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**Assessment of biological remains from  
excavations at Waterstones bookshop, 28-29  
High Ousegate, York (site code: 2002.475)**

*PRS* 2003/50

## Assessment of biological remains from excavations at Waterstones bookshop, 28-29 High Ousegate, York (site code: 2002.475)

by

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### Summary

*An archaeological watching brief and excavation was carried out by York Archaeological Trust during the construction of a lift pit in the basement of Waterstones bookshop, 28-29 High Ousegate, York, during July and August 2002. Ten samples, a small quantity of hand-collected shell and seven boxes of hand-collected bone, recovered from deposits of Roman and Anglo-Scandinavian date, were submitted to PRS for an assessment of their bioarchaeological potential.*

*Plant remains were well preserved in all but one of the 'GBA' samples examined. For the most part they represented food remains and a modest range of taxa were present from staples and pulses, to vegetables and flavourings. Woodland/heathland/fenland mosses often recorded from deposits of this period, and traces of dyeplants and perhaps other taxa associated with textile working, were also present.*

*Evidence from the insect remains was generally complementary to that from the plants. Some of the insect remains were stunningly well preserved consistent with the theory that there is a band of exceptional preservation in York on the ridge between the south-west end of Parliament Street and Spurriergate. Honeybees were noted from three of the samples, which accords with a growing pattern for this area and period.*

*All but one of the 'GBA' samples contained some eggs of intestinal parasitic worms. Trichuris eggs were generally very well preserved, often retaining both polar plugs. Comparison of these eggs with data for modern trichurids indicated that the eggs seen were almost certainly of the whipworms of humans or pigs, or perhaps of both.*

*All of the hand-collected shell was of generally rather poorly preserved oyster. The small quantity of remains recovered and their poor condition render the assemblage of little interpretative value. However, it seems likely that all of the oyster shell derives from human food waste, and its presence indicates the importation of this coastal resource.*

*The vertebrate assemblage showed that these deposits were rich in extremely well-preserved bone. Cattle were the most dominant species throughout, caprovids and pig were present in similar smaller amounts, and other species were far less numerous. The butchery practices observed were very similar to those noted from other sites in York, particularly from the material recovered from St Saviourgate and those from Hungate. A number of different economic activities appear to have been responsible for the remains. One component was 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. Some domestic food waste was also apparent. Clearly, several related activities were being undertaken in the vicinity and the features excavated were typically used for the disposal of refuse of both a domestic and commercial nature.*

*Despite good preservation, it is probably not worth carrying out further archaeobotanical analysis of the present material, though an effort should be made to examine material from the full range of other types of contexts, if sampled. Most of the samples assessed here demand further, detailed, investigation for insects, however, and any other samples from the site should be assessed and analysed fully where appropriate. Publication of material such as this is highly desirable. Three of the samples (from Contexts 1016, 1043 and 1089) gave sufficient well-preserved Trichuris eggs to warrant further attention. No further work is recommended for the hand-collected shell. It is recommended that a detailed archive be made of all well-dated vertebrate remains. Publication of the results of these further analyses would be highly desirable (particularly for the insect remains).*

**KEYWORDS:** WATERSTONES BOOKSHOP; 28-29 HIGH OUSEGATE; YORK; WATCHING BRIEF; ASSESSMENT; ROMAN; 9<sup>TH</sup>-11<sup>TH</sup> CENTURY; ANGLO-SCANDINAVIAN; PLANT REMAINS; CHARRED PLANT REMAINS; CHARRED GRAIN; DYEPLANTS; INVERTEBRATE REMAINS; INTESTINAL PARASITE EGGS; VERTEBRATE REMAINS; TEXTILE WORKING; ANTLER/HORN WORKING; TANNING

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## Assessment of biological remains from excavations at Waterstones bookshop, 28-29 High Ousegate, York (site code: 2002.475)

### Introduction

An archaeological watching brief and excavation was carried out by York Archaeological Trust during the construction of a lift pit in the basement of Waterstones bookshop, 28-29 High Ousegate, York (NGR SE 6035 5168), during July and August 2002.

A series of deposits containing well-preserved organic and other material of medieval, Anglo-Scandinavian and Roman date were revealed, which included a number of textile fragments, leather objects, a Frisian comb and large quantities of Roman pottery, along with a number of timber posts and wattle fences.

