

**Evaluation of biological remains from excavations in the Hungate area,  
York (site codes YORYM2000.1-14)**

by

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**Summary**

*Fourteen evaluation trenches, excavated in the Hungate area of York, yielded a total of 73 samples, 44 boxes of bone and a single box of shell. These were submitted to the EAU for evaluation of their bioarchaeological potential.*

*Three deposits yielded modest to large assemblages of plant remains preserved by anoxic waterlogging, a feature of all of which was the presence of peatland taxa and/or peat fragments. Suites of insect remains suggesting that deposits included stable manure were obtained. It is possible that the peat was part of a stable manure component, having been used as litter in animal housing, though archaeobotanically the assemblages were not typical of those thought to contain stable manure.*

*Certain of the samples from this evaluation exercise should be recorded in detail for future synthesis. Deposits should not be destroyed by development without archaeological excavation, appropriate sampling, and provision for post-excavation analysis and publication.*

*The bias of the recovered shellfish towards edible taxa, together with the percentage of shells showing evidence of having been opened using tools, strongly suggests that this assemblage derives almost exclusively from human food waste, but it is too small and too poorly preserved to be of any further value for interpretation. The very few land snail remains were of no interpretative value.*

*Useful bodies of vertebrate material, dating to a range of periods, have been recovered from some of the excavated trenches and show some potential for providing both zooarchaeological and archaeological interpretation.*

**Keywords:** YORK; HUNGATE; EVALUATION; ROMAN; ANGLO/SCANDINAVIAN; MEDIEVAL; POST-MEDIEVAL; VERTEBRATE REMAINS; PLANT REMAINS; INVERTEBRATE REMAINS; LAND SNAILS; MARINE MOLLUSCS

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19 May 2000

## Evaluation of biological remains from excavations in the Hungate area, York (site codes YORYM2000.1-14)

### Introduction

During the first quarter of 2000, fourteen evaluation trenches were excavated by York Archaeological Trust in the Hungate area of the city. The trenches were spread across the development area with a view to investigating the nature and extent of the archaeological deposits prior to the redevelopment of the site.

A total of 73 sediment samples (from 46 contexts), 44 boxes of bone (each box approximately 20 litres) and 1 box of shell were submitted for evaluation of their potential for further bioarchaeological work.

### Methods

#### *Sediment samples*

Twenty-one samples were selected for evaluation on the basis of information supplied by the excavators and an initial examination of all the submitted samples. Descriptions of the lithologies of the selected samples were recorded using a standard *pro forma*. Subsamples were taken from eleven 'GBA' (*sensu* Dobney *et al.* 1992) samples for extraction of macrofossil remains following procedures of Kenward *et al.* (1980; 1986), whilst six samples were bulk-sieved. Samples 6 (Context 16025) and 69 (Context 24027) were treated as 'Spot' samples. Two additional samples were described, but no further work was undertaken. Table 1 details the processing/treatment of the samples.

The resulting flots/washovers and residues were examined for plant, invertebrate and vertebrate remains.

#### *Hand-collected shell*

One box of hand-collected shell (representing material from 82 contexts, 13 of which were either undated or too broadly dated for classification, from 12 trenches) were submitted. Brief notes were made on the preservational condition of the shell (using 4-point scales for erosion and fragmentation: 0 - none; 1 - slight; 2 - moderate; 3 - high) and the remains identified to species where possible.

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

#### *Vertebrate remains*

For the hand-collected vertebrate remains that were recorded, data were entered directly into a series of tables using a purpose-built input system and *Paradox* software. Subjective records were made of the state of preservation, colour of the fragments, and the appearance of broken surfaces ('angularity'). Additionally, for the larger assemblages, notes were made concerning fragment size, dog gnawing, burning, butchery and fresh breaks.

Where possible, fragments were identified to species or species group, using the reference collection at the Environmental Archaeology Unit, University of York. Fragments not identifiable to species were described as the

'unidentified' fraction. Within this fraction fragments were grouped into a number of categories: large mammal (assumed to be cattle, horse or large cervid), medium-sized mammal (assumed to be caprovid, pig or small cervid), bird, fish, small mammal and totally unidentifiable.

## Results

The samples are considered in order of sitecode and then by context. Where more than one sample number is given, the number in bold indicates the sample that was processed. Table 1 gives a list of the samples from the various sites that were selected for evaluation.

YORYM 2000.2 (Trench 15)

**Context 15032** [dump deposit for the purpose of raising and levelling the ground surface]  
Sample 34 and **35**

Moist, mid grey-brown, firm/brittle to crumbly (working soft and slightly plastic), slightly sandy, clay silt to silty clay. Very small and small (2 - 20mm) stones, ?rotted mortar, and charred grain were present.

There was a very small washover of about 150 cm<sup>3</sup> of charcoal with moderate numbers of elder (*Sambucus nigra* L.) seeds, some snails, a few other seeds, and some fine (<2 mm) fragments of wood (this last very decayed, and perhaps from sawdust). The moderate-sized residue of about 2.4 litres was of sand with traces of bone and brick/tile. A few fragments of land snail were recovered from this sample including poorly preserved remains of three individuals of ?*Trichia* sp.

YORYM 2000.3 (Trench 16)

**Context 16025** [backfill of a post-medieval brick built culvert]  
Sample 6

This deposit consisted of a mixture of thin sandwich-like layers of fine black sooty material,

which may well have been largely soot or ash, and paler grey-brown silty material which was rather calcareous and which appeared to have fine (sub-millimetre) banding within it. The small residue from this sample consisted of barely 100 cm<sup>3</sup> of cinders and coal with traces of sand-grade brick/tile but no quartz sand.

YORYM 2000.5 (Trench 19)

**Context 19056** [build-up of horticultural type soil - 13thC]  
Sample 1 and **2**

Moist, mid to dark grey-brown, firm to crumbly (working soft and slightly sticky), clay silt, with very small and small (2-20mm) stones, ?brick/tile and charcoal.

There was a moderate-sized residue of about 3.5 litres of sand and brick/tile with some bone and gravel; the very small washover consisted of a few cm<sup>3</sup> of charcoal and coal within which were a very few charred and uncharred seeds which included two charred flax (*Linum usitatissimum* L.) seeds.

The vertebrate remains were rather poorly preserved and fairly fragmented. Mostly the fragments represented large and medium-sized mammals but a small fish assemblage was also recovered. Although most fragments were unidentified, herring (*Clupea harengus* L.) and gadid vertebrae were noted. Remains of vole (*Microtus* sp.) and shrew (*Sorex* sp.) were also identified.

YORYM 2000.6 (Trench 20)

**Context 20018** [primary fill of pit - 15th C]  
Sample **4 + 5**

Waterlogged, dark grey to black, soft, 'gritty' clay sand, with traces of ?wood, fish and marine mollusc shell (including oyster). Mammal bone was recorded as abundant.

The large residue of about 1100 cm<sup>3</sup> consisted of coal, sand and grit with moderate amounts of bone, cinders and decayed wood fragments with a little pottery and brick/tile. The washover, of about 200

cm<sup>3</sup> was of woody debris, mainly very decayed wood to 25 mm and perhaps containing a 'sawdust' component of very fine material. There were a few moderately well preserved uncharred plant and animal remains, of which only *Sphagnum imbricatum* Hornsch. ex Russ. leaves and animal hairs reached an abundance of 2 on the four-point scale used. The former seem most likely to have originated in raised bog peat (cf. Context 20051), the latter perhaps from working of skins or textiles.

