sediment samples were inspected in the laboratory. Fourteen of the samples 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 flots, washovers and residues were examined for plant remains. The flots and washovers were also examined for invertebrate remains, and the residues were examined for other biological and artefactual remains. One additional sample (Sample 94, Context 1631) was mostly of bone and these remains were also recorded.

Table 1 shows a list of the submitted samples and 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.

For oyster (*Ostrea edulis*) shell additional notes were made regarding: numbers of left and right valves; evidence of having been opened using a knife or similar implement; measurability of the valves; damage from other marine biota (polychaete worms and dog whelks); and encrustation by barnacles.

### *Vertebrate remains*

Bone was only recorded from those contexts which could be assigned to one of the phases outlined above. The following report is based on vertebrate material recovered from 73 of the deposits, the bulk of which were interpreted as ditch or pit or post-hole fills.

Data concerning the vertebrate remains were recorded electronically directly into a series of tables using a purpose-built graphical input system and *Paradox* software. Semi-subjective, non-quantitative data were recorded for the material from each context regarding the state of preservation, colour, and the appearance of broken surfaces ('angularity'). Additionally, for the bone from each context, semi-quantitative information was recorded concerning fragment size, dog gnawing, burning, butchery and fresh breakage.

Identification was 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). Remaining elements which could be identified to species were merely 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), medium-sized mammal 2 (assumed to be dog, cat, hare or equivalent-sized mammal), unidentified bird, and totally unidentified.

Skeletal element representation for the major domestic species was undertaken using total fragment counts rather than MNI figures because of the small size of the assemblages.

Caprovid tooth wear stages were recorded using those outlined by Payne (1973; 1987), and those for cattle and pigs followed the scheme of Grant (1982). Cattle, pig and caprovid mandibles were assigned to the general age categories outlined by O'Connor (1989) and, in addition, caprovid mandibles and isolated teeth were also assigned to the age categories detailed by 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 4<sup>th</sup> 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).

Withers height for horses was estimated using calculations devised by Kiesewalter (in von den Driesch and Boessneck 1974), for cattle those detailed by Foch (1966) and for sheep following Teichert (1975). (Withers height for horses is expressed in hands (hh), where 1 h = 4 in = 101.6 mm.)

## Results

A complete list of plant 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 4-10 provide data concerning snails, other molluscs, and vertebrate remains.

### *Sediment samples*

The results are presented in context number order within the four phases defined. Archaeological information, provided by the excavator, is presented in square brackets. No insect remains were recovered from the samples; most of the samples gave small numbers of land snails and these are summarised in Table 5.

PHASE 1 (LATE IRON AGE TO END OF 2<sup>ND</sup> CENTURY AD)

**Context 1286** [fill of shallow depression/pit 1287]

**Sample 38/T** (4.5 kg sieved to 300 microns with washover)

Just moist, light to mid grey-brown to light to mid grey, brittle to crumbly (working soft and sticky when wet), ?slightly sandy silty clay (to clay silt) with patches of red ?burnt soil (to 10 mm). Stones (2 to 60 mm), ?rotted mortar, charcoal (to 10 mm), mammal bone and ?modern rootlets were present in the sample.

The small to moderate-sized residue of about 300 cm<sup>3</sup> comprised chalk (to 30 mm), burnt (reddened) chalk (to 25 mm) and sand, a trace of pottery (to 25 mm), and a little bone (to 30 mm—seventeen fragments of MM1 long bone shaft and two fragments of large mammal (LM) shaft: total weight 9.2 g). The washover of about 20 cm<sup>3</sup> consisted of modern rootlets, with some snails and charcoal (to 10 mm), and a few poorly preserved charred wheat grains. There was also a trace of charred hazel (*Corylus avellana*) nutshell.

**Context 1409** [primary fill of ditch 1410]

**Sample 55/T2** (2.5 kg sieved to 300 microns with washover)

Orange-brown, stiff to crumbly (working soft), slightly sandy silty clay with traces of stones 2-60 mm and ?charcoal.

There was a large residue of about 600 cm<sup>3</sup> of mainly angular red chalk to 60mm; the small washover of a few cm<sup>3</sup> was of snails and sand with traces of small coal and charcoal fragments.

**Context 1455** [primary fill of ditch 1501]

**Sample 77/T** (3 kg sieved to 300 microns with washover)

Moist, varicoloured (light yellow-brown, light bluish-grey, mid brown, mid grey and dark grey), soft and sticky (working more or less plastic), ?slightly silty, clay. Stones (2 to 20 mm), charcoal and land snails were present in the sample.

The small to moderate-sized residue of about 250 cm<sup>3</sup> consisted of burnt chalk (to 50 mm), sand and undisaggregated sediment (to 5 mm); the washover of about 30 cm<sup>3</sup> included snails, charcoal (to 10 mm), a little charred hazel nutshell and a few charred cereal grains, including barley and oats (*Avena*). There were also traces of charred root/rhizome and ?heather root/twig material, perhaps from burnt turves. Two small fragments of medium-sized mammal rib, one of which was burnt, and one fragment of calcined medium-sized mammal longbone shaft (total weight 1 g) were also noted.

PHASE 2 (3<sup>RD</sup> CENTURY AD - MUCH OF IT PERHAPS EARLIER 3<sup>RD</sup> CENTURY)

**Context 1390** [fill of charcoal-rich slot 1398]

**Sample 49/T** (3 kg sieved to 300 microns with washover)

Just moist, dark grey to mid grey-brown to black, unconsolidated to crumbly (working soft), slightly sandy clay silt (?with some ash). Stones (2 to 60+ mm) were present in the sample.

The moderate- to large-sized residue of about 500 cm<sup>3</sup> was chalk gravel (to 45 mm), burnt (reddened) chalk (to 30 mm) and sand. In the washover of about 40 cm<sup>3</sup> there were moderate numbers of snails, with traces of charcoal (to 10 mm) and a few fragments of charred plant material which were tentatively identified as root/basal twig material of heather, *Calluna vulgaris*. That this plant was present is perhaps

confirmed by the identification of several small fragments of charred shoot which were clearly from *Calluna*. The presence (in clasts up to 5 mm) of some material which may well be burnt soil perhaps indicates an origin for the heather in burnt turves. There was a single fragment of charred cereal grain.

PHASE 3 (MID 3<sup>RD</sup> CENTURY TO MID 4<sup>TH</sup> CENTURY AD)

**Context 1177** [fill of ditch 1176]

**Sample 29/T** (3 kg sieved to 300 microns with washover)

Dry, light to mid grey-brown, crumbly and brittle, slightly clay sandy silt. Pottery, land snails (all those seen being *Cecilioides acicula*), modern rootlets and a modern seedling were present in the sample.

The moderate- to large-sized residue of about 400 cm<sup>3</sup> was mostly chalk gravel (to 45 mm in maximum dimension), with a little sand and a single sherd of pot (to 40 mm). The washover consisted of about 20 cm<sup>3</sup> of modern rootlets, with some snails (mostly *C. acicula*) and a few uncharred (probably modern) weed seeds; there were two specimens which may have been very poorly preserved charred cereal grains.

**Context 1184** [fill of posthole 1183]

**Sample 11/T2** (0.45 kg)

Very dark grey to black, unconsolidated ash and silt with stones 2-6 mm present and ?charcoal.

The small residue of about 40 cm<sup>3</sup> consisted of chalk gravel (to 10 mm); there was a small washover of a few cm<sup>3</sup> of charcoal (including ash, *Fraxinus*), with a little spelt chaff (two glumes) and a few snails.

**Context 1198** [fill of posthole 1197]

**Sample 12/BS** (7 kg sieved to 300 microns with washover)

Just moist, light to mid grey-brown and mid grey (mottled on a mm-scale), unconsolidated to crumbly, ?slightly ashy, slightly sandy clay silt. Stones (2 to 60 mm, mostly chalk) and patches of ?lime (to 30 mm) were present.

There was a moderate-sized residue of about 650 cm<sup>3</sup> of chalk gravel (to 50 mm) and a little sand and bone (to 30 mm). The washover comprised about 40 cm<sup>3</sup> of snails, modern root fragments, and some poorly preserved charred cereal grains, amongst which were a few rather better preserved wheat glume-bases and a single spikelet fork. The chaff appeared to be of spelt wheat, *Triticum spelta*. There were a few other charred remains, seeds of what were probably weeds, although some remains which may have been seeds of pea, *Pisum sativum*, were noted.