Ten samples (seven 'GBA' and three 'SPOT' *sensu* Dobney *et al.* 1992), from seven contexts, together with a small amount of hand-collected shell and seven boxes of hand-collected bone, were submitted to PRS for an assessment of their bioarchaeological potential. Most of the samples considered here were taken from the backfills of pit features and provisionally of Anglo-Scandinavian date (ranging from 9<sup>th</sup> to 11<sup>th</sup> century). Two of the deposits yielding hand-collected shell and five of those with hand-collected bone were thought to be of earlier, Roman, date.

### Methods

#### *Sediment samples*

The submitted 'GBA' samples were inspected in the laboratory and their lithologies recorded using a standard *pro forma*. Subsamples were taken for processing, following the procedures of Kenward *et al.* (1980; 1986), for the recovery of plant and invertebrate macrofossils.

Plant remains were examined in the residues (and, where appropriate, in 'washovers' taken from them) and the 'flots' from paraffin flotation were checked briefly. Insect and other invertebrate macrofossils were inspected in the flots, preservation being recorded using the scheme of Kenward and Large (1998). The residues were also examined for other biological and artefactual remains.

The 'GBA' samples were examined for the eggs of intestinal parasites using the 'squash' technique of Dainton (1992). Assessment slides were scanned at 150x magnification with 600x used where necessary. Although primarily for the detection of intestinal parasitic nematode eggs, the 'squash' technique routinely reveals other microfossil remains, and where present these have also been noted.

The 'SPOT' samples were examined and the remains identified where possible.

#### *Hand-collected shell*

A small quantity of hand-collected shell from 15 contexts (one of which was unstratified) was submitted.

Brief notes were made on the preservational condition of the hand-collected shell and the remains identified to species where possible. For oyster (*Ostrea edulis* L.) shell 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 (though measurements were not taken as part of this evaluation); damage from other marine biota (polychaet worms and dog whelks); encrustation by barnacles. Preservation was recorded subjectively on two four-point scales

for erosion and fragmentation as: 0 – none; 1 – slight; 2 – moderate; 3 – severe.

### *Hand-collected vertebrate remains*

For the hand-collected vertebrate remains, 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 Palaeoecology Research Services Limited, County Durham. 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), unidentified fish, and totally unidentifiable. All are shown as 'Unidentified' in Table 4.

## Results

### *Sediment samples*

The samples are considered by stratigraphic group. Archaeological information, provided by the excavator, is given in square brackets. A brief summary of the processing method and an estimate of the remaining volume of unprocessed sediment follows (in round brackets) after the sample numbers.

Results for the microfossil 'squashes' are given in the following text and summarised in Table 1.

*Group 2: Anglo-Scandinavian pits – late 9<sup>th</sup>-10<sup>th</sup> century*

### **Context 1089** [backfill of cess pit]

Sample 11/T (1 kg sieved to 300 microns with paraffin flotation; approximately 6 litres of unprocessed sediment remain)

Moist, dark brown, layered, fibrous and compressed to brittle (working crumbly then soft), ?slightly sandy, silt and amorphous organic sediment, with fine and coarse herbaceous detritus (including 'straw').

The very large residue of about 1300 cm<sup>3</sup> was mostly fine organic debris—largely wheat/rye (*Triticum/Secale*) 'bran'. The coarser material comprised 'flaky' faecal concretions to 40 mm, with some eggshell and eggshell membrane, and a few plant food remains other than 'bran': field bean (*Vicia faba* L.), ?pea (cf. *Pisum sativum* L., leek (*Allium* cf. *porrum* L.), apple (*Mallus sylvestris* Miller) and blackberry (*Rubus fruticosus* agg.). The sediment appeared to be almost pure faecal matter, although some ?woad (*Isatis tinctoria* L.) xylem concentrations (see further below) were noted.

'Bran' and other plant fragments made up most of the flot, which was of modest size. Coarse bristles were common. Fly adults were fairly abundant, but other insects present in only quite small numbers. Preservation was superb, however (E 1.0-1.5, mode 1.5 distinct; F 1.0-3.0, mode 1.5 weak). The beetles appeared to be a small random selection of typical Anglo-Scandinavian fauna, though it is possible that *Cyphon ?padi* (Linnaeus) and a mummified aphid had entered via faeces, having been accidentally ingested.

The microfossil 'squash' was mostly organic detritus with some fragments of plant tissue, fungal spores and a little inorganic material. There were also fairly large numbers of well-preserved parasite eggs, at least 18 *Trichuris* and 24 *Ascaris*.

It is highly desirable that invertebrates from a much larger subsample of this material should be investigated fully. The bristles too require identification.