The large flot was only examined in part for invertebrate remains. There were moderately large numbers of insects, although detailed analysis would be better carried out on remains from a larger subsample. Fly puparia were abundant, and beetles fairly well represented. 'House fauna' was present (e.g. more than one of each of *Tipnus unicolor* and *Xylodromus concinnus*), and there were some decomposers associated with at least moderately foul conditions (e.g. *Cercyon unipunctatus*, *C. ?haemorrhoidalis*, *Aphodius* sp.).

There was more than one *Trox scaber*, perhaps several, but their preservational condition was the same as for the remaining beetles, and there is no reason to suspect an association with tanning (as deduced by Hall and Kenward 2000 for certain other sites).

Cattle, caprovid, chicken and dog remains were all represented amongst the bones recovered from this sample. A small number of gadid and herring (*Clupea harengus* L.) vertebrae were present.

**Context 20051** [infill of wicker lining (Context 20059) of cut 20061]  
Sample 14, 15 and 16

Moist, dark grey to black, crumbly and, 'crisp' and granular' ?ash, with medium-sized (20-60 mm) stones present. This deposit appeared to be mostly charcoal or cinder in a matrix of ?ash.

The moderate- to large-sized residue of about 800 cm<sup>3</sup> consisted mainly (all but about 150 cm<sup>3</sup>) of twigs and other plant detritus, especially in the <2 mm fractions; the rest was sand and grit. Amongst the plant material, there were rather large amounts of peat (in fragments up to 20 mm) and of wood (to

30 mm, but very decayed). It seems likely that more than one type of peat was present, with components from fen and bog peat both being observed. The former was probably the source of the bog-bean (*Menyanthes trifoliata* L.) seeds recorded, whilst the latter was no doubt the source of the various parts of cotton-grass (*Eriophorum vaginatum* L.) plants and the traces of *Sphagnum* leaves (some of which were *S. imbricatum*). Preservation of the seeds present was variable and they were at low concentrations; some were fresh looking, others (e.g. the bog-bean seeds) distinctly worn (consistent with reworking from peat). Most of the plant taxa were weeds of waste places and cultivated land, though there was a single tentatively identified fuller's teasel (*Dipsacus sativus* (L.) Honckeny) fruit which may indicate textile working (remains of this plant have been recorded from time to time in deposits formed at the margins of the King's Pool in York).

The flot was mostly fine plant detritus, but among this were numerous invertebrate remains, mainly beetles. Preservation varied, although for most of the fossils it was rather poor; however, the condition of the remains posed no special difficulties in identification.

Much of the fauna would have been at home in decaying material with the characteristics of stable manure: moist, foul, but fairly open-textured. The possibility that stable manure as such was present was suggested by the combination of (a) modest numbers of typical decomposers of such material (including *Monotoma* spp., *Anthicus ?formicarius*, *Cercyon atricapillus*, *Lithocharis ochraceus* and *Carpelimus fuliginosus*), (b) small numbers of 'hay' taxa (*Sitona* sp., *Apion* spp., some soft), (c) grain pests (*Sitophilus granarius*, *Oryzaephilus ?surinamensis*), and (d) 'house fauna' (e.g. *Anobium punctatum*, *Xylodromus concinnus*, *Tenebrio obscurus*, *Lathridius minutus* group, *Tipnus unicolor*). The presence of these ecological groups was regarded by Kenward and Hall (1997) as very typical of stable manure. To them may be added some aquatics (e.g. *Hydrobius fuscipes*, *Lophopus crystallinus*), since evidence is growing that aquatic insects and other invertebrates such as Cladocera and Bryozoa very commonly entered archaeological deposits via the faeces of livestock,

having been accidentally ingested (they also seemed to have arrived in water used for various purposes).

Analysis of a larger subsample of this deposit would undoubtedly clarify interpretation.

**Context 20070** [one of a series of dumps excavated in spits built up between 10th and 13/14th C]  
Sample 17

Moist, mid to dark grey-brown, brittle to crumbly (working soft and slightly sticky), clay silt. Small (6-20mm) stones and ?charcoal were present.

There was a moderate-sized residue of about 700 cm<sup>3</sup> of which about 150 cm<sup>3</sup> comprised large bone fragments and 50 cm<sup>3</sup> a single cobble; the rest was mainly sand and gravel. The small washover consisted of a few cm<sup>3</sup> of charcoal with moderate numbers of elder and henbane (*Hyoscyamus niger* L.) seeds and traces of several other probable weeds. There was a very small flot with more elder seeds and some very decayed *Cristatella* statoblasts. No other invertebrates were present.

**Context 20073** [one of a series of dumps excavated in spits built up between 10th and 13/14th C]  
Sample 18 + 19

Moist, dark grey, crumbly (working plastic and slightly sticky), sandy, clay silt, with very rotted marine mollusc shell. It is possible that the dark colour of this deposit was because of the inclusion of fine charcoal rather than because of a humic content.

The small residue was about 250 cm<sup>3</sup> of sand and gravel with some bone and pottery. The washover consisted of about 100 cm<sup>3</sup> of charcoal with many cereal grains (almost all oats, *Avena* sp(p)., and barley, *Hordeum* sp(p).), some only partly charred. There were also a few charred and uncharred seeds of weeds (including wild oats, *Avena fatua* L.) and at least one charred flax seed. There were only traces of (badly decayed) invertebrate cuticle.

Forty-two fragments of rather battered bone were recovered from the residue. Most fragments (37) were unidentified to species, but were assigned to the large and medium-sized mammal categories. A

single cat metapodial and a cow third phalange were noted, along with herring (*Clupea harengus* L.), eel (*Anguilla anguilla* (L.)) and Pleuronectidae vertebrae.

**Context 20079** [one of a series of dumps excavated in spits built up between 10th and 13/14th C]  
Sample 24 + 25

Moist, mid to dark grey, soft (working plastic), humic, silty, clay sand. Charcoal, wood fragments and vertebrate remains were present.

There was a small residue of about 250 cm<sup>3</sup> of which about 50 cm<sup>3</sup> was organic detritus in the washover (which proved to be mainly woody root fragments, perhaps of recent—or at any rate post-depositional—origin), the rest rather clean sand and gravel and a large (50 cm<sup>3</sup>) fragment of bone. There were three charred cereal grains identified as oat, barley and ?wheat (cf. *Triticum* sp.). The small flot consisted mostly of rootlet fragments and included no more than a trace of decayed invertebrate cuticle.

**Context 20080** [pit fill - 10th C]  
Sample 26 + 27

Moist, mid to dark grey-brown, crumbly (working soft), slightly sandy, clay silt, with small (6-20mm) and large (>60mm) sized stones and charcoal.

Of the moderate- to large-sized residue of about 850 cm<sup>3</sup>, all but about 300 cm<sup>3</sup> was material which formed a washover of organic detritus; the rest was sand and gravel. The organic detritus mainly consisted of root fragments which were probably post-depositional, perhaps even recent in origin, and some charcoal. Seeds in the washover and flot were sparse but mostly quite well-preserved; they included some woody types likely to survive where less robust propagules had been lost to decay.

No invertebrate remains were observed in the flot from either subsample.

The very few bone fragments recovered were rather small and battered in appearance.

**Context 20094** [?river deposit or ?bank deposit or ?dumps into marsh - 2nd/3rd C]  
Sample 51 + 52

Moist, mid blue-ish grey oxidising to slightly orange grey-brown, soft (working plastic and somewhat thixotropic), very sandy clay to clay sand. Fragments of charcoal and coal were present.