The bone recovered (total weight 19 g) included several pig bones (including two unfused proximal femur fragments and one pelvis fragment), and a number of caprovid bones (including distal phalanx, two carpals and calcaneum). In addition, there were twenty medium-sized mammal fragments.

**Context 1200** [fill of slot 1199]

**Sample 15/T** (3 kg sieved to 300 microns with washover)

Just moist, mid brown to black, crumbly. Slightly sandy ashy silt with small lumps of indurated light to mid brown clay (to 20 mm). Stones (2 to 60+ mm), ?lime/?rotted mortar and modern rootlets were present in the sample.

This subsample yielded a large residue of about 650 cm<sup>3</sup> of chalk gravel (to 50 mm) with some sand and ?baked clay/daub (to 40 mm). The rather large washover of about 90 cm<sup>3</sup> consisted mainly of snails, charcoal (to 20 mm, some of it probably willow/aspens/poplar, *Salix/Populus*) and some rather well preserved charred cereal grains, identified as wheat and barley (*Hordeum*).

**Sample 93/BS2** (7 kg sieved to 300 microns with washover)

Mid brown, unconsolidated to crumbly (working more or less soft), sandy clay silt with stones 2-60 mm present and a little charcoal.

The large residue of about 1000 cm<sup>3</sup> was mainly of chalk gravel and sand; the small washover of about 25 cm<sup>3</sup> consisted of charcoal with abundant snails. There was also some oak charcoal and a few well and poorly preserved charred wheat and barley grains.

**Context 1631** [fill of posthole 1630]

**Sample 94** (record of vertebrate remains only)

This sample was not processed, but contained approximately seventy small fragments of calcined and heavily charred bone (total weight 164 g), several of which were identified as caprovid. Identifiable material originated from the mandible, axis, vertebrae, ribs, humerus, radius, femur, tibia, astragalus, calcaneum and phalanges. The presence of two axes fragments indicated that the remains of at least two animals had been deposited.

PHASE 4 (MID 4<sup>TH</sup> CENTURY ONWARDS)

**Context 1265** [fill of pit 1264]

**Sample 33/BS2** (9 kg sieved to 300 microns with washover)

Mid-dark brown, crumbly (working soft), sandy clay silt, with stones 2-60+ mm present and traces of ?charcoal and large mammal bone.

This subsample yielded large residue of about 1200 cm<sup>3</sup> of chalk gravel with a trace of coal, bone and sand; the small washover of about 25 cm<sup>3</sup> contained charcoal, snails and sand, amongst which were some modern seeds and charred remains: ?heather twig/root fragments and unidentified root/rhizome fragments, these together perhaps indicating material originating in burnt turves. There were also a few very poorly preserved charred cereal (?wheat) grains.

**Context 1378** [fill of shallow hollow in natural subsoil]

Two samples of material associated with metal artefacts and provided by Leesa Vere-Stevens at the Conservation Laboratory of York Archaeological Trust (who had excavated and cleaned the objects from blocks of sediment), were processed. Both were sieved to 300 microns and a washover taken.

**Sample 137801/T2** (3.5 kg)

Moist, mid grey-brown, unconsolidated, crumbly (working sticky and plastic), slightly clay silt with some stones.

This subsample yielded a large residue of about 550 cm<sup>3</sup> of angular chalk gravel with a little red chalk, and bone; the finer fractions consisted mainly of undisaggregated silty sediment plus chalk 'sand' and



quartz sand. The small washover comprised a few cm<sup>3</sup> of modern root fragments and some charred material, including root/rhizome fragments and two barley grains.

**Sample 137802/T2** (4.3 kg)

Block of sediment and some loose material: almost dry, light grey to grey-brown, indurated (working crumbly), clay silt to silty clay with stones and Cu alloy fragments.

Again, there was a large residue, here of about 600 cm<sup>3</sup> of angular chalk gravel with a little red chalk, and bone (mostly somewhat copper-stained); the finer fractions once more consisted mainly of undisaggregated sediment with chalk 'sand' and quartz sand. The small washover of a few cm<sup>3</sup> in volume comprised modern root fragments and charred material, including root/rhizome fragments and a few very poorly preserved cereal grains.

**Context 1423** [fill of oval pit 1622]

**Sample 73/T** (3 kg sieved to 300 microns with washover)

Moist, mid grey-brown, crumbly (working soft and slightly sticky), sandy clay silt with stones (2 to 60+ mm) and modern rootlets present.

The moderate- to large-sized residue of about 350 cm<sup>3</sup> consisted of chalk gravel (to 40 mm) with a little burnt soil (to 5 mm). The washover of about 30 cm<sup>3</sup> contained snails, charcoal (to 10 mm), and modern rootlets. There were some small lumps of sediment which were obviously black and charred at one end and reddened at the other, which may have originated in burning of soil or turves. That the latter was the case is perhaps confirmed by the presence of traces of charred remains of heather and moss shoots, root/rhizome fragments, herbaceous detritus, tormentil (*Potentilla cf. erecta*) achenes, and heather root/basal twig fragments. There were also traces of charred weed seeds, at least one wheat grain, and some unidentified cereal grain fragments.

**Context 1467** [layer in shallow wide hollow]

**Sample 65/T** (3 kg sieved to 300 microns with paraffin flotation)

Just moist, mid to dark grey-brown, brittle to crumbly (working soft), slightly sandy clay silt with stones (2 to 60 mm) and land snails present.

The moderate to large-sized residue of about 350 cm<sup>3</sup> was of angular chalk gravel (to 50 mm, most of it burnt), and a little sand, with traces of bone and pottery. The tiny flot comprised modern rootlets, with a little charcoal (to 10 mm), snails, and traces of poorly preserved cereal grains which could not be identified further.

**Context 1516** [fill of pit/ditch terminus 1515]

**Sample 100/BS** (7.5 kg sieved to 300 microns with washover)

Just moist, varicoloured (light grey, light brown, mid brown and shades of grey-brown through to very dark grey), crumbly to unconsolidated, slightly clay silty sand (with some ash). Stones (6 to 60+ mm, mostly chalk) were present in the sample.

The large residue of about 1500 cm<sup>3</sup> consisted of coarse chalk gravel (to 90 mm) with some sand and bone (to 35 mm— one caprovid mandibular condyle, one large mammal vertebra fragment, one fragment of unidentified medium-sized mammal bone: total weight 3.7 g), the finer fractions including some amorphous calcareous material with the appearance of recrystallised calcium carbonate, and some burnt soil/daub. The large washover of about 350 cm<sup>3</sup> included about 100 cm<sup>3</sup> sand and burnt soil mixed with silicified cereal chaff (see below), the rest being rather poorly preserved charred cereal grains and rather

well preserved chaff. The grains usually showed some blistering and puffing, but some had clearly begun to germinate prior to charring, having visible coleoptiles and/or a somewhat shrunken appearance. They were probably mainly wheat, but with some barley and oats also present. The coarser chaff consisted of glume bases and spikelet forks which were probably spelt wheat, with rachis fragments which included barley. Most of the 0.3-1 mm fraction comprised silicified chaff in the form (mainly) of awn (beard) fragments. There were some tens of cm<sup>3</sup> of this material and it, and the charred remains, no doubt represent the burning of a large quantity of chaff containing some unwinnowed grain which had begun to germinate (perhaps because it had become damp prior to burning). There were remarkably few weed seeds: merely a few charred nutlets of corn gromwell, *Buglossoides arvensis*.

**Context 1728** [primary fill of pit 1713/1727]

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

Dry, light to mid brown to mid to dark grey-brown, brittle to unconsolidated, very stony, ?slightly sandy clay silt. Stones (2 to 60 mm), rotted charcoal, land snails and a modern seedling were present in the sample.

The large residue of about 550 cm<sup>3</sup> consisted of chalk gravel (to 30 mm), with some flint. The washover of about 60 cm<sup>3</sup> included snails and charcoal (to 10 mm) and a few charred and uncharred weed seeds, the latter probably modern.

**Context 1736** [fill of oval pit 1737]

**Sample 89/T** (3 kg sieved to 300 microns with washover)

Just moist, mid grey-brown, crumbly to unconsolidated, slightly sandy clay silt. Stones (2 to 60 mm), mammal bone and land snails were present in the sample.