### **Context 1048** [upper backfill in pit 1050]

Sample 6/T (1 kg sieved to 300 microns with paraffin flotation; approximately 6 litres of unprocessed sediment remain)

Just moist, mid to dark brown to dark grey-brown, brittle to crumbly (working soft), slightly sandy silt, with some fine and coarse woody and herbaceous detritus. Stones (20 to over 60 mm) were present and bark and wood were common.

The large residue of about 750 cm<sup>3</sup> consisted mainly of granular organic fragments, including much bark, sometimes in large fragments (to 90 mm) with some

wood and a little sand and grit; rather a lot of the clasts proved to be undisaggregated sediment comprising somewhat fine-‘strawy’, compressed silt, probably all rather strongly decayed. There were rather few fossils amongst all this and it is difficult to discern the use of the pit; certainly food remains were extremely sparse. Some remains were rather worn, others well preserved, the wood fragments mostly small. There was perhaps a component from turf or other short-grassland vegetation.

Most of the small flot consisted of what appeared to be well-decayed wood fragments. A small and very restricted group of insects was present, preservation being rather poor (E 3.5-4.5, mode 4.0 weak; F 2.5-4.0, mode 3.0 weak). A domestic origin seems likely: there were puparial and adult *Melophagus ovinus* (Linnaeus) (sheep keds), probably from wool cleaning, and beetles such as *Trox scaber* (Linnaeus), *Typhaea stercorea* (Linnaeus) and a dermestid, perhaps most likely to occur together in a building. A single honeybee (*Apis mellifera* Linnaeus) was present.

The microfossil ‘squash’ was mostly organic detritus, with a little inorganic material. Large numbers of pollen grains and ?phylolith fragments were noted, as was a single live soil nematode. No eggs of intestinal parasites were observed.

Although not well preserved, and at a low concentration, the invertebrate remains should be fully recorded using a larger subsample, to clarify origins and to investigate the possibility that the association of decayed bark and *T. scaber* may be significant (they have been suggested to be indicators of tanning by Hall and Kenward 2003).

This upper fill was described by the excavator as containing ‘...a very high proportion of wood chippings and cess’. Given the lack of indicators of faecal material, it is extremely unlikely that this deposit represents a period of use as a cess pit, however.

#### Group 5: Anglo-Scandinavian pits – 10<sup>th</sup> century

##### **Context 1070** [backfill of a shallow cess pit]

Sample 10/T (1 kg sieved to 300 microns with paraffin flotation; approximately 8 litres of unprocessed sediment remain)

Moist, dark brown to dark grey-brown, brittle (and layered, fibrous and compressed) to crumbly (working soft), very humic silt to amorphous organic sediment, with fine and coarse woody and herbaceous detritus. Large mammal bone and fly puparia were present, and ‘straw’ (?monocotyledon stems) was common.

The very large residue of about 850 cm<sup>3</sup> consisted mostly of rather fine organic detritus, mainly ‘bran’, whilst the coarser fractions contained stiff ‘straw-like’ material. There were some small faecal concretions (to 30 mm), with very well preserved food remains: the sloe (*Prunus spinosa* L.) stones, for example, were very fine, some still having a purplish colour and some mesocarp attached. Other food plants included linseed, leek, field bean, apple and dill (*Anethum graveolens* L.) and there were traces of charred oats (*Avena*) and barley (*Hordeum*) grains. Some stem fragments that may have been from flax (*Linum usitatissimum* L.) were also noted. For the rest, mosses of the kind seen in other samples rich in faeces from this site were also noted here, but with records for *Antitrichia curtipendula* (Hedw.) Brid., *Leucodon sciuroides* (Hedw.) Schwaegr. and *Sphagnum*, not seen in the other samples (but quite typical of assemblages of this kind). ?Woad xylem concentrations were present here too.

The flot was rather large, consisting primarily of plant debris including much ‘bran’. Insects (and very abundant mites) were in a very fresh state of preservation (E 1.0-2.0, mode 1.5 weak; F 1.0-2.0, mode 1.5 weak). This preservation is about as good as ever recorded from York and is discussed further below. The beetle assemblage was of modest size but ecologically unequivocal, being dominated by species associated with very foul matter, often dung. There were numerous *Cercyon unipunctatus* (Linnaeus), several *C. terminatus* (Marshall), and some *C. haemorrhoidalis* (Fabricius), and small numbers of other species likely to live with these, including *Cercyon melanocephalus* (Linnaeus), rather rarely found in archaeological deposits. There were also some *Philonthus ?politus* (Linnaeus), a rove beetle very typical of cess pits at 16-22 Coppergate (Kenward and Hall 1995). Fly puparia were very numerous, apparently mostly Sphaeroceridae, a family with many species found under foul conditions and again abundant in archaeological cess pits. What appeared to be a soft *Sitona* weevil, two *Ceutorhynchus contractus* (Marshall) (found on crucifers), and a water beetle (*Hydraena* sp.) may have entered with faeces or waste, though a background origin cannot be ruled out.