The very small residue of about 500 cm<sup>3</sup> was of sand and gravel with traces of brick/tile, pottery and bone; there was a very small washover of a few cm<sup>3</sup> of charcoal (to 10 mm).

**Context 20097** [fill of cut - 2nd/3rd C. ?waterlain or ? dumped deposit]  
Sample 61 + 62

Moist, mid grey oxidising to slightly orange grey-brown, stiff (working plastic), very sandy clay, with flecks of charcoal.

The very small residue of about 450 cm<sup>3</sup> consisted of sand and gravel (to small cobble size, 100 mm); a small washover of a few cm<sup>3</sup> of charcoal (to 10 mm) provided the only ancient plant remains (there were also some root fragments which may have been post-dated the formation of the deposit).

**Context 20099** [?river deposit or ?bank deposit or ?dump into marsh - 2nd/3rd C]  
Sample 64 + 65 (not processed)

Moist, light to mid orange-brown to mid grey, thixotropic (working soft and plastic), clay sand.

This deposit was not processed as inspection in the laboratory strongly suggested that it was a 'natural' river deposit.

**Context 20100** [?river deposit or ?bank deposit or ?dump into marsh - 2nd/3rd C]  
Sample 66 (not processed)

Waterlogged, lumps of mid grey-brown sandy, slightly stony clay in a matrix of mid slightly orange grey-brown, silty sand. Description of the sediment was hampered by the waterlogged condition of the sample.

This deposit was almost certainly a 'natural' river deposit and, therefore, no further analysis was undertaken.

YORYM 2000.7 (Trench 24)

**Context 24008** [dump within backyard - 11-12thC]  
Sample 67

Moist, mid to dark grey-brown, crumbly (working slightly sticky), sandy, silty clay to sandy clay silt (locally slightly more clay). Medium-sized (20-60 mm) stones, white flecks and vertebrate remains were present. A possible ash component was also noted.

This sample yielded a small residue of about 400 cm<sup>3</sup> of which most was sand and stones with traces of brick/tile, bone, oyster shell and pottery. The small washover contained a few roots and some (rather rounded) charcoal to 10 mm. The only identifiable remains were seeds of elder and charred nutlets of bog-rush, *Schoenus nigricans* L. (see further under Context 11035, below). Most of the vertebrate remains were unidentified. All were small and <5 cm in dimension. Two burnt fragments were noted. The small flot yielded further rootlets. There were traces of well decayed arthropod cuticle, among which only a single fragment of *Trox scaber* could be recognised.

**Context 24027**  
Sample 69 SPOT

A large lump of ?cinder (to about 150 mm) with some fragments of charred plant material in thin ribbons on one face; these seem most likely to be bark of some kind, presumably young bark of hazel, silver birch or cherry, all of which can produce thin peeling strips.

**Context 24051** [dump or accumulation of tanning and shoe-making waste - 15thC]  
Sample 71

Just moist, mid grey-brown, crumbly, slightly clay silt. Small (6-20mm) stones, ?rotted charcoal, bone and very rotted marine mollusc shell were present, whilst brick/tile was recorded as common (i.e. forming 1-10% of the residue).

There was a moderate-sized residue of about 700 cm<sup>3</sup> of charcoal, cinder, coal and bone with some concretions (which were worn and perhaps reworked). Seeds in the washover from this and from the small flot were few and mainly very decayed uncharred propagules from arable weeds. Also present were traces of fig (*Ficus carica* L.) seeds and several cereals (oats, barley and bread/club wheat, *Triticum 'aestivo-compactum'*, all being noted). The assemblage overall seemed typical of urban occupation deposits where there had been a low input of plant material and/or rather strong decay at or since burial.

**Context 24057** [dump or accumulation of tanning and shoe-making waste - 14/15th]

Sample 71

Moist, black, crumbly (working slightly plastic), charcoal rich, sandy silt. Large (>60 mm) stones, brick/tile, twigs and vertebrate remains were present.

The large residue was about 1.1 litres, of which about 600 cm<sup>3</sup> formed a washover of granular wood fragments and twigs with rather a lot of very decayed leather (including one large—up to 100 mm—fragment), and some coal, charcoal and cinder. The remainder was mainly brick/tile (to 40 mm) and sand.

There were some very well preserved plant remains including some nearly whole ash (*Fraxinus excelsior* L.) fruits (keys, minus their seeds); indeed, there was a distinct component of woody plants including two bullace (*Prunus domestica* ssp. *insititia* (L.) C. K. Schneider) fruitstones and one sloe (*P. spinosa* L.) stone, all holed by small mammals. Other remains included taxa representing a diversity of likely components. Thus there were probable food plants, such as hazel (*Corylus avellana*) nutshell, fig seeds, apple (*Malus sylvestris* Miller) 'core', and wheat/rye (*Triticum/Secale*) 'bran' (of which more was present in the flot). Grassland plants (perhaps from hay) and cornfield weeds (perhaps from straw) were also present in small numbers, as were peatland taxa (notably cotton-grass and bog-bean), presumably from reworked peat. Preservation was mostly rather good and overall the assemblage

suggested a possible origin in stable manure but with some taxa probably from local weedy stands of vegetation (e.g. burdock, *Arctium*, and scotch thistle, *Onopordum acanthium* L.).

The flot (of which half was examined) contained numerous insects, identifiable but not very well preserved. House fauna was well represented by several *Lathridius minutus* group and *Tipnus unicolor*, more than one *Ptinus ?fur*, and single individuals of some others. Grain pests were present (*S. granarius* and *O. ?surinamensis*). Foully decaying matter was suggested by *Gyrophypnus* sp., *Platystethus arenarius*, several *Cercyon analis*, *Oxytelus sculptus*, *Monotoma* sp., *Omalius ?rivulare* and at least three *Aphodius* species. *Sitona* sp. and *Apion* sp?p. (one freshly emerged) perhaps hint at hay, so the whole assemblage may be derived from stable manure.

A larger subsample would yield a clearly interpretable group of insect remains.

Forty-six fragments of bone, all of which were extremely well-preserved, were recovered from this sample. Most of the fragments were the remains of fish, including, herring (*Clupea harengus* L.) and Pleuronectidae. Chicken and goose bones were also noted.

YORYM 2000.8 (Trench 8)

**Context 8066** [backfill of Roman pit]

Sample 58

Moist, mid slightly orange grey-brown, sticky (working soft and somewhat plastic), silty clay to clay silt, with very small (2-6mm) stones and mammal bone.

There was a very small residue of about 350 cm<sup>3</sup> and a small washover of a few cm<sup>3</sup> of charcoal to 5 mm (and single charred barley and unidentified cereal grains); the residue was mostly sand and concreted silt with some bone and brick/tile.



## YORYM 2000.10 (Trench 11)

**Context 11028** [occupation deposit - 11/12th C]  
Sample 4

Moist, mid to dark grey-brown, crumbly (locally plastic), sandy silt to silty sand, with small clay lumps. Vertebrate remains were present. This deposit was possibly rich in ash.

There was a small residue of about 550 cm<sup>3</sup> of which about 150 cm<sup>3</sup> was a washover of rather angular and fresh-looking charcoal (to 20 mm, and including material of oak and ash) and some bone and oyster shell; the rest was sand with traces of brick/tile, burnt bone and fish bone. There was a single charred ?barley grain. Vertebrate remains recovered from this deposit were well-preserved, but quite fragmented. Of the 45 fragments recorded only 13 could be identified. These included pig, chicken and fish (herring and Pleuronectidae) remains. The tiny flot contained further charcoal and traces of well-decayed ?arthropod cuticle.