There was a large residue of about 500 cm<sup>3</sup> of chalk gravel (to 60 mm) with some bone (to 80 mm—two fragments of medium-sized mammal rib and one almost complete immature right pelvis of fox (*Vulpes vulpes*): total weight 20 g) and sand; the washover of about 40 cm<sup>3</sup> contained snails, charcoal (to 5 mm), coal (to 30 mm), and a few small bones.

**Context 1738** [secondary fill of pit 1724]

**Sample 86/T** (3 kg sieved to 300 microns with washover)

Just moist, mid reddish-brown to mid grey-brown, brittle to crumbly (working more or less soft), slightly clay sandy silt. Stones (2 to 60 mm), very rotted charcoal and land snails (all those seen being *C. acicula*) were present in the sample.

The small to moderate-sized residue of about 250 cm<sup>3</sup> consisted of chalk gravel (to 30 mm), a little bone (three fragments of unidentified mammal bone and one small mammal long bone shaft: total weight 1 g) and sand. The washover of about 40 cm<sup>3</sup> consisted of snails and charcoal (to 5 mm), with some coal (to 10 mm), and a few poorly preserved charred cereal grains, perhaps wheat. There were also traces of ?heather root/twig material (to 15 mm) and of charred root/rhizome fragments, suggesting that material from burnt turves was present.

**Context 1739** [primary fill of pit 1724]

**Sample 87/T** (3 kg sieved to 300 microns with washover)

Just moist, mid grey to mid grey-brown to dark grey, crumbly (working more or less plastic), sandy clay silt (with some ?ash) with some ?rotted lime present.

The small to moderate-sized residue of about 300 cm<sup>3</sup> was of chalk gravel (to 25 mm) with traces of bone (to 30 mm— a single small fragment of medium-sized mammal rib weighing 0.7 g) and sand. The washover of about 40 cm<sup>3</sup> included modern rootlets, with snails, charcoal (to 10 mm) and a range of charred remains perhaps most likely to have originated in burnt turves: moderate numbers of ?heather root/twig fragments and root/rhizome fragments (to 10 mm), as well as traces of heather flowers and shoot tips, caryopses of heath grass (*Danthonia decumbens*), and a seed of ribwort plantain, *Plantago lanceolata*. There were also traces of charred barley grains and of a seed which may have been pea.

**Context 1743** [fill of pit 1742]

**Sample 90/BS** (7 kg sieved to 300 microns with washover)

Just moist, mid brown, unconsolidated to crumbly (working soft), sandy clay silt. Stones (2 to 60+ mm, mostly chalk with some flint) and some bone (in a separate bag) were present in the sample.

The large residue of about 1600 cm<sup>3</sup> comprised chalk (to 90 mm), some of it burnt, with a little flint and sand. The small washover of about 20 cm<sup>3</sup> contained snails, a few poorly preserved charred cereal grains and fragments (including oats), and charred root/rhizome material and ?heather root/twig fragments.

The separately bagged bone comprised the fragmentary and incomplete remains of a human baby, including fragments of the humerus, radius, metacarpal, vertebrae and ten ribs (total weight 18 g). These bones appear to have been hand-collected from the deposit, as no other bone was recovered from the bulked sample.

### *Hand-collected shell*

A small quantity of hand-collected shell was recovered from 23 contexts. Twelve of the contexts gave a few fairly well-preserved remains of only one land snail (*Cepea* sp.) of no interpretative value. Context 1019 also gave *Cepea* sp. (55 individuals) but additionally yielded the remains of twelve bleached but otherwise well-preserved individuals of *Helicella itala*, a species typical of dry exposed places including calcareous grasslands, and three *Trichia* sp.

Ten of the contexts (two from 1<sup>st</sup>-2<sup>nd</sup> century deposits, five from 3<sup>rd</sup>-4<sup>th</sup> century deposits, and three unphased) gave single specimens or a few remains of oyster. These were mostly well-preserved, though there was some variability—Context 1323 gave a very poorly preserved valve and Context 1339 a curiously thickened valve that seemed to be partly ‘fossilised’—and some fresh breakage was noted on oyster valves from two contexts. Evidence of the oysters having been opened using a knife or similar implement was noted on eight of the sixteen oyster valves, indicating their consumption by humans. No evidence of damage from other marine biota was seen.

Table 4 presents a summary of the hand-collected shell remains by context.

### *Hand-collected vertebrate remains*

A moderate-sized assemblage of vertebrate remains, amounting to seven boxes of hand-collected bone (each box approximately 20 litres), was recovered from 73 ditch, pit and post-hole fills. A total of 2056 fragments were recorded, of which a large proportion (1348 fragments) were assigned to the unidentified categories. An important component of the assemblage, accounting for almost half of the identified remains, was a number of possible ‘special deposits’, including complete and part skeletons, an

articulated limb and a skull. These were recovered from deposits assigned to Phases 1, 3 and 4. Table 6 shows the fragment counts for each species by phase excluding the complete or part skeletons. As can be seen from this table, the exclusion of the animal burials reduces the assemblage somewhat, particularly when it is divided into the different phase groups. The limitations of such small assemblages must be borne in mind and conclusions drawn from them regarding the relative importance of different species can only be tentative.

Although bone preservation varied slightly between contexts, with the exception of Contexts 1014 and 1074 (both Phase 3), it was described as 'good' or 'fair'. The proportion of fragments damaged by fresh breakage was frequently recorded at 50% and above and, as a result, fragmentation was high in many contexts. Variation of colour was noted, but rarely between fragments within the same deposit. In general, the bones were either fawn or brown. Evidence of dog gnawing, burning and butchery was recorded on a number of bones, but with the exception of Contexts 1086, 1290, 1467 (butchery), 1198, 1253 and 1517 (burning), did not affect more than 10% of the fragments in any context. Butchery appears to have been most frequently carried out with knives, but the high proportion of fresh breakages, and the slightly rounded nature of the fragments, may have disguised other butchery techniques.

Further damage, affecting bone mostly from Contexts 1014 and 1074 (but also the occasional fragment from other deposits) was indicated by the degradation of the surface layer of cortical bone, lending a rather 'battered' quality to the fragments. This degradation, which was observed in varying stages of severity, is most likely to be related to the mechanical and chemical action of plant roots.

### **Species representation and abundance of major domesticates**

Throughout the different phases cattle, caprovid, horse and pig remains dominated the assemblages. Complete and part skeletons representing sheep and cattle were identified from Phases 1, 3 and 4. These are discussed in more detail below. Small numbers of dog bones were recovered, mainly from ditch deposits, and included animals in a range of sizes. A part skeleton was recovered from a Phase 4 pitfill, Context 1701; the remains most closely resembling an immature fox.

Bird remains were rather scarce. Five chicken bones were identified from several Phase 4 deposits. These included Contexts 1738 and 1739, associated pit fills, which produced four of the fragments, whilst an isolated coracoid was recovered from Context 1467, the fill of a hollow. Rook/crow remains were present in three separate ditch fills (Contexts 1161, 1182 and 1591), most elements originating from the wings. One additional fragment was recovered from a posthole fill (Context 1328).

Clearly, wild resources were not an important component of the diet. Beside the corvid bones and a number of amphibian fragments, two red deer bones were the only other remains representing wild animals/birds. A metatarsal was recovered from a Phase 1 pit fill, Context 1092, whilst an antler fragment was identified from material within Context 1467, the fill of a natural hollow (Phase 4). Both fragments were rather eroded.

Proportions of the major domesticates (cattle, sheep and pig) within each phase, calculated using simple fragment counts (and excluding the complete and part skeletons), showed a marked decrease in the frequency of sheep/goat from 52% in Phase 1 to 34% in Phase 2 (Table 7). A corresponding increase in the proportion of cattle remains was apparent. The assemblage from the Phase 2 deposits may not be large enough for valid interpretation, but a similar pattern was seen from the Phase 3 values. Cattle continued to be prevalent in both Phases 3 and 4, but sheep bones, once again, became more abundant in Phase 4, forming 41% of the assemblage. Fragment counts for Phases 2, 3 and 4 were amalgamated forming a group of 3<sup>rd</sup>-4<sup>th</sup> century date. Using these figures, the general picture remained the same, albeit with a

slightly lower frequency (51%) for cattle in the Phase group 2-4. The proportion of pig remains from the different phases stayed relatively consistent, around 11-13%. The exception was Phase 2, where only 5% of the bones were pig. Using the amalgamated frequencies, the proportion of pigs was the same (11%) in Phases 1 and in Phase group 2-4.