The microfossil ‘squash’ was mostly organic detritus, with a little inorganic material; nine live soil nematodes were also seen. There were also a minimum of 35 *Trichuris* eggs and five or six of *Ascaris*. This sample gave the largest number of trichurid eggs but their state of preservation was rather poor in comparison with those from some of the other deposits at this site.

The characteristic insect fauna should be investigated further using a larger subsample, to characterise it, and to attempt to determine those elements with a faecal origin and whether this offers clues as to diet.

**Context 1043** [backfill of pit 1046]

Sample 4/T (1 kg sieved to 300 microns with paraffin flotation; approximately 6 litres of unprocessed sediment remain)

Moist, mid brown to mid to dark grey-brown to dark brown to almost black, brittle and layered (fibrous and compressed in places) to crumbly (working soft), very humic silt, with fine and coarse woody and herbaceous detritus. Stones (6 to 20 mm and over 60 mm) and twigs were present.

There was a large residue of about 700 cm<sup>3</sup> of organic debris with a little gravel and quite a lot of twiggy and mossy detritus and some 'wood chips' (to 35 mm), amongst which were some well-preserved fragments of wool yarn. Preservation of plant material was generally very good with some fine 'fronds' of the moss *Thuidium tamariscinum* (Hedw.) Br. Eur. (and with several other woodland and heathland mosses typical of assemblages of this period and location—*Antitrichia curtispindula* (Hedw.) Brid., *Eurhynchium striatum*, *Hylocomium splendens* (Hedw.) Br. Eur., *Hypnum* cf. *cupressiforme* Hedw., *Isoetecium myurum* Brid., *Neckera complanata*, *Rhytidiadelphus* cf. *squarrosus* (Hedw.) Warnst. and *Ulota* sp(p). Another plant from woodland was holly, *Ilex aquifolium* L., represented by well-preserved leaf epidermis fragments. Bracken (*Pteridium aquilinum* (L.) Kuhn) was present in the form of moderate numbers of pinnule (frond) fragments and some stalk. Food remains included some very well preserved coriander (*Coriandrum sativum* L.) 'seeds', nutlets of summer savory (*Satureja hortensis* L.) as well as 'seeds' of dill, leek epidermis, hila (attachment scars) of pea, and remains of apple and sloe. There was a trace of dyer's greenweed (*Genista tinctoria* L.) stem and ?woad vegetative remains. Overall, the assemblage would not be out of place amongst those from Anglo-Scandinavian Coppergate, though it is perhaps worth remarking that at that site coriander was only recorded from the earliest Anglo-Scandinavian levels (Phase 3).

The flot, of modest size, was mainly coarse and fine plant debris, including 'bran'. Insects were fairly numerous, and there were some mites. Preservation was very good (E 1.5-2.5, mode 1.5 weak; F 1.3-3.0, mode 2.0 weak). The insect assemblage was ecologically mixed, with some notable elements. There were indications of foul conditions, presumably *in situ*, and hints of foul open-textured material with the consistency of stable manure from small numbers of several species. This range of habitats might occur in a cess pit containing human faeces and other debris, however. The waterside/damp ground beetle *Cyphon* ?*padi* may have arrived in water taken from the riverside (though a 'background' origin cannot be ruled out). The chafer *Phyllopertha horticola* (Linnaeus) may

be another background element, though importation with moss or cut vegetation seems very likely in view of the evidence for moss and other litter amongst the plant remains. A further hint that the latter explanation is correct comes from a pale, soft weevil, *Apion* sp., presumably imported since it would be unable to fly, and considered typical of 'hay-like' cut vegetation.

There were remains of two bark-beetles, *Scolytus* ?*rugulosus* (Müller). This insect has occurred in small numbers at several sites in Anglo-Scandinavian York and may just possibly indicate the presence of fruit trees (though it has a range of other hosts). It is discussed by Kenward and Hall (2000) and Hall and Kenward (2000b and forthcoming). A second record of note is of the nettlebug *Heterogaster urticae* (Fabricius), the numerous records of which from Anglo-Scandinavian York have been argued to indicate temperatures above those of the mid 20<sup>th</sup> century (Kenward in press a). Lastly, a 'pollen basket' of a honeybee, *Apis mellifera*, was noted from this sample (discussed further below).