**Context 11035** [occupation deposit - 10th C]  
Sample 47

Moist, mix of light yellow to mid grey-brown, brittle (working crumbly) ?ash, with burnt soil and ?fine charcoal present.

The moderate-sized residue of about 700 cm<sup>3</sup> consisted of baked clay/daub with some gravel and sand and bone fragments (mostly burnt black or white). There was a small washover (perhaps 50 cm<sup>3</sup>) of charcoal and a small flot. Notable in the washover and flot were moderate numbers of charred and uncharred nutlets of bog-rush (*Schoenus nigricans*); this plant has been used as thatching material in the past and it is difficult to see how else it might have arrived here unless used in this way or perhaps as floor litter. Other identifiable plant remains were mostly charred and included elder, bog-bean and a few weed taxa. All of the 17 bone fragments recovered from the residue were burnt and rather brittle, and none were identified to species. No invertebrate remains were observed.

## YORYM 2000.12 (Trench 12)

**Context 12013** [dump deposit - 13-16th C]  
Sample 53

Moist, mid to dark grey-brown, crumbly, silty sand to sandy silt. Fragments of mortar/plaster, brick/tile, charcoal, bone and pieces of very rotted marine mollusc shell were present. Roots, possibly of modern origin were also noted.

There was a large residue of about 3 litres of sand, coal and considerable amounts of bone, much of it from fish. The latter included the remains of herring (*Clupea harengus* L.), eel (*Anguilla anguilla* (L.)), cod (*Gadus morhua* L.), ling (*Molva molva* (L.)) and other Gadidae. Also recorded were cinders and brick/tile. The washover was mostly coal or 'char' derived from it, with a single uncharred fig seed and a single charred bread/club wheat grain.

*Hand-collected shell*

Hand-collected shell was recovered from eighty-two contexts (from twelve trenches). Preservation was variable (ranging from very poor to very good) but predominantly poor (average erosion and fragmentation scores were 2.45 and 2.42, respectively, of a possible 'worst' value of 3.0). All of the material was assessed and the taxa identified as closely as possible.

Tables 2 and 3 show the total numbers of contexts assessed by trench and period respectively. Table 4 gives the total number of fragments (not counting mm-size flakes of shell) recorded by taxon and period.

The mollusca from almost all of the contexts included oyster shell. Summary information (by period) for this material is presented in Table 5.

Most of the recovered shell was of edible shellfish from deposits of medieval and post-medieval date. Oyster was, by far, the most commonly represented taxon with mussel (*Mytilus edulis* L.—occasionally present in moderate numbers: Contexts 20005 and 20003, post-medieval and medieval deposits within



trench 20), cockle (*Cerastoderma edule* (L.)), and occasional common whelk (*Buccinum undatum* (L.)) remains also present in small numbers. All are edible species commonly occurring off the east coast of Britain.

Oyster shell was, on the whole, fairly poorly-preserved much of the shell being soft and flaky. Approximately 78% of the valves could be identified as either left or right valves but, of the valves for which 'side' could be determined, only 19% were measurable (though measurements were not taken as part of this evaluation). Evidence of the oysters having been opened using a knife or similar implement (as shown by 'V'- or 'W'-shaped notches on the shell margins) was noted on 39-48% of the valves. There was very little evidence of damage to the valves (e.g. polychaet worm burrows, dog whelk holes) or encrustation (e.g. by barnacles) by other marine biota. In a few cases, pairs of valves from different individuals had become fused, perhaps indicating a cramped or over-crowded growing environment.

The recovered land snails were all *Helix* sp. (probably *Helix aspersa* Müller, the 'garden snail', a highly eurytopic species of no value in interpreting ecological conditions on the site, beyond indicating the availability of at least modest amounts of calcium carbonate, possibly provided by the decomposing shellfish remains).

### Vertebrate remains

Vertebrate material was recovered from a total of 12 trenches and amounted to 44 boxes. Table 6 shows the amount of material recovered from each trench by general period, whilst Table 7 shows the number of fragments, measurable bones and mandibles with teeth *in situ* recorded during the evaluation. Where possible, material for recording or scanning was selected to represent the various time periods covered by the deposits from each trench.

#### 2000.2 (Trench 15)

Deposits within this trench produced 6 boxes of vertebrate remains. Approximately two thirds (4

boxes) of the assemblage represented just 3 contexts (15015, 15017 and 15019) of post-medieval date (mainly 16-18th century). A very small assemblage of late medieval date (14-15th century) was also recovered.

Preservation of most of the material was described as 'good' or 'excellent', although the largest groups of bones, those from Contexts 15015 and 15017 in particular, had a slightly battered appearance. Additionally, bones from Contexts 15016 and 15032 were rather poorly preserved, material from the latter having a mixed appearance and including some very eroded fragments. Human bones were identified from a number of contexts (15015, 15014, 15030 and 15032) which also suggests the possible presence of redeposited material.

Butchered fragments were fairly frequently observed within the post-medieval assemblages. Evidence of butchery took the form of split cattle shaft fragments, chopped vertebrae (both longitudinally and transversely) and, from Context 15019, a sheep skull which had been chopped in half. Single horncores, chopped from the rest of the skull, were noted from Contexts 15019 and 15022).

The range of species present was similar throughout the assemblage and included the usual domesticates, i.e. cattle, caprovids, pigs, chickens and geese. Some juvenile individuals were present amongst the cattle remains, a characteristic of post-medieval assemblages. Bones representing large cattle and pigs were also recorded in the assemblage. Large animals of post-medieval date may indicate the presence of 'improved' varieties of livestock.

Wild birds were represented by a single ?lapwing (*Vanellus vanellus* (L.)) humerus from Context 15019, whilst fallow deer (*Dama dama* (L.)) fragments were identified from Context 15022. Fish bones were also recovered, and included a conger eel (*Conger conger* (L.)) dentary, which, on the basis of comparison with modern reference material, probably represented an individual of over 1 m in length.

An initial examination of body part representation for the major domesticates from the post-medieval

assemblage does not show any clear patterns. A range of elements, including meat-bearing and non-meat-bearing ones, is evident for all three of the main domesticates (cattle, caprovids and pigs). It is likely that the assemblages from these deposits represent waste from a range of activities. A full analysis of the bones would probably prove to be more illuminating.

### 2000.3 (Trench 16)

The very small assemblage from this trench amounted to three bags, representing material from three contexts. These deposits were modern (18-20th C) in date. No further analysis of this material was undertaken

### 2000.5 (Trench 19)

A total of 16 animal bone fragments were recovered from this trench. This material represented four deposits interpreted by the excavator as possible horticultural soils. Numbers of fragments are insufficient to provide any useful information.

### 2000.6 (Trench 20)

This trench produced the largest assemblage of bone, amounting to 12 boxes, representing 54 contexts. Approximately eight boxes of bones were recorded or scanned.

Bone was mainly recovered from late medieval/early post-med deposits (20005, 20008, 20013, 20016, 20018 and 20033 (14th)), whilst deposits of Anglo/Scandinavian to early medieval date (20073, 20077, 20078, 20079 and 20082) produced a smaller assemblage. Material from a series of Roman dumps was also assessed.

With the exception of the fragments recovered from the sequence of Roman deposits, the bones from this trench were reasonably well preserved, although it was noted that some of the larger groups had a slightly battered appearance and the occasional very rounded fragment. Colour of the fragments did vary from fawn to dark brown, but this was not apparent within contexts. A single human phalanx was identified from Context 20016, and this fragment may indicate the presence of

reworked material. Very little bone was present in the deposits of Roman date and those fragments which were recovered were small, fragmented and rather poorly preserved.