Values produced by MNI counts showed a somewhat different picture (Table 8). As seen from the fragment counts, sheep had the highest frequencies in Phase 1, but using the MNI frequencies, sheep remained dominant in Phase 2. This was reversed in Phase 3, when cattle became more prevalent, although, there was again an increase in sheep in Phase 4. Pig frequencies stayed fairly constant throughout Phases 1, 2 and 3, but MNI figures suggested that pigs constituted a larger component of the Phase 4 assemblage, forming the same proportion, 31%, as cattle.

It must be noted, however, that the extensive fresh breakage damage recorded for much of the vertebrate assemblage may have created a bias against the remains of the larger mammals; increased fragmentation tends to reduce the number of large mammal bones which can be positively identified as cattle.

### **Skeletal element representation**

With so few fragments, it is difficult to judge the significance of any trends in the distribution of skeletal elements for the main domestic animals. With the exception of isolated teeth, which were, on the whole, the most commonly occurring element for both cattle and sheep, no one group of elements predominated. To a certain degree, the skeletal elements that were recorded were the denser and less easily broken bones, such as carpals, tarsals, calcanei, astragali and distal humeri. However, cattle and caprovids were represented by both meat-bearing elements (domestic debris) and head and lower limb elements (butchery refuse), suggesting that these animals were both butchered and eaten at the site (Tables 9 and 10). Pigs were mainly represented by mandibles and isolated teeth, a bias most likely related to taphonomic factors.

Horses were represented by a range of elements, with teeth predominating in Phase 1 deposits. The later phases included a greater number of skeletal elements from both fore and hind limbs. Eleven of the fragments recovered from Context 1271 were identified as an articulated fore limb (radius to first phalanx) which was likely to have been deposited in articulation.

### **Age-at-death**

For cattle, dental attrition of isolated teeth provided most of the information, with additional records from six mandibles. Once divided into phase groups, the data were rather scant; however, all phases had a group of animals that were killed once they had reached maturity, with each group having one elderly individual (i.e. over 8 years of age when slaughtered). Tooth wear data from a skeleton from Context 1357 (Phase 1) represented an immature individual, probably less than a year old, whilst a calf skeleton from a Phase 4 pit fill, Context 1523, was that of a neonatal individual. No clear age-at-death profiles could be distinguished. Data provided by the fusion state of the various skeletal elements were equally limited, but suggested that most of the individuals represented (from all phases) were over 3 years of age before they were culled. Single bones from Phases 1, 3 and 4 represented mature beasts aged at least 4 years. Phase 4 data showed the greatest number of young animals, with a third of the earliest fusing elements remaining unfused (representing individuals of less than a year old).

Data from sheep 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 patterns were evident because of the small sample size for each phase, so data from

Phases 2, 3 and 4 were amalgamated. Both the O'Connor and Payne systems suggested that in Phase 1 one group of animals was slaughtered when aged between approximately 6 months and a year, whilst a second group represented adult individuals. The amalgamated data for Phases 2 to 4 showed that 35% of the individuals represented were killed between the ages of 6 and 12 months, whilst a further 29% were slaughtered between 1 and 2 years of age. As with Phase 1, a much older group of individuals was also represented, which fell into O'Connor's Adult 3 category and Payne's categories G/H (4-8 years) and H (6-8 years).

Epiphysial fusion data for caprovids were somewhat restricted by the size of the assemblage, but generally supported the overall pattern suggested by the mandibles and teeth. However, there was no evidence for the slaughter of very young animals as seen in the dental data. Overall, a range of ages were represented, showing a gradual kill-off with no indication of any specialised husbandry practices. The disparity with the dental data may be a result of the limited assemblage size and/or the poor survival of bones representing juvenile individuals.

Nine pig mandibles were recovered from three of the four phases. The three Phase 1 individuals were all classed as 'Immature 2' (after O'Connor 1989), representing individuals of approximately 12-15 months old, whilst all the Phase 4 individuals were slightly older (approximately 2 years) when culled. A single adult individual was also present within this phase. The single mandible from Phase 3 represented an individual that was assigned to O'Connor's 'Immature 1' group. Most bones for which fusion data was available were unfused, confirming that most pigs were slaughtered before reaching maturity.

Isolated horse incisors from Phase 1 deposits showed wear indicative of individuals aged between 5 and 10 years, with a single tooth from a mature horse of approximately 20 years old. From Phase 4, another incisor was recovered from a horse aged approximately 5-6 years. All recorded horse bones were fused.

## **Biometry**

Insufficient measurements were available to provide much inter-phase comparison of the size and shape of the domestic mammals represented at Goodmanham. Several measurements from metapodials from Phases 3 and 4 were used to reconstruct cattle withers heights. The resulting heights—1120mm, 1261 mm (Phase 3) and 1084 mm (Phase 4)—were quite wide ranging, with the smallest value of 4<sup>th</sup> century date providing a height estimate similar to that for Iron Age cattle from Dragonby, North Lincolnshire (Harman 1996), whilst the tallest individual was likely to have been of a similar stature to animals from 3<sup>rd</sup> century deposits at Lincoln which were thought to represent large stock imported from the continent for the improvement of native animals (Dobney *et al.* 1996).

Withers heights, calculated from the greatest length measurements of four complete sheep bones, produced values of 562 mm, and 576 mm for Phase 1, with individuals with heights of 533 mm and 527 mm for Phases 3 and 4. The latter are very small animals, shorter than those from 3<sup>rd</sup> and 4<sup>th</sup> century deposits at Lincoln. Six shoulder heights of sheep of 3<sup>rd</sup>-4<sup>th</sup> century from the nearby site at Shiptonthorpe (Mainland 1988) were calculated for comparison. Whilst those estimates from the greatest length measurements of metapodials produced values that represented somewhat taller individuals (ranging from 561 mm to 609 mm) than those present at Goodmanham, the values determined from radius measurements (500 mm and 484 mm) indicated sheep that were far smaller. When compared with data for sheep metapodials from deposits of a comparable date at Hayton (another site not far from Goodmanham), the withers heights of the individuals represented fell within the lower end of the range of heights. The sample size from Goodmanham is inadequate for detailed interpretation but does not suggest the presence of improved animals or imported livestock.

Measurements from two horse bones (a radius and a metacarpal) from the same individual provided withers height estimations (Kiesewalter in von den Driesch and Boessneck 1974) which indicated the animal stood at 12 2 hands (one 'hand' = 4 inches).

An archive of all the measurements taken can be found in the Appendix.

### **Animal burials and 'special deposits'**

Several groups of bones were identified which did not seem to fit with the pattern of normal waste disposal and these have been tentatively identified as ritual or special deposits. These included complete and part skeletons, articulated limbs, and a skull, recovered mainly by hand-collection from the deposits assigned to Phases 1, 3 and 4. The following is a description of each group of bones by phase.

#### **PHASE 1**

Context 1726 contained the almost complete remains of a juvenile cow; most of the head was missing, although several cranial fragments and two incisors were recovered, suggesting the carcass had been complete when deposited. None of the skeletal elements were fused and the bones were extremely porous, indicative of a very young calf. There was no evidence of butchery marks or cause of death. This articulated individual had been deliberately buried in a pit, which was located between two inhumations. Structural features, including other pits, post-holes and slots were situated close-by. Another articulated juvenile cow (Context 1357) was recovered from this phase, from within pit 1355. This immature individual lacked hind legs and pelvis (probably destroyed when the pit was truncated by a later feature), but most other parts of the body were represented, including ribs and vertebrae. None of the bones were fused, but wear on the first mandibular molar suggested that the animal was probably less than a year old. Again, this animal had been deliberately placed in the pit.

Within 5 or so metres of the calf skeleton, Context 1726, a further animal burial was identified. Pit fill 1699 yielded part of the articulated skeleton of a young sheep. Epiphysal fusion data suggested that the individual represented was approximately 2-3 years old when it died. Mainly hind limb elements were identified, including femur, tibiae and calcanei. Metapodial fragments and phalanges were present and, additionally, a number of isolated incisors were recovered. Cranial and rib fragments from the same deposit were also probably part of this skeleton. Knife marks were observed across the anterior aspect of the distal epiphysis of the right tibia. A second part skeleton of a sheep was recovered from Context 1216, a ditch fill. In this case, skeletal elements representing the head (mandibles and cranial fragments), and fore legs of the animal were prevalent, but a femur and a metatarsal were also present amongst the remains, suggesting that originally the whole body was deposited within the ditch. This individual was of a similar age to the one from Context 1699. No butchery marks were noted on any of the bones recovered.