That the deposit had some faecal content was shown by the presence of eggs of intestinal parasites (generally rather well preserved). The microfossil 'squash' gave a single *Ascaris* and 14 *Trichuris* eggs, but was mostly of organic detritus, with a little inorganic matter, some ?phytolith fragments and two live soil nematodes.

The remarkable group of insect remains requires detailed recording both for context interpretation and as a source of data for wider syntheses, and investigation of a larger subsample is desirable.

**Sample 12/SPT**

A few plant remains had been collected as a 'spot' find; they comprised thorns and fruitstones of sloe and moss shoots (*Thuidium tamariscinum*).

**Group 7: Anglo-Scandinavian post built wall and cobble surface – 10<sup>th</sup> century****Context 1059** [organic deposit]

Sample 5/T (1 kg sieved to 300 microns with paraffin flotation; approximately 6 litres of unprocessed sediment remains)

Wet to waterlogged, mid to dark grey to black, sticky to soft, clay silt. Wood (including a large ?'stake') was present. An unusual, slimy to sticky, green/black, 'jelly-like' substance was common to abundant. The sample smelled very strongly of sulphides when disturbed.

The small residue of about 100 cm<sup>3</sup> comprised gravel and grit and some charcoal amongst which was some

vivianite (probably representing remains from a formerly larger organic content); the very small flot contained some beetles and flecks of vivianite and the merest scraps of plant detritus, both woody and herbaceous, with traces of charred cereal grain (rye, *Secale cereale* L. and wheat, perhaps both bread/club wheat, *Triticum 'aestivo-compactum'* and spelt, *T. spelta* L. The small washover consisted of a few cm<sup>3</sup> of organic detritus, mostly invertebrate cuticle and small wood fragments, together with some 'bran' and undisaggregated colloidal gel, which formed the bulk of the raw sediment and whose nature remains enigmatic.

The flot contained only a few insect remains and a single mite. Preservation was mostly very poor (E 2.5-5.0, mode 5.0; F 2.0-4.0), so it seems likely that a large suite of remains had decayed completely. Fragments of two *Philonthus* species were noticeably better preserved, though the significance of this is not clear.

The 'squash' was, again, mostly organic detritus, with some inorganic material and ten live soil nematodes were seen. There were a small number of eggs of intestinal parasitic worms, two each of *Trichuris* (both well preserved) and *Ascaris*.

No further study of the remains from this sample is warranted.

*Group 9: Anglo-Scandinavian pits and linear cut – 10<sup>th</sup>/11<sup>th</sup> century*

**Context 1016** [backfill of pit 1018]

Sample 3/T (1 kg sieved to 300 microns with paraffin flotation; approximately 5 litres and 2 additional tubs of sediment remain)

Moist, very dark brown to very dark grey-brown to almost black, brittle (and layered, fibrous and compressed in places), to crumbly (working soft), very humic, slightly sandy silt to amorphous organic sediment, with fine and coarse herbaceous detritus. Stones (over 60 mm), ?twigs, ?'straw'(?monocotyledon stems), marine mollusc (oyster) and fly puparia were present.

The large residue of about 700 cm<sup>3</sup> included a little grit and sand but was mostly organic detritus, especially in the finer fractions. There was also some twiggy debris. The nature of this deposit as another one composed largely of faecal material was confirmed by the presence of 'faecal concretions' (to 35 mm), some containing moss (of the kinds seen in Sample 2 from Context 1012, see immediately following, but with the addition of *Calliargon* cf. *giganteum* (Schimp.) Kindb., *C. cuspidatum* (Hedw.) Kindb., *Dicranum* sp(p), *Drepanocladus* sp(p). and *Homalothecium sericeum* (Hedw.) Br. Eur./*H. lutescens* (Hedw.) Robins.), some

with 'strawy' impressions. Preservation by anoxic waterlogging was again very good, the food component again comprising wheat/rye and oat 'bran' (with corncockle (*Agrostemma githago* L.) seed fragments), with abundant leek and some mineral-replaced testa (seed-coat) fragments of field bean. As possible evidence for textile working, there were some stem fragments which may have been flax, a trace of hemp (*Cannabis*) seeds, one small fragment of dyer's greenweed stem, and some tangled masses of xylem vessel spiral thickenings which are thought to represent the vegetative residue of woad leaves after dyeing.