Evidence of butchery, chopping in particular, was quite high throughout most of the periods represented. A recurring feature of the 14th to 15th century assemblages was the presence of both cattle and caprovid vertebrae which had been split longitudinally. This demonstrates the practise of splitting carcasses and is a feature quite commonly found in medieval assemblages. The earlier, 10th to 12th century material, particularly that from Context 20073, was also fairly heavily butchered and included split cattle shaft fragments. Bones from this deposit were also more fragmented than the later assemblage and slightly less well-preserved.

Late medieval/early post-medieval activity within this trench is characterised by an episode of dumping and pit digging. The vertebrate assemblage recovered from these deposits showed a greater range of species than encountered in most of the other trenches. Besides the remains of cattle, caprovids, pig, chickens and geese, small quantities (mostly single fragments) of the remains of wild species were identified. These included fallow deer (*Dama dama* (L.)) from Contexts 20002 and 20005, roe deer (*Capreolus capreolus* (L.)) from Context 20016, crane (*Grus* sp.) from Context 20008, Columbidae from Context 20008, razorbill/guillemot (*Alca torda* L./*Uria aalge* (Pontoppidan)) from Context 20016 and various wader fragments (Contexts 20008, 20016 and 20033). The remains of turbot (*Scophthalmus maximus* (L.)) and Gadidae were also identified.

A preliminary examination of the composition of the recorded assemblages suggested that a mixture of waste was represented. Fragments such as mandibles, cranium, metapodials and other non-meat bearing elements were noted, including a few horse bones (one metapodial sawn and chopped). However, a large proportion of the bones appeared to be kitchen/domestic refuse. Cattle fragments also included the remains of very young individuals, a characteristic normally associated with later, post-medieval assemblages. Their presence in these

deposits, along with the diversity of the species represented may hint at high status occupation.

Dump deposits of 10th-13/14th century date produced an assemblage not that dissimilar to the later material. The range of species was fewer and more restricted to the major domesticates, although a roe deer (*Capreolus capreolus* (L.)) tibia fragment was identified from Context 20077. In the case of this assemblage, however, preliminary investigations suggested the presence of a larger component of primary butchery waste than noted for the later period.

As already mentioned, the Roman vertebrate remains were few in number and rather battered and eroded, with few identifiable fragments. Contexts 20095 and 20096 contained fragments of the same human humerus. The nature of the bones from these deposits suggests that most of this material has been redeposited.

#### 2000.7 (Trench 24)

Ten boxes of bones were recovered from this trench. On the basis of spot dates provided by the pottery over half of the material is 10th -12th century in date, with a small group of bones of 14/15th century date also present. Preservation of the recorded material was mainly good. The 10th century assemblage from Context 24061 (amounting to 3 boxes) was well-preserved on the whole, but had a slightly battered appearance and a small component of rounded fragments. However this material did not appear to have a mixed origin, but may have included redeposited material. Bones from Context 24057 (14/15th century deposit), on the other hand, whilst reasonably well preserved, had clearly not all been dumped at the same time or come from the same place. Approximately 20% of the fragments were dark brown in colour and had very rounded edges. The rest of the assemblage was so well preserved that some fragments had an almost 'greasy' appearance and the edges of the bones were 'distinct'. These records suggest that quite a large component of this assemblage was almost certainly reworked material.

The small 14/15th century assemblage clearly included rubbish and waste from a number of

different activities. Remains of cattle, caprovids and pig typically formed the largest proportion of the assemblage. A range of elements was represented for these species, which included meat-bearing and non-meat-bearing elements. The inclusion of kitchen waste in the assemblage is suggested by the remains of chickens and geese. The elements of these birds that were identified are those which would normally be removed before the bird was cooked. Also present were a few dog and cat bones. Traces of possible skinning marks were observed on two dog humeri from Context 24057. Caprovid metapodials were also fairly numerous in the assemblage from this deposit. These remains may derive from the processing of animal skins.

Most of the bone from this trench was recovered from a series of dump deposits of 10/11th century date, with 3 boxes of material being recovered from Context 24061. Evidence for butchery was extensive and included transversely chopped large mammal (assumed to be mainly cattle) shaft fragments, and heavily chopped (some longitudinally) cattle vertebrae and pelvises. Two cattle mandibles had been burnt or scorched along the tooth row.

Another characteristic of the material from this period was the presence of small numbers of cattle, goat and sheep horncores. Most had been deliberately chopped from the main part of the skull. Metapodials, including those of goat, were also more prevalent in these deposits. Several slivers of antler were identified, providing clear evidence for antler working. These remains all suggest waste from craft activities, albeit on a fairly small scale.

Evidence for the presence of four-horned sheep was provided by a ram skull (Context 24061) with two short anterior horncores and two smaller straight posterior cores. Although uncommon, multi-horned or polycerate skulls have been found at other urban archaeological sites, including St Saviourgate, York (Carrott *et al.* 1998b) and Flaxengate, Lincoln (O'Connor 1982). A genetically determined growth defect in the horn core is believed to cause this feature.

The remains of cattle were most common in this period, with caprovid bones also present in reasonable numbers. Fragments of other species were rather scarce but included pig, horse and dog. Birds were represented by chicken and geese.

A preliminary examination of the occurrence of different parts of the skeleton for cattle from Context 24016 showed that more than half of the fragments represented non-meat bearing elements such as horncores, mandibles, isolated teeth and metapodials. However, meat-bearing elements radii, humeri and pelvis were also fairly well represented. A number of different economic activities appear to have been responsible for the remains recovered from this deposit. One component seemed to be waste from craft processes such as antler working, hornworking and/or tanning, whilst the remainder of the material suggested refuse from slaughter, primary butchery and secondary carcass preparation.

#### 2000.8 (Trench 8)

Twenty-nine contexts from this trench produced three boxes of bone, of which one was recorded in detail. Most of the deposits from which any significant quantities of bone were recovered were dated by pottery to the 10th and 11th centuries. The vertebrate remains from these deposits formed a small assemblage which showed similarities to the bones from Trench 24. Preservation was variable throughout the trench. Some of the assemblages were recorded as having 'good' preservation (e.g. those from Contexts 8017 and 8021), whilst others (e.g. 8015, 8022 and 8025) were much less well-preserved and contained bones which were battered in appearance, with flaky and eroded surfaces. Cattle remains and large mammal fragments predominated and showed evidence of systematic and extensive butchery. Only a few fragments of caprovid, pig, chicken and goose were recorded. A single gadid cleithrum was identified from Context 8021.

Few measurable fragments, or mandibles with teeth *in situ* were recovered.

#### 2000.9 (Trench 25)

As with Trenches 16 and 19, very few vertebrate remains were recovered, in this case only 10 (148 g) fragments representing four contexts. This assemblage is too small to provide any useful information.

#### 2000.10 (Trench 11)

A total of four boxes (representing 39 contexts) of bones was recovered from this trench. Deposits of Anglo/Scandinavian to medieval date were encountered but mostly the bone was retrieved from deposits of 10th century date. Over a quarter (1.5 boxes) of the material came from a single context (11055). Although much of the recorded material was very well preserved, the bones from 11055 were poorly preserved, had very battered and eroded surfaces and were also mottled black/brown in colour. As a consequence of the poor preservation, measurable fragments from Context 11055 were few in number.