#### **PHASE 3**

A part skeleton of a calf was recovered from a deposit described as the fill (Context 1165) of a pit or post-hole associated with a series of post-holes forming a possible fence line. Bones from this skeleton were heavily damaged by fresh breakage but, as with the other calf skeletons from this site, most parts of the new page number body seemed to be represented and none of the elements were fused. This individual was not described by the excavator as being articulated *in situ*, which suggests that it may not have been deliberately placed in this feature, but rather dumped in a 'casual' manner. Similarly, several neonatal cattle bones, including elements from both the fore and hind limbs, identified from the fill (Context 1253)

of the boundary ditch of a small enclosure, probably represent part of a single animal, the remains of which were disposed of in the nearest convenient hole.

Context 1198, a post-hole fill, produced the skeleton of an immature sheep (aged between 6 and 12 months), with most elements present, including head, fore and hind limbs, plus a few rib and vertebra fragments. There was an absence in the hand-collected material of small elements such as carpals, tarsals and phalanges, although several of these were recovered from the sediment sample (Sample 12). Corresponding knife marks on the atlas and occipital area of the skull were observed suggesting that the head had been removed from the rest of the body. Several skeletal elements were burnt (including humerus, tibia and femur), of which most represented the left side, the exception being a single right scapula. Additionally, some of the rib fragments showed evidence of burning. Remains of other species (pig and cattle) were identified from this deposit, together with some artefactual material (mortar fragments).

Further burnt remains were identified from another post-hole fill, Context 1631. A single sample from this deposit produced approximately seventy small fragments of calcined and heavily charred bone (total weight 164 g), several of which were definitely identified as caprovid. Identifiable material originated from the mandible, axis, vertebrae, ribs, humerus, radius, femur, tibia, astragalus, calcaneum and phalanges. The presence of two axes fragments indicated that the remains of at least two animals had been deposited.

A radius, ulna, carpals, metacarpal and first phalanx of a horse, identified from Context 1271, are likely to have been deposited in articulation. Similar articulated horse legs have been recovered from sites of Iron Age and Roman date at Garforth, West Yorkshire (Jaques 2000) and Dragonby, North Lincolnshire (Harman 1996).

#### PHASE 4

The fifth calf skeleton (Context 1523) recovered from the site was identified from within pit 1521, situated amongst a group of pits, in the vicinity of the remains of a possible building. This articulated skeleton, which had been extensively fragmented during excavation and post-excavation processes, represented a neonatal individual. No butchery marks were observed on any of the bones. To the north of this skeleton, the remains of a young child were recovered.

Context 1516, the fill of a pit/ditch terminus produced the skull and mandible of a small to medium-sized dog. There was some evidence to suggest that the processus coronoideus of the mandible and part of the temporalis region of the skull had both been chopped, possibly for the disarticulation of the mandibles. Whether the reason for this was economic—both skinning and butchery marks have been observed on dog bones from other sites, e.g. Danebury, Hampshire (Grant 1984)—or ritual, was not clear. A small quantity of cattle fragments, including a horncore were also recovered from this fill.

Finally, the part skeleton of a canid, of the size of a small to medium-sized dog or fox was recovered from the secondary fill (Context 1701) of pit 1700. These remains were associated with bones of sheep, pottery and other artefacts, suggesting that this may have been a general rubbish pit.



## Discussion

### *Sediment samples*

Though plant remains were, for the most part, sparse, they consistently suggested that material originating in burnt heathland turves might well have become incorporated into most of these various fills, along with charred cereal remains (perhaps as likely to have come from straw as from grain crops *per se*). The rich assemblage from Context 1516 was exceptional in consisting very largely of fine chaff, much of it preserved in a silicified rather than charred form (and probably represents the attempted disposal of a mass of chaff rather than straw, for example). Although it appears at first sight rather unlikely that acid grassland supporting heather would have been located on the Chalk Wolds in the immediate environs of the site, heather is sometimes found on leached soils on the Chalk (*vide* Crackles 1990, 112), as is heath grass, so importation from, for example, the lower-lying sandy ground to the south and east of Market Weighton, need not necessarily be invoked. The charring of the turves—if this is the appropriate interpretation of this material—may relate to destruction of a structure in which turves were used rather than the use of turves for fuel, of course.

The land snails (other than catholic taxa and *C. acicula*) recovered from the samples (and the *H. itala* hand-collected from Context 1019) were typical of an open landscape of short-turfed calcareous grassland very much the same at the area is today. The most abundant remains were of *C. acicula* but this is a burrowing snail and almost certainly intrusive to the deposits.

### *Hand-collected shell*

The hand-collected shell remains have little interpretative value other than to indicate the importation of oysters to the site for food. This does imply that the settlement operated within a wider economic system, however.

### *Hand-collected vertebrate remains*

The vertebrate assemblage from Late Iron Age and Romano-British deposits at Goodmanham was mostly too small to provide anything other than a tentative interpretation of the exploitation of animals at the site. Extensive fresh breakage was prevalent, which reduced both the number of fragments that could be identified to species and the number of bones which could be measured. However, some information was gleaned from this assemblage.

Data from the recovered vertebrate remains suggested that, the animal economy, throughout the represented periods, was based almost entirely on domestic mammals. The low species diversity and the predominance of the main domestics over wild resources appear to be typical of sites of this period in the region. (Mainland 1988; Kenward *et al.* 2002). The limited utilisation of wild resources implies that the settlement was of low status (Grant 1989), however, it has also been suggested that the consumption of wild animals and birds was restricted by certain taboos and rituals (Hill 1995) and this could have continued throughout the Romano-British period.

Regardless of the methods of quantification (e.g. MNI or basic fragment counts) sheep remains were dominant in the earlier period (Phase 1), although later, in the 3<sup>rd</sup> century (Phase 3), the emphasis shifted in favour of cattle. By the 4<sup>th</sup> century (Phase 4), however, both MNI and fragment counts suggested that the frequencies for both cattle and sheep were roughly similar, with dominance by one or the other

dependent upon the quantification method used. In spite of these variations, cattle, with their larger carcass size, would have provided the most meat in the later periods. Age-at-death data were not abundant, but the range of ages represented, from the very young to the mature, indicated that both cattle and sheep were being bred and reared at the settlement. No clear mortality patterns were discernable, but the presence of lambs and more mature sheep may indicate an emphasis on meat and perhaps milk. The older individuals would also have provided wool. Pigs were mostly immature, reflecting that their primary importance was for the provision of meat.

The predominance of cattle is characteristic of most Roman assemblages and shows a marked change from the dietary preference for lamb and mutton typically suggested by Late Iron Age assemblages (King 1999). It has been suggested that this change in diet is related to the 'Romanisation' of the indigenous population, although, in fact, the dietary traditions adopted are more akin to those found in the Low Countries and Germany (King *op. cit.*; Dobney 2001). Similar trends were observed from vertebrate assemblages recovered from some of the other sites along the Teesside-Saltend Ethylene Pipeline (Jaques *et al.* 2002; Kenward *et al.* 2002), and from the nearby site at Shiptonthorpe (Mainland 1988).

As the assemblage is so small, the animal burials account for a large proportion of the identifiable fragments. At Goodmanham, the complete or part skeletons attributed to Phase 1 all appeared to have been carefully and deliberately placed in pits. As far as could be ascertained from information supplied by the excavator, other artefacts were absent from these deposits. With the exception of knife marks on one sheep bone, no evidence of butchery or cause of death was apparent. The calf skeleton from Phase 4 was also articulated and recovered from a similar location and circumstances to those animal burials from Phase 1.

In contrast, animals skeletons from Phase 3 deposits, tended to be less complete, most were recovered from post-hole fills and none were recognised during excavation as being articulated or representing single individuals. Additionally, pottery, other bones and artefacts were also recovered from the same deposits. Butchery marks were recorded on the individual from Context 1198 and also some of the bones from the later skeleton were burnt.