The flot was fairly small, with plant debris, hairs and feathers. Some mites and a fairly small group of insects were noted, preservation being very good (E 1.5-2.5, mode 1.5 weak; F 1.5-3.0, mode 2.0 weak). The fauna was fairly mixed ecologically, though with indications of fairly foul conditions. A flea body segment and a fragment of puparium of the sheep ked *Melophagus ovinus* perhaps hint at the presence of domestic debris. A honey bee (*Apis mellifera*) pollen basket was noted. A few plant feeders may have been from imported material, though other origins are equally likely.

The microfossil 'squash' was of organic detritus with a little inorganic material. Twenty-six, mostly well preserved, eggs of *Trichuris* and four of *Ascaris* were noted. There were also eleven live soil nematodes present.

Full recording of the invertebrates from a larger subsample is desirable, to attempt to clarify the origins of certain components of the fauna, for context and wider reconstruction, and to gather data for synthesis.

Sample 13/SPT

A small bag of plant debris labelled 'organic veg' was rinsed to 0.3 mm and found to consist of unidentifiable 'grassy' plant debris with some wheat/rye 'bran' and corncockle seed fragments. A sliver of bone to 50 mm might be from the nasal cavity of a large mammal.

**Context 1012** [dump or occupation deposit, possibly a fill of pit 1018]

Sample 2/T (1 kg sieved to 300 microns with paraffin flotation; approximately 6 litres of unprocessed sediment remain)

Moist, dark brown to mid to dark grey brown to olive-brown (often slightly orange-brown internally – looks very 'fresh'), brittle (and layered, fibrous and compressed in places) to crumbly (working soft), very humic, slightly sandy silt, and fine and coarse herbaceous and woody detritus (with some amorphous organic sediment). There were also some patches of

light brown silt. Wood and ?hair/textile were present and 'straw' (?monocotyledon stems) was common in the sample.

There was a very large residue of about 1100 cm<sup>3</sup> of fine organic detritus with a rather earthy smell. The large less than 2 mm fraction was mostly wheat/rye and oat 'bran', with abundant corncockle seed fragments, representing flour and milled contaminant weed seeds; typical of deposits interpreted as faecal in origin. There was some coarse herbaceous stem material which may have been grass or straw litter, though some material which might have been flax 'straw' was also noted. Food, other than 'bran' made up much of the assemblage, with moderate amounts of seeds and 'core' (endocarp) of apple and traces of dill, celery seed (*Apium graveolens* L.), and linseed and the fruits hawthorn (*Crataegus monogyna* Jacq.), sloe, blackberry and ?bilberry (*Vaccinium*). Scraps of a range of mosses typical of these kinds of deposits (Anglo-Scandinavian pit fills) were also noted: *Eurhynchium praelongum* (Hedw.) Br. Eur., *E. striatum* (Hedw.) Schimp., *Hypnum* cf. *cupressiforme* Hedw., *Neckera complanata* (Hedw.) Hüb. and *Pseudoscleropodium purum* (Hedw.) Fleisch. Overall, preservation of plant material was as good as for any sample seen at 16-22 Coppergate (Kenward and Hall 1995).

The flot, of modest size, consisted primarily of fine and coarse plant debris; there were some feathers, and numerous hair-like fibres. Insects were present in fairly small numbers, with good preservation (E 1.5-2.5, mode 2.0 weak; F 2.0-3.0, mode 2.5 weak). The insects, mainly beetles, were typical of pre-Conquest York, with hints of an origin in predominantly dry plant debris such as might have occurred on a house floor. Further hints of a domestic origin come from a single (tentatively identified) fragment of an adult sheep ked (*Melophagus ovinus*)—most likely to have been deposited during wool-cleaning—an unidentified body segment of a flea, and what was probably a human louse (*Pediculus humanus* Linnaeus). A single *Daphnia* ephippium (water flea resting egg) seems most likely to have arrived with imported water.

The 'squash' subsample was mostly of hair and organic detritus, with a little inorganic material, some pollen grains/spores and some ?phytolith fragments. There were also a small number of eggs of intestinal parasitic worms, three each of *Trichuris* (quite well preserved) and *Ascaris*.

This invertebrate assemblage deserves further investigation using a larger subsample, in order to clarify its origin and implications, and the 'hairs' should also be identified if possible.

Sample 9/SPT

Most of the sample was a mass of matted hair, perhaps human, and extremely well preserved.

Large quantities of identifiable hair such as this are only rarely recovered from archaeological deposits. A small quantity of this material has been sent to Professor Alan Cooper (University of Oxford) for DNA analysis, the results of which are pending.