The recorded assemblage included cattle, caprovid and pig remains, with a few horse, chicken and goose fragments.

#### 2000.11 (Trench 33)

Only three contexts from Trench 33 produced bone, a total of 12 (107 g) fragments. These deposits were almost certainly late medieval to post-medieval in date. Little information can be obtained from such a small assemblage.

#### 2000.12 (Trench 12)

The vertebrate assemblage recovered from this trench amounted to four boxes (each box approximately 20 litres), representing 23 contexts. Most of the deposits from which bone was produced were either dumps or pitfills dating to the 10th -16th centuries. The pottery suggests that some of these deposits are more broadly dated than others or include redeposited or reworked material. This can be seen from the preservation of the bone. Of the material recorded, the largest concentrations (from Contexts 12007, 12012, 12013 and 12015) and least well-dated assemblages were recorded as

containing a mixture of well-preserved and more poorly preserved fragments. Some of these bones were also battered in appearance, whilst others had eroded and flaky surfaces. Conversely, the more tightly dated material (from Contexts 12008 and 12021) tended, on the whole, to be better preserved.

A quite diverse range of species were identified from the deposits in this trench. The usual domestic mammals such as cattle, caprovid and pig made up the bulk of the assemblages. However, bones of cats and dogs, including single elements and part skeletons were noted from a number of the deposits (12008, 12011, 12012, 12013, 12015 and 12021). These remains could be waste from the activities of a furrier or a tanner, but no skinning or butchery marks were observed on any of the bones. It seems more likely that this area may have been a convenient place for dumping dead pets or strays.

Birds were represented by goose, chicken, duck and single fragments of red kite (*Milvus milvus* (L.)) from Context 12015 and ?jack snipe (cf. *Lymnocytes minimus*) from Context 12013. Fish bones were also present and included turbot (*Scophthalmus maximus* (L.)), haddock (*Melanogrammus aeglefinus* (L.)), Gadidae and Rajidae, with herring and eel being recorded from Sample 53 (Context 12013). The remains of fallow deer (Contexts 12013, 12015), hare and rabbit (both from Context 12013) were also identified.

These deposits produced a varied assemblage which obviously included much domestic/kitchen refuse. Some butchery waste is indicated though by the presence of the non-meat bearing elements of cattle, caprovids and pigs.

#### 2000.13 (Trench 13)

Three boxes of bones were recovered from this trench. Dating provided by the pottery indicates that the material was rather mixed. Overall, the preservation was recorded as good to fair, but some contexts contained battered and rounded fragments.

Material from ten deposits was scanned. Most contained human remains with varying proportions of animal bones. Much of the human material was

almost certainly fragments from burials which had been disturbed during later grave digging.

#### 2000.14 (Trench 14)

Only a single box of bone, representing material from eight contexts, was recovered from Trench 14. Pottery spot dates suggest that these deposits were mainly post-medieval, and the broad scale of these dates indicates that some reworking of deposits has taken place.

Human remains were identified throughout the assemblage, which must surely represent residual/redeposited material from the earlier medieval graves. Material from this trench shows no potential for further analysis.

### Discussion and statement of potential

#### *Plant and invertebrate remains (other than shell)*

Some of the deposits at sites 2000.6 and 2000.7 contain abundant biological remains preserved by anoxic waterlogging, and this material has substantial potential for useful analysis providing its archaeological context is fully understood. Even if the context is not wholly elucidated, the remains would be of use in wider synthesis providing dating is secure; the records of grain pests and of *Tipnus unicolor* are of particular value in this respect since both changed their abundance substantially in the past.

Where there was suitable preservation, the suites of invertebrate remains recovered appeared at the level of analysis possible in evaluation to indicate the presence of stable manure. Plant remains indicated a variety of materials of which some may have been litter consistent with the presence of stable manure, though lacking the component of grassland plants which is usual in such assemblages.

Several deposits contained very small quantities of charred plant material other than charcoal, but with the possible exception of the sample with moderate amounts of charred and uncharred nutlets of bog-rush, they are not interpretatively informative from an archaeobotanical point of view.

### Shell

Only small assemblages of remains were recovered from individual deposits. When considered by trench, only Trench 20 (2000.6) gave a modest-sized shell assemblage.

The almost complete bias of the recovered shell towards edible taxa, together with the percentage of oyster shells showing evidence of having been opened using tools, strongly suggests that these assemblages derive almost exclusively from human food waste.

From current evidence, the oysters could only have been imported to the site from the Kent, Essex or Suffolk coasts or the Firth of Clyde (Winder 1992 and pers. comm.). However, Kenward (1998) has speculated that exploitation of more local (but as yet unlocated) oyster beds may well have been more widespread along the east coast of England.

The fusion of the valves of some of the recovered oyster shell was, perhaps, indicative of overcrowding in the bed(s) and the lack of epibionts may suggest a relatively poor growing environment.

It seems likely that all of the remains of other edible marine taxa were also derived from human food—all of these taxa are common off the coast of north eastern Britain today.

The land snail remains were of no interpretative value.

### Vertebrate remains

Excavations at Hungate have enabled us to explore an area of York from which little archaeological information was previously known. Useful bodies of vertebrate material, dated to a range of periods, have been recovered from most of the excavated trenches and show some potential for providing important zooarchaeological and archaeological information.

The very small assemblages dated to the Roman period from Trenches 11, 20 and 24 show little or no potential for further analysis. Further excavation

may produce more substantial assemblages of this date, but on the basis of the current material, this seems unlikely.

The vertebrate remains from deposits of 10th -12th century date in Trench 24 clearly hold much important evidence for reconstructing aspects of human activity. Preservation is good, with little indication of residual or redeposited material. The bulk of the material appears to be refuse from a range of different activities, including craft working and carcass preparation, with little domestic food waste present. Similarly dated assemblages were recorded from nearby Trenches 11 and 20.

A number of recent excavations within the city, specifically at Davygate (Carrott *et al.* 1998a) and St Saviourgate (Carrott *et al.* 1998b) have also produced early medieval assemblages. A synthesis of these data (combined with analyses of the datasets from Hungate) would provide a wider understanding of the activities being undertaken in different areas of the city.

Aspects of the vertebrate assemblage from Trench 20 also show some potential for interpreting 14/15th century deposits, possibly associated with the Carmelite Friary. A large proportion of the assemblage clearly represents domestic/kitchen refuse, although a component of butchery waste is also present. Longitudinally chopped cattle vertebrae may indicate that the Friary was being provisioned with sides of beef and that the small quantities of butchery waste may represent small scale carcass preparation undertaken by the friars themselves. This and the presence of juvenile cattle remains, more commonly associated with later post-medieval deposits, may suggest that the friary was being supplied from outside the city. Similar remains were recovered from deposits of the same period at the Bedern, York (Bond and O'Connor 1999) and here it was suggested that the Vicar's college was obtaining beef from specialist dairy herds, a source not available to other inhabitants of the city.

The range of wild mammal, bird and fish remains from the same assemblages hint at an association with high status or ecclesiastical establishments. Remains of deer and crane indicate access to wild



resources, which may also suggest individuals of high status. Venison was a prized commodity in the medieval period and was usually only available to people either through hunting in their own parks or through gifts provided by patronage (Neave 1991).

The presence of the guillemot/razorbill fragment is unusual, but remains of these birds have been found in medieval deposits elsewhere in York (O'Connor 1988; 1989). Bond and O'Connor (1999) have postulated that auks may have been seen locally as an acceptable substitute for fish for eaten on Fridays and fast days, again perhaps associated with an ecclesiastical diet.