Articulated skeletons, animal skulls and limbs have, as a result of their deposition or association with other finds, been regarded as ritual in nature, although there is some controversy over this interpretation (Wilson 1992). Much has been written regarding the definition and recognition of such deposits (Grant 2002; Hill 1996) and, indeed, it is difficult to identify conclusively a group of bones as having ritual or special significance. Research (e.g. by Wait 1985; Hill 1995) on these so-called 'special deposits' has concentrated mainly on Iron Age sites in the south of England, where distinct patterns of associations of these deposits with remains of other animals, humans and artefacts have been identified. Such detailed investigations have not been undertaken on assemblages from the north of England, but clearly, as has been noted at this site and others in the region (Dobney 2001; Mainland 1988; Jaques 2000; Jaques *et al.* 2000), similar activities were being undertaken, both in the Iron Age and, subsequently, throughout the Romano-British period. The 'special deposits' from Goodmanham may represent ritual deposition, but this seems more likely for the skeletons from Phases 1 and 4. The individuals and limbs from Phase 3, which show some differences in the manner of their deposition and composition to those from Phases 1 and 4, may merely be animals or parts of animals that had been casually discarded as refuse. The incomplete remains of at least two caprovids from Context 1631 (Sample 94) were thoroughly charred and are perhaps more likely to represent food debris. However, there are some similarities to cremated sheep skeletons from 3<sup>rd</sup> and 4th century deposits at Welton Road, Brough (Hamshaw-Thomas and Jaques 2000) and comparable skeletons to the part burnt sheep from Context 1198 have been identified from Hayton (Jaques *et al.* 2000).

Although small, the assemblage of bones from Goodmanham showed a similar range of characteristics to other rural assemblages recovered from the region. The apparently increasing significance of cattle within the economy through the Roman-British period suggests the adoption of new husbandry practices, whilst the evidence for complete and part animal skeletons may indicate the retention of long-held ritual traditions.

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*Table 1. List of examined sediment samples with notes on their treatment. Samples marked \* were examined during the main post-excavation phase, the remainder during the assessment.*

<b>Context</b>	<b>Sample</b>	<b>Notes</b>
1177	29	3 kg sieved to 300 microns with washover
1184	11*	0.45 kg sieved to 300 microns with washover
1198	12	7.5 kg sieved to 300 microns with washover
1200	15	3 kg sieved to 300 microns with washover
	93*	7 kg sieved to 300 microns with washover
1265	33*	9 kg sieved to 300 microns with washover
1286	38	4.5 kg sieved to 300 microns with washover
1378	137801*	3.5 kg of material associated with metal artefacts sieved to 300 microns with washover
1378	137802*	4.3 kg of material associated with metal artefacts sieved to 300 microns with washover
1390	49	3 kg sieved to 300 microns with washover
1409	55*	2.5 kg sieved to 300 microns with washover
1423	73	3 kg sieved to 300 microns with washover
1455	77	3 kg sieved to 300 microns with washover
1467	65	3 kg sieved to 300 microns with paraffin flotation
1516	100	7.5 kg sieved to 300 microns with washover
1631	94	Record of vertebrate remains only
1728	82	3 kg sieved to 300 microns with washover
1736	89	3 kg sieved to 300 microns with washover
1738	86	3 kg sieved to 300 microns with washover
1739	87	3 kg sieved to 300 microns with washover
1743	90	7 kg sieved to 300 microns with washover

Table 2. Complete list of taxa recorded from deposits at TSEP site 907, north-east of Goodmanham. Nomenclature and taxonomy for plant remains follow Tutin et al. (1964-80). All material was charred unless otherwise indicated; modern or probably modern material has been excluded.

Taxon	Vernacular name	Remains recorded
<i>Salix/Populus</i> sp(p).	willow/poplar/aspen	charcoal 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>Polygonum aviculare</i> agg.	knotgrass	fruit(s)
<i>Rumex</i> sp(p).	docks	fruit(s)
<i>Atriplex</i> sp(p).	oraches	seed(s)
<i>Silene</i> sp(p).	campions, etc.	seed(s)
<i>Ranunculus</i> Section <i>Ranunculus</i>	meadow/creeping/ bulbous buttercup	achene(s)
<i>Potentilla</i> cf. <i>erecta</i> (L.) Rauschel	?tormentil	achene(s)
cf. <i>Pisum sativum</i> L.	?garden/field pea	cotyledon(s), seed(s)
cf. <i>Trifolium</i> sp(p).	?clovers, etc.	seed(s)
<i>Calluna vulgaris</i> (L.) Hull	heather, ling	flower(s), shoot fragment(s), shoot tip(s)
cf. <i>C. vulgaris</i>	?heather, ling	basal twig and/or root fragment(s)
<i>Fraxinus excelsior</i> L.	ash	charcoal fragment(s)
<i>Galium aparine</i> L.	goosegrass, cleavers	fruit(s)
<i>Buglossoides arvensis</i> (L.) I. M. Johnston	nutlet(s)	corn gromwell, 'stone-hard'
<i>Hyoscyamus niger</i> L.	henbane	seed(s)
<i>Plantago major</i> L.	greater plantain	seed(s)
<i>P. lanceolata</i> L.	ribwort plantain	seed(s)
<i>Lapsana communis</i> L.	nipplewort	achene(s)
Gramineae	grasses	caryopsis/es
Gramineae/Cerealia	grasses/cereals	caryopsis/es
Cerealia indet.	cereals	awn(s)/awn fragment(s), caryopsis/es, silicified awn(s)/awn fragment(s)
<i>Triticum spelta</i> L.	spelt wheat	glume-base(s)
<i>T.</i> cf. <i>spelta</i>	?spelt wheat	spikelet fork(s)
cf. <i>T. 'aestivo-compactum'</i>	?bread/club wheat	caryopsis/es
<i>Triticum</i> sp(p).	wheats	caryopsis/es (some with evidence of sprouting), rachis fragment(s)
<i>Hordeum</i> sp(p).	barley	caryopsis/es, rachis fragment(s)
<i>Avena</i> sp(p).	oats	caryopsis/es
<i>Danthonia decumbens</i> (L.) DC. in Lam. & DC.	heath grass	caryopsis/es

Table 3. Complete lists of plant remains and other components of samples recorded during examination of plant material from site TSEP907, north-east of Goodmanham. 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; Cu—copper; dec—decayed; Fe—iron; ff—fruit fragments; fgts—fragments; fls—flowers; glb—glume, glume-base; inc—including; lf—leaf; max—maximum dimension; rt-tw—basal twig/root; Sect.—Section; sil—silicified; sht—shoot; spec—specimen; spklt—spikelet; spr—sprouting; st—stem; v—very.

<b>Context 1177, Sample 29/T</b>		flint	1 max 20 mm
chalk gravel	3 max 45 mm	root/rootlet fgts (modern)	1
Atriplex sp(p).	1 ?modern	snails	1
Cecilioides acicula	1		
cf. Cerealia indet.	1		
Chenopodium album	1 ?modern		
Fumaria sp(p).	1 modern		
charcoal	1 max 5 mm		
pottery	1 max 40 mm		
root/rootlet fgts (modern)	1		
sand	1		
snails	1		
<b>Context 1184, Sample 11/T2</b>		<b>Context 1200, Sample 15/T</b>	
chalk gravel	2 max 10 mm	chalk gravel	4 max 50 mm
Cecilioides acicula	1	Atriplex sp(p). (ch)	2
Fraxinus excelsior (charcoal)	1 max 10 mm	Cecilioides acicula	2
Gramineae/Cerealia (ch)	1	Triticum sp(p).	2
Rumex sp(p). (ch)	1	?baked clay/daub	2 max 40 mm
Triticum spelta (glb)	1	charcoal	2 max 20 mm
cf. Triticum sp(p).	1 single spec	Atriplex sp(p).	1 ?modern
charcoal	1 max 5 mm	Fumaria sp(p).	1 ?modern
dicot lf fgts (contaminant)	1	Hordeum sp(p).	1
root/rootlet fgts (modern)	1	Salix/Populus sp(p). (charcoal)	1 max 20 mm
snails	1	Sambucus nigra	1 ?modern
		Silene sp(p).	1 v dec
		bone fgts	1 max 5 mm
		flint	1 max 35 mm
		root/rootlet fgts (modern)	1
		sand	1
		snails	1
		<b>Context 1200, Sample 93/BS2</b>	
<b>Context 1198, Sample 12/BS</b>		chalk gravel	3 max 45 mm
chalk gravel	4 max 50 mm	Cecilioides acicula	2
sand	2	sand	2
Cecilioides acicula	1	snails	2
Cenococcum (sclerotia)	1	Atriplex sp(p).	1 modern
Heterodera (cysts)	1	Cerealia indet. (awns)	1
cf. Pisum sativum	1	Hordeum sp(p).	1
Polygonum aviculare agg. (ch)	1	Plantago major (ch)	1
Ranunculus Sect. Ranunculus (ch)	1	Quercus sp(p). (charcoal)	1 max 10 mm
Rumex sp(p). (ch)	1	Triticum sp(p).	1
cf. Trifolium sp(p).	1	cf. Trifolium sp(p).	1
Triticum cf. spelta (glb)	1	charcoal	1 max 10 mm
Triticum cf. spelta (spklt forks)	1 single spec	gravel	1 max 30 mm
bark fgts (ch)	1 max 10 mm	red chalk gravel	1 max 15 mm
bone fgts	1 max 30 mm	root/rootlet fgts (modern)	1
burnt bone fgts	1 max 30 mm		
charcoal	1 max 10 mm	<b>Context 1265, Sample 33/BS2</b>	
		chalk gravel	3 max 70 mm