### *Hand-collected shell*

All of the small quantity of shell was oyster valves recovered from 15 contexts (one unstratified, two from Roman, Group 1 deposits and 12 from Anglo-Scandinavian deposits of Groups 2, 4, 5, 8, 9 and 10). Individual context assemblages were, in the main, of only a few valves, the exception being that from Context 1049 (1216 g) which accounted for almost half (by weight) of the shell from the site. Most of the valves were rather poorly preserved being both eroded (average erosion 2.3) and quite heavily fragmented (average fragmentation 2.1). The presence of many small flakes showed that the shell is continuing to deteriorate.

Approximately 70% of the valves could be identified as either left or right valves but, less than 10% of the valves for which 'side' could be determined were measurable (though measurements were not taken as part of this assessment). 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 up to 15% 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. Up to 11% of the valves showed some fresh breakage presumably caused during excavation.

Summary information for the hand-collected shell assemblage is presented as Table 2.

### *Hand-collected vertebrate remains*

A total of 886 fragments were recovered from 28 deposits, representing eight of the eleven stratigraphic groups. Over 70% of the remains were recovered from pit fills, although occupation and levelling/dump deposits also produced small amounts of bone. The remainder were recovered from floors and surfaces. Of the 28 deposits containing bone, the five assigned to Group 1 are likely to be Roman; pottery spot dates suggest a mainly 2<sup>nd</sup>/3<sup>rd</sup> century date. Although Roman pottery was found in a number of the other deposits, this was interpreted as being residual and the remaining contexts were mainly dated to the Anglo-Scandinavian period (9<sup>th</sup>-10<sup>th</sup> centuries). Details of the range of



species, number of fragments, measurable bones and mandibles with teeth *in situ* can be found in Tables 3 and 4.

Overall, preservation was extremely good, with only colour (either brown or dark brown) varying between contexts. On the whole, the lighter fragments were recovered from the Roman deposits, whilst those from the Anglo-Scandinavian deposits mostly tended to be dark brown in colour. Some of the deposits which included residual Roman pottery also produced paler fragments. Bones from Contexts 1012, 1042 and 1045 were somewhat variable in colour, including fragments that were both dark and light brown. The darker staining of most of the fragments from the pit fills is typical of waterlogged material. Both dog gnawing and fresh breakage damage were noted but both were minimal in extent. In contrast, much of material showed extensive evidence of butchery which was particularly noticeable on bones from Contexts 1037, 1043 and 1055. These included longitudinal splitting of cattle long-bones (metapodials, tibiae and radii, in particular) and heavily chopped pelves and ribs. Some of the cattle mandibles had been chopped through the ascending ramus. This cut would have freed the jaw from the rest of the head, facilitating the removal of the tongue. Damage to a cattle skull (Context 1045) suggested that the animal had been slaughtered by a blow to the head, whilst a pig skull from Context 1016 had been sagittally split for access to the brain or/and for the utilisation of the cheek meat. Additionally, a few of the cattle mandibles and long bones (principally metapodials) showed areas of localised burning/scorching; this may have been to make chopping or breaking the bones easier. Horn removal was also evident, both from the presence of horncores (Contexts 1043, 1045, 1049, 1057 and 1066), chopped at the base (or with associated cranium), and from skulls showing that the horncores had been deliberately removed (Contexts 1037 (sheep), 1043, 1048).

Evidence of a pathological condition was noted on two of the cattle cranial fragments from Contexts 1043 and 1048. This consisted of perforations in the nuchal region of the occipital bone. A number of possible clinical factors (congenital, infectious, parasitic, neoplastic and direct pressure through yoking) have been proposed as the likely aetiology of this condition. These factors have been most recently discussed by Brothwell *et al.* (1996) and, on the basis of their brief survey, it would appear that parasites, tumours, and infection can all be ruled out as causal factors. Although the cause could not be clearly established, these authors suggest that it is most likely to be congenital in origin. This phenomenon has been noted from a number of sites ranging in date from Roman (Dobney *et al.* 1996) to post-medieval (Carrott *et al.* 1997).

The following sections detail the assemblage by stratigraphic group.

*Group 1: Roman occupation deposits – mid 2<sup>nd</sup> to late 3<sup>rd</sup> century*

Five deposits, believed to date to the Roman period, produced a small assemblage which amounted to 45 fragments, 20 of which were identifiable to species. The most commonly occurring species were cattle and pig, with caprovid remains also recovered. A skull and mandible were recorded as cat, whilst two floor surface deposits, Context 1054 and 1058, produced remains identified as cervid. The latter were a large skull fragment from a red deer hind, and a roe deer metacarpal shaft fragment. Two measurable fragments and one mandible with teeth *in situ* were noted.