Vertebrate remains from medieval dump and pitfill deposits in Trench 12 show a similar diverse range of species. Fish remains from Sample 53 (12013) were numerous, showing the potential of these deposits for the preservation of more fragile remains. Unfortunately, the largest accumulations of material appear to be too broadly dated to provide useful interpretation. These assemblages would have more potential if a tighter dating framework could be achieved.

A small and mostly late medieval/post-medieval assemblage was recovered from Trench 15. Overall, preservation was good, although a few human fragments suggest that a small component of reworked material may be present.

This late medieval/post-medieval assemblage would provide a small but inherently useful dataset for archaeological interpretation. This transitional period has been identified by English Heritage (1991) as a research priority. The investigation of assemblages of this and later periods has been, until recently, largely neglected, leaving a gap in our knowledge at an important period of agricultural intensification. Changes in height and body confirmation and hence the evidence of early stock improvement may be identified through the use of biometrical data from these vertebrate remains. Another possible indicator of the so called 'agricultural revolution' is the increase in the number of juvenile cattle remains in assemblages of this period (Albarella and Davis 1996; Dobney *et al.* 1996), a feature also observed in the assemblage from Trench 15. This increase in the culling of

younger animals has been interpreted as evidence of dairying, with the consequent surplus of calves for veal.

The bones recovered from these sites will, therefore, contribute to a broader archaeological research framework, which includes aspects of craft and industry, wealth and socio-economic status, provisioning and access to resources and the intensification of agriculture – information still lacking for large areas of the city.

## Recommendations

Most of the samples yielded insufficient plant remains to warrant further study on them and it seems unlikely that many of the samples not selected for this evaluation would be archaeobotanically productive and archaeologically informative. The assemblages containing peat or peatland taxa from contexts 20018, 20051 and 24057 might be worth examining in more detail to provide more information about the way the deposits formed or the nature of material from occupation nearby which contributed to them.

The invertebrate remains from certain of the samples from this evaluation exercise should be recorded in detail for future synthesis.

An archive of measurements of those oyster valves (for which this is possible) from well-dated contexts should perhaps be made (for comparative purposes), although the data would not add to the interpretation of this site.

No further work is recommended on the marine taxa other than oyster. No further work is recommended on the land snails.

It is recommended that further detailed analysis of vertebrate remains from all well-dated deposits be undertaken. Particular attention should be paid to recording skeletal element distribution, biometrical and age-at-death data.



If further excavation should take place, some areas within the development, particularly around Trenches 12, 15, 20 and 24, are likely to produce large assemblages of well preserved vertebrate remains.

Deposits should not be destroyed by development without archaeological excavation, appropriate sampling, and provision for post-excavation analysis and publication.

### Storage requirements

The remaining sediment, residues, flots and extracted invertebrate remains and bone should all be preserved for the present to permit further study.

### Archive

All material is currently stored in the Environmental Archaeology Unit, University of York, along with paper and electronic records pertaining to the work described here.

### Acknowledgements

The authors are grateful to Neil Macnab and Jane McComish (York Archaeological Trust) for providing the material and the archaeological information, and to English Heritage for allowing AH and HK to work on this material.

### References

Albarella, U. and Davis, S. J. M. (1996). Mammals and birds from Launceston Castle, Cornwall: decline in status and the rise of agriculture. *Circaea, The Journal of the Association for Environmental Archaeology* 12(1), 1-156.

Bond, J. M. and O'Connor, T. P. (1999). Bones from medieval deposits at 16-22 Coppergate and other sites in York. *The Archaeology of York* 15 (5), 299-429 + Plates XVI-XIX. York: Council for British Archaeology.

Carrott, J., Hall, A., Hughes, P., Jaques, D., Kenward, H. and Worthy, D. (1998a). An assessment of biological remains from the former Davygate Centre, York (site code: 97.125). *Reports from the Environmental Archaeology Unit, York* 98/9, 18 pp.

Carrott, J., Hall, A., Hughes, P., Jaques, D., Johnstone, C., Kenward, H. and Worthy, D. (1998b). Assessment of biological remains from excavations at St Saviourgate, York (site code 1995.434). *Reports from the Environmental Archaeology Unit, York* 98/14, 41 pp.

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

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

English Heritage. (1991). *Exploring our past*. London: HBMC.

Hall, A. and Kenward, H. (2000). Publication draft: Can we identify biological indicator groups for craft, industry and other activities? *Reports from the Environmental Archaeology Unit, York* 2000/26, 27 pp.

Kenward, H. K. (1998). Invertebrates in archaeology in the north of England (unpublished draft).

Kenward, H. K. (1992). Rapid recording of archaeological insect remains - a reconsideration. *Circaea, the Journal of the Association for Environmental Archaeology* 9 (for 1991), 81-8.

Kenward, H. K., Engleman, C., Robertson, A., and Large, F. (1986). Rapid scanning of urban archaeological deposits for insect remains. *Circaea* 3, 163-72.

Kenward, H. and Hall, A. (1997). Enhancing bioarchaeological interpretation using indicator groups: stable manure as a paradigm. *Journal of Archaeological Science* 24, 663-673.

Kenward, H. K., Hall, A. R. and Jones, A. K. G. (1980). A tested set of techniques for the extraction of plant and animal macrofossils from waterlogged archaeological deposits. *Science and Archaeology* **22**, 3-15.

Neave, S. (1991). *Medieval parks of East Yorkshire*. Beverley: Hutton Press.

O'Connor, T. P. (1982). Animal bones from Flaxengate, Lincoln, c. 870-1500. *Archaeology of Lincoln* **18** (1), 52pp. plus fiche. London: Council for British Archaeology.

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

O'Connor, T. P. (1989). Bones from Anglo-Scandinavian levels at 16-22 Coppergate. *The Archaeology of York* **15** (3), 137-207 + Plates VII-XI. London: Council for British Archaeology.

Winder, J. M. (1992). *A study of the variation in oyster shells from archaeological sites and a discussion of oyster exploitation*. PhD. Thesis, University of Southampton, Department of Archaeology, 304 pp.

Table 1. List of samples examined for evaluation for Hungate, York.

Sitecode	Context	Sample	Context type (pottery spot dates in parentheses)	Subsamples examined
2000.2	15032	35	dump deposit for the purpose of raising and levelling the ground surface (10th-14thC)	BS: 17.33kg sieved to 300 µm
2000.3	16025	6	backfill of a post-medieval brick built culvert	SPOT: 1 kg
2000.5	19056	2	build-up of horticultural type soil (13th C)	BS: 24.8 kg sieved to 300 µm and washover to 300 µm
2000.6	20018	4	primary fill of pit (15thC)	GBA: 3 kg sieved to 300 µm, with paraffin flotation
2000.6	20051	16	infill of wicker lining (Context 20059) of cut 20061 (14thC)	GBA: 3 kg sieved to 300 µm, with paraffin flotation
2000.6	20070	17	one of a series of dumps excavated in spits built up between 10th and 13/14th C (R; 10-13/14thC)	GBA: 3 kg sieved to 300 µm, with paraffin flotation
2000.6	20073	19	one of a series of dumps excavated in spits built up between 10th and 13/14th C (10-12/13th C)	GBA: 3 kg sieved to 300 µm and washover to 300 µm
2000.6	20079	25	one of a series of dumps excavated in spits built up between 10th and 13/14th C (R; 10th C)	GBA: 3 kg sieved to 300 µm, with paraffin flotation
2000.6	20080	26	pit fill (10th C)	GBA: 3 kg sieved to 300 µm, with paraffin flotation
2000.6	20094	52	?river deposit or ?bank deposit or ?dumps into marsh (2nd C)	BS: 16 kg sieved to 300 µm and washover to 300 µm
2000.6	20097	62	fill of cut (2nd/3rd C)	BS: 12 kg sieved to 300 µm and washover to 300 µm
2000.6	20099	64 and 65	?river deposit or ?bank deposit or ?dumps into marsh (2nd/3rd C)	examined in laboratory; not processed
2000.6	20100	66	?natural	examined in laboratory; not processed