sand	2
Atriplex sp(p).	1 modern
cf. Calluna vulgaris (ch rt-tw fgts)	1 max 10 mm
Cecilioides acicula	1
Cenococcum (sclerotia)	1
Fumaria sp(p).	1 modern
cf. Triticum sp(p).	1
bone fgts	1 max 50 mm
brick/tile	1 max 15 mm
charcoal	1 max 10 mm
coal	1 max 20 mm
flint gravel	1 max 40 mm
moss (ch st fgts)	1
red chalk gravel	1 max 40 mm
root/rhizome fgts (ch)	1 max 10 mm
root/rootlet fgts (modern)	1
small mammal bone	1
snails	1

#### Context 1286, Sample 38/T

burnt chalk	2 max 25 mm
chalk gravel	2 max 30 mm
sand	2
'ash beads'	1
Corylus avellana (ch)	1
Cruciferae	1 modern
Triticum sp(p).	1
bone fgts	1 max 30 mm
charcoal	1 max 10 mm
flint	1 max 30 mm
pottery	1 max 25 mm
root/rootlet fgts (modern)	1
snails	1

#### Context 1378, Sample 137801/T2

chalk gravel	3 max 40 mm
chalk 'sand'	2
sand	2
unwashed sediment	2 max 5 mm
Atriplex sp(p).	1 modern
Cecilioides acicula	1
Fumaria sp(p).	1 modern
Hordeum sp(p).	1
Stellaria media	1 modern
bone fgts	1 max 30 mm
brick/tile	1 max 5 mm
charcoal	1 max 15 mm
coal	1 max 5 mm
Cu/alloy corrosion fgts	1 max 10 mm
eggshell fgts	1 max 3 mm
flint gravel	1 max 35 mm
glass fgts	1 max 5 mm
red chalk gravel	1 max 25 mm
root/rhizome fgts (ch)	1 max 10 mm

root/rootlet fgts (modern)	1
sandstone	1 max 70 mm
slug shells	1
snails	1

#### Context 1378, Sample 137802/T2

chalk 'sand'	3
chalk gravel	3 max 60 mm
Cecilioides acicula	2
sand	2
snails	2
unwashed sediment	2 max 2 mm
Atriplex sp(p).	1 modern
Cerealia indet.	1
cf. Hordeum sp(p).	1
cf. Triticum aestivo-compactum	1
amphibian bone	1
bone fgts	1 max 35 mm
brick/tile	1 max 5 mm
charcoal	1 max 10 mm
coal	1 max 5 mm
Cu/alloy corrosion fgts	1 max 10 mm
eggshell fgts	1 max 5 mm
Fe corrosion fgts	1 max 5 mm
flint gravel	1 max 20 mm
red chalk gravel	1 max 25 mm
root/rhizome fgts (ch)	1 max 5 mm
root/rootlet fgts (modern)	1
slug shells	1
twig fgts (ch)	1 max 20 mm
woody root fgts (modern)	1

#### Context 1390, Sample 49/T

chalk gravel	3 max 45 mm
burnt chalk	2 max 30 mm
sand	2
snails	2
Calluna vulgaris (ch sht fgts)	1
cf. Calluna vulgaris (ch rt-tw fgts)	1 max 5 mm
Cecilioides acicula	1
Cerealia indet.	1 single fgt
?burnt soil	1 max 5 mm
charcoal	1 max 10 mm
twig fgts (ch)	1 max 10 mm

#### Context 1409, Sample 55/T2

red chalk gravel	3 max 60 mm
sand	2
chalk gravel	1 max 10 mm
charcoal	1 max 2 mm
coal	1 max 2 mm
gravel	1 max 30 mm

**Context 1423, Sample 73/T**

chalk gravel	3 max 40 mm
Atriplex sp(p).	1 ?modern
Calluna vulgaris (ch sht fgts)	1
cf. Calluna vulgaris (ch rt-tw fgts)	1 max 5 mm
Cecilioides acicula	1
Cerealia indet.	1 fgt(s) only
Galium aparine (ch)	1
Potentilla cf. erecta (ch)	1
Rumex sp(p).	1 ?modern
Triticum sp(p).	1
bone fgts	1 max 5 mm
burnt chalk	1 max 35 mm
?burnt soil	1 max 5 mm
charcoal	1 max 10 mm
charred herbaceous detritus	1
charred moss	1
coal	1 max 5 mm
earthworm egg caps	1
root/rhizome fgts (ch)	1 max 10 mm
root/rootlet fgts (modern)	1
sand	1
snails	1

**Context 1455, Sample 77/T**

burnt chalk	2 max 50 mm
snails	2
unwashed sediment	2 max 5 mm
Atriplex sp(p). (ch)	1
Avena sp(p).	1
cf. Calluna vulgaris (ch rt-tw fgts)	1 max 5 mm
Cerealia indet.	1
Corylus avellana (ch)	1
Hordeum sp(p).	1
bone fgts	1 max 15 mm
burnt bone fgts	1 max 15 mm
chalk gravel	1 max 15 mm
charcoal	1 max 10 mm
flint	1 max 20 mm
pottery	1 max 25 mm
root/rhizome fgts (ch)	1 max 5 mm
sand	1

**Context 1467, Sample 65/T**

chalk gravel	3 max 30 mm
?burnt chalk	2 max 70 mm
Cerealia indet.	1
Heterodera (cysts)	1
charcoal	1 max 10 mm
flint	1 max 25 mm
root/rootlet fgts (?modern)	1
sand	1
snails	1

**Context 1516, Sample 100/BS**

chalk gravel	3 max 90 mm
Cerealia indet. (sil awns)	2
Triticum cf. spelta (glb)	2
Triticum sp(p). (inc spr)	2
'char'	2
Atriplex sp(p). (ch)	1
Avena sp(p).	1
Buglossoides arvensis (ch)	1
Cecilioides acicula	1
Cerealia indet.	1
Hordeum sp(p).	1
Hordeum sp(p). (rachis fgts)	1
Triticum cf. spelta (spklt forks)	1
Triticum sp(p). (rachis fgts)	1
?ash concretions	1 max 10 mm
?burnt soil	1
bone fgts	1 max 35 mm
charcoal	1 max 10 mm
sand	1
snails	1
snails (ch)	1

**Context 1728, Sample 82/T**

chalk gravel	4 max 30 mm
Atriplex sp(p).	2
Cecilioides acicula	2
charcoal	2 max 10 mm
sand	2
snails	2
Bilderdykia convolvulus (ff)	1 modern
Fumaria sp(p).	1 ?modern
Gramineae (ch)	1
Hordeum sp(p).	1
Hyoscyamus niger (ch)	1
Rumex sp(p). (ch)	1
charred herbaceous detritus	1
flint	1 max 35 mm

**Context 1736, Sample 89/T**

chalk gravel	4 max 60 mm
sand	2
snails	2
Cecilioides acicula	1
Fumaria sp(p).	1 modern
bone fgts	1 max 80 mm
burnt chalk	1 max 30 mm
charcoal	1 max 5 mm
coal	1 max 30 mm
flint	1 max 25 mm
root/rootlet fgts (modern)	1