*Group 2: Anglo-Scandinavian pits – late 9<sup>th</sup>-10<sup>th</sup> century*

A third of the entire assemblage from this site was recovered from three pit fills assigned to Group 2. A fourth pit fill, Context 1089 produced only one other fragment. Despite the presence of residual Roman pottery, these deposits were probably of Anglo-Scandinavian date.

Cattle remains, and large mammal fragments (assumed to be mainly cattle), formed the bulk of the material from these deposits, with the less numerous caprovid and pig bones represented in almost equal amounts. Two fragments were identified as horse, one of which was an isolated incisor representing an aged individual of 20 years or older when it died. Measurements from the other bone, a complete metatarsal, produced an estimated withers height of 15 h.h for the horse represented. Additionally, antler fragments (not seen by the author), were recovered from Context 1049.

Skeletal element representation for the main domesticates showed a range of elements including both meat-bearing and non-meat-bearing bones, with perhaps an emphasis, particularly for cattle, on elements, such as mandibles, isolated teeth, and metapodials—bones usually removed during the first stages of butchery. Pig remains showed a higher number of meat-bearing elements.

During excavation, two fills (Context 1048 and 1049) from the same pit, Context 1050, showed distinct differences suggesting that the pit had been initially used for the disposal of rubbish and secondly as a cess pit (though this secondary function seem unlikely given the lack of evidence from Sample 6). The vertebrate remains, however, showed no such distinctions and it would appear that the dumping of bone into the pit continued despite its possible change of use.

*Group 4: Dumps – undated*

Only a single deposit from this group, Context 1047 (a levelling deposit), produced vertebrate remains, amounting to just 11 fragments, most of which could not be identified to species. Besides several cattle and pig fragments, two chicken bones were also present. The unidentified remains included both large and medium-sized mammal fragments.

*Group 5: Anglo-Scandinavian pits – 10<sup>th</sup> century*

One hundred and eighty-five fragments were recovered from four deposits—most (139 fragments) were from a single pit fill, Context 1043. Three other pitfills (Contexts 1045, 1070 and 1080) provided the rest of the assemblage.

Remains of the major domestic mammals again provided the largest component of the assemblage, with cattle bones predominating. Single fragments of chicken (Context 1070) and duck (Context 1043) were recorded. Over half of the remains, however, were assigned to the unidentified category and were again primarily large mammal sized bones, the bulk of which were rib and shaft fragments.

A preliminary examination of the presence of different skeletal elements for cattle and caprovids from these deposits showed a greater frequency of meat-bearing bones than seen in the Group 2 assemblage.

This assemblage included 14 measurable fragments and six mandibles with teeth *in situ*.

*Group 7: Anglo-Scandinavian post built wall and cobble surface – 10<sup>th</sup> century*

Few fragments (11) were recovered from the two bone-bearing deposits, Contexts 1038 and 1042, allocated to this group. Most were large mammal sized and cattle fragments, with a single caprovid bone.

*Group 8: Anglo-Scandinavian dumps and a pit – late 9<sup>th</sup> to early 10<sup>th</sup> century*

One hundred and six fragments were produced by four deposits, Contexts 1019 and 1020 (both dumps), and 1021 and 1022 (both occupation layers). Cattle were again the most commonly occurring species, with very few pig and caprovid remains present. Cervids were represented by a single antler fragment. A single goose ulna fragment (Context 1020) was the only bird bone present. Many fragments could not be identified to species; most were large mammal rib and shaft

fragments, with a few vertebrae. Several medium-sized mammal fragments were also recorded.

Skeletal element representation for cattle showed a greater preponderance of waste associated with primary carcass preparation (mandibles and lower limb bones), however, too few bones were recovered from the other species for detailed interpretation.

Deposits from this group produced 15 fragments that were measurable and three mandibles that could provide age-at-death data.

*Group 9: Anglo-Scandinavian pits and linear cut – 10<sup>th</sup>/11<sup>th</sup> century*

The vertebrate material from Group 9 deposits amounted to a total of 181 fragments. Five fills of pit 1018 produced the greatest quantity of material (140 fragments). Both caprovid and pig remains were noted, but, as with previous groups, most of the identified fragments were cattle. Other species present included horse, represented by a large fragment of skull (Context 1012), and ?red deer. Additionally, one chicken bone was noted (Context 1006). Deposits from this group also produced 15 antler fragments (most from Context 1037, but not seen by the author), described by the excavator as ‘offcuts from antler working’. Other evidence for craft activities is hinted at by the presence of several horncores which had been deliberately removed from the rest of the skull presumably for utilisation of the horn sheaths.