Sitecode	Context	Sample	Context type (pottery spot dates in parentheses)	Subsamples examined
2000.7	24008	67	dump within backyard (10/11th C)	GBA: 3 kg sieved to 300 $\mu$ m, with paraffin flotation
2000.7	240027	69		SPOT:
2000.7	24051	71	dump or accumulation of tanning and shoe-making waste (15th C)	GBA: 3 kg sieved to 300 $\mu$ m, with paraffin flotation
2000.7	24057	72	dump or accumulation of tanning and shoe-making waste (14/15th C)	GBA: 3 kg sieved to 300 $\mu$ m, with paraffin flotation
2000.8	8066	58	backfill of pit (Roman)	BS: 7.4 kg sieved to 300 $\mu$ m and washover to 300 $\mu$ m
2000.10	11028	4	occupation deposit (11/12th C)	GBA: 3 kg sieved to 300 $\mu$ m, with paraffin flotation
2000.10	11035	47	occupation deposit (10th C)	GBA: 3 kg sieved to 300 $\mu$ m, with paraffin flotation
2000.12	12013	53	dumpdeposit (13-16th C)	BS: 8.8 kg sieved to 300 $\mu$ m and washover to 500 $\mu$ m

*Table 2. Numbers of contexts containing hand-collected shell by trench for Hungate, York.*

<b>Trench number</b>	<b>Trench code</b>	<b>No. of contexts</b>
11	2000.10	9
33	2000.11	2
12	2000.12	5
13	2000.13	4
14	2000.14	1
15	2000.2	11
16	2000.3	2
18	2000.4	1
19	2000.5	2
20	2000.6	29
24	2000.7	12
8	2000.8	5

*Table 3. Numbers of contexts containing hand-collected shell by period for Hungate, York.*

<b>Period</b>	<b>No. of contexts</b>
not dated	13
medieval	44
post-medieval	18
early modern	5
modern	3

Table 4. Hand-collected shell counts by period for Hungate, York. Counts for bivalve taxa are minimum numbers of whole valves. Counts for other taxa are minimum numbers of individuals.

Taxon	Period					Total
	not dated	medieval	post medieval	early modern	modern	
Whelk ( <i>Buccinum undatum</i> (L.))	0	0	3	1	0	4
?Red whelk ( <i>Neptunea antiqua</i> (L.))	0	0	1	0	0	1
Mussel ( <i>Mytilus edulis</i> L.)	4	16	85	0	0	105
Oyster ( <i>Ostrea edulis</i> L.)	30	130	146	17	6	329
Cockle ( <i>Cerastoderma edule</i> (L.))	1	3	12	1	0	17
<b>Total (marine taxa)</b>	<b>35</b>	<b>149</b>	<b>247</b>	<b>19</b>	<b>6</b>	<b>456</b>
<i>Helix</i> sp.	1	5	2	1	0	9
<b>Total</b>	<b>36</b>	<b>154</b>	<b>249</b>	<b>20</b>	<b>6</b>	<b>565</b>

Table 5. Additional notes on oyster valves from Hungate, York, summarised by period. A '?' before numbers indicates possible numbers (e.g. '3(?6) = definitely 3, possibly as many as 6). Key: 'Right valves' = number of right (or upper) valves; 'Left valves' = number of left (or lower) valves; 'Indet. valves' = number of valves of indeterminate side; 'Knife marks' = number of valves showing damage characteristic of the oyster having been opened using a knife or similar implement; 'Measurable?' = estimated number of valves well enough preserved to provide metrical data; 'Worm burrows' = number of valves showing damage by polychaet worms; 'Barnacles' = number of valves with barnacles; 'Dog whelk' = number of valves showing damage from dog whelk boring.

Period	Left valves	Right valves	Indet. valves	Knife marks	Measurable?	Worm burrows	Barnacles	Dog whelk
not dated	11	12	7	9(?14)	3	0	0	0
medieval	53	42	35	47(?64)	17	1	1	0
post-medieval	60	61	25	65(?74)	23	1	0	0
early modern	7	5	5	4(?5)	3	1	0	0
modern	3	1	2	2	2	0	0	0
<b>Total</b>	<b>134</b>	<b>121</b>	<b>74</b>	<b>127(?159)</b>	<b>48</b>	<b>3</b>	<b>1</b>	<b>0</b>

Table 6. The number of boxes of vertebrate remains recovered from each trench at Hungate, York, by general period. Key: A/S = Anglo/Scandinavian.

Site code	Roman	A/S - early medieval	medieval	late medieval	post-medieval	modern or broadly dated	Total no. of boxes	No. of contexts with bone
2000.2	-	-	-	1	4	1	6	21
2000.3	-	-	-	-	-	0.25	0.25	3
2000.5	-	-	-	-	-	0.25	0.25	3
2000.6	0.75	1.75	1	7.5	-	1	12	54
2000.7	-	7.5	-	1.5	-	1	10	32
2000.8	0.5	1.5	-	-	-	1	3	29
2000.9	-	-	-	-	-	0.25	0.25	4
2000.10	-	3.25	0.5	-	-	0.25	4	39
2000.11	-	-	-	-	-	0.25	0.25	3
2000.12	-	-	0.25	1	-	2.75	4	23
2000.13	-	-	-	-	-	3	3	24
2000.14	-	-	-	-	-	1	1	8



Table 7. The number of fragments, measurable bones and mandibles with teeth in situ recorded for the evaluation from each trench at Hungate, York, by general period.

Period	Site code	Total fragments evaluated	No. mandibles	No. measurable	No. of boxes evaluated
Roman	2000.6	138	1	4	0.75
Anglo/Scandinavian - early medieval	2000.6	535	14	33	1.75
	2000.7	509	16	39	4
	2000.8	198	5	16	1.25
	2000.10	412	3	25	2.5
medieval	2000.10	30	0	1	0.25
	2000.12	106	1	7	0.25
late medieval	2000.2	163	1	10	1
	2000.6	985	14	88	4.25
	2000.7	210	3	22	1
	2000.12	490	7	53	1
post-medieval	2000.2	423	22	53	3
modern or broadly dated	2000.12	1364	7	56	2.75

Table 7. The number of fragments, measurable bones and mandibles with teeth in situ recorded for the evaluation from each trench at Hungate, York, by general period.

Period	Site code	Total fragments evaluated	No. mandibles	No. measurable	No. of boxes evaluated
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Anglo/Scandinavian - early medieval	2000.6	535	14	33	1.75
	2000.7	509	16	39	4
	2000.8	198	5	16	1.25
	2000.10	412	3	25	2.5
medieval	2000.10	30	0	1	0.25
	2000.12	106	1	7	0.25
late medieval	2000.2	163	1	10	1
	2000.6	985	14	88	4.25
	2000.7	210	3	22	1
	2000.12	490	7	53	1
post-medieval	2000.2	423	22	53	3
modern or broadly dated	2000.12	1364	7	56	2.75