**Context 1738, Sample 86/T**

chalk gravel	2 max 30 mm
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unwashed sediment	2 max 5 mm
Atriplex sp(p).	1 ?modern
Cecilioides acicula	1
Fumaria sp(p).	1 modern
bone fgts	1 max 15 mm
burnt chalk	1 max 25 mm
cf. Calluna vulgaris (ch rt-tw fgts)	1 max 15 mm
cf. Triticum sp(p).	1
charcoal	1 max 5 mm
coal	1 max 10 mm
metallic slag	1 max 15 mm
root/rhizome fgts (ch)	1 max 10 mm
sand	1
snails	1

**Context 1739, Sample 87/T**

chalk gravel	3 max 25 mm
cf. Calluna vulgaris (ch rt-tw fgts)	2 max 10 mm
root/rhizome fgts (ch)	2 max 10 mm
Calluna vulgaris (ch fls)	1
Calluna vulgaris (ch sht tips)	1
Cecilioides acicula	1
Danthonia decumbens (ch)	1
Fumaria sp(p).	1 modern
Hordeum sp(p).	1

Lapsana communis (ch)	1
Plantago lanceolata (ch)	1
bark fgts (ch)	1 max 5 mm
bone fgts	1 max 30 mm
burnt chalk	1 max 15 mm
cf. Pisum sativum (ch cot)	1
charcoal	1 max 10 mm
charred herbaceous detritus	1
charred moss	1
root/rootlet fgts (modern)	1
sand	1
snails	1

**Context 1743, Sample 90/BS**

chalk gravel	3 max 90 mm
burnt chalk	2 max 70 mm
Avena sp(p).	1
Cecilioides acicula	1
Cerealia indet.	1 fgt(s) only
bone fgts	1 max 10 mm
cf. Calluna vulgaris (ch rt-tw fgts)	1 max 5 mm
charcoal	1 max 5 mm
flint	1 max 30 mm
pottery	1 max 30 mm
root/rhizome fgts (ch)	1 max 10 mm
sand	1
snails	1

Table 4. Hand-collected shell by context from site TSEP907, north-east of Goodmanham.

Context	Terrestrial taxa		Oyster valves			
	<i>Cepaea</i> sp	Other	Left	Right	Knife	Notes
1019	55	<i>Trichia</i> sp (3) <i>Helicella itala</i> (12)				
1020	1	-	-	-	-	
1031	1	-	-	-	-	
1112	-	-	-	1	1	Not measurable
1122	8	-	1	1	0	Both measurable
1254	-	-	-	1	1	Not measurable. Fresh breakage
1271	3	-	-	-	-	
1290	-	-	-	1	0	Some measurements possible
1320	9	-	-	-	-	
1323	-	-	-	1	0	Not measurable. Very soft.
1333	1	-	-	-	-	
1339	-	-	-	1	0	Not measurable. ?part fossilised
1344	2	-	-	-	-	
1361	4	-	-	-	-	
1372	-	-	-	1	1	Measurable
1423	3	-	-	-	-	
1467	-	-	3	2	3	Some measurable. 3 large frags
1516	1	-	-	-	-	
1517	-	-	1	1	2	Not measurable. 1 frag
1548	1	-	-	-	-	
1671	1	-	-	-	-	
1701	3	-	-	-	-	
1725	-	-	-	-	0	1 indeterminate side valve

Table 5. Land snails recovered from the sediment samples from site TSEP907, north-east of Goodmanham.

Key: f – few; s – some; m- many.

Taxon	Context													
	1177	1198	1200	1286	1390	1423	1455	1467	1516	1728	1736	1738	1739	1743
<i>Carychium</i> sp.							f						f	
<i>Cochlicopa</i> ? <i>lubrica</i> (Müller)										f			f	
<i>C.</i> ? <i>lubricella</i> (Porro)		f									f	f		
<i>Cochlicopa</i> sp.									2					
<i>Vertigo</i> ? <i>pygmaea</i> (Draparnaud)									2				f	f
<i>Pupilla muscorum</i> (Linnaeus)								1						
<i>Vallonia</i> ? <i>excentrica</i> Sterki		s			f	f		f	f				s	
<i>Vallonia</i> sp.				f			f							
<i>Discus rotundatus</i> (Müller)													f	
<i>Cecilioides acicula</i> (Müller)	s	m	m		m	m	f	s		m	s	m	s	f
<i>Trichia</i> ? <i>hispidula</i> (Linnaeus)											s			
<i>Trichia</i> sp.			f		f	f			m	f				
? <i>Cepea</i> sp.							f				1		f	
unidentified		f		s		f						f		f

Table 6. Hand-collected vertebrate remains by phase (excluding complete and part skeletons and other 'special deposits' from site TSEP907, north-east of Goodmanham.

Species		1	2	3	4	Total
Canid	dog family	-	-	-	5	5
<i>Canis</i> f. domestic	dog	3	1	2	8	14
cf. <i>Canis</i> f. domestic	?dog	-	-	-	1	1
<i>Equus</i> f. domestic	horse	12	-	9	9	30
<i>Sus</i> f. domestic	pig	11	2	8	17	38
<i>Cervus elaphus</i> L.	red deer	1	-	-	1	2
<i>Bos</i> f. domestic	cattle	26	23	38	61	148
Caprovid	sheep/goat	40	13	23	55	131
<i>Gallus</i> f. domestic	chicken	-	-	-	5	5
<i>Corvus corone</i> L./ <i>Corvus frugilegus</i> L.	crow/rook	1	2	1	1	5
Amphibian	amphibian	-	-	5	1	6
<i>Sub-total</i>		94	41	86	164	385
Unidentified bird		-	-	-	7	7
Large mammal		75	63	86	179	403
Medium-sized mammal 1		129	44	72	176	421
Medium-sized mammal 2		4	0	3	22	29
Unidentified		124	14	37	129	304
<i>Sub-total</i>		332	121	198	513	1164
<b>Total</b>		<b>426</b>	<b>162</b>	<b>284</b>	<b>677</b>	<b>1549</b>

Table 7. Total fragment counts and frequencies for major domesticates by phase from site TSEP907, north-east of Goodmanham.

Species	Phase 1	%	Phase 2	%	Phase 3	%	Phase 4	%
cattle	26	34	23	61	38	55	61	46
sheep/goat	40	52	13	34	23	33	55	41
pig	11	14	2	5	8	12	17	13

Table 8. Minimum number of individuals (MNI) for major domesticates by phase from site TSEP907, north-east of Goodmanham.

Species	Phase 1	%	Phase 2	%	Phase 3	%	Phase 4	%
cattle	3	33	2	33	3	50	4	31
sheep/goat	4	44	3	50	2	33	5	38
pig	2	22	1	17	1	17	4	31

Table 9. Fragment count showing skeletal element representation for cattle by phase from site TSEP907, north-east of Goodmanham.

Element	1	2	3	4
horncore	2	-	-	3
maxilla	-	1	-	-
mandible	-	1	1	6
isolated teeth	8	12	14	11
scapula	4	-	1	2
humerus	1	1	3	5
radius	3	-	2	2
ulna	1	-	1	-
metacarpal	1	-	3	1
carpals/tarsals		-	1	7
pelvis	2	-	4	3
femur	-	-	1	1
tibia	-	2	2	2
astragalus	-	1	-	4
calcaneum	1	1	-	6
metatarsal	1	3	1	2
phalanx 1	1	-	4	4
phalanx 2	1	-	-	1
phalanx 3	-	1	-	-
cuboid-navicular	-	-	-	1

*Table 10. Fragment count showing skeletal element representation for sheep/goat by phase from site TSEP907, north-east of Goodmanham.*

<b>Element</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
horncore	-	-	1	-
maxilla + teeth	1	-	-	1
mandible	6	3	2	8
isolated teeth	16	5	3	22
scapula	1	-	-	-
humerus	1	1	2	-
radius	3	1	1	3
ulna	-	1	-	-
metacarpal	2	-	1	2
carpals/tarsals	-	-	-	-
pelvis	3	-	3	4
femur	1	-	1	1
tibia	2	-	4	4
astragalus	-	-	-	1
calcaneum	-	-	-	2
metatarsal	4	1	2	2
phalanx 1	-	-	2	4
phalanx 2	-	-	-	1
phalanx 3	-	1	1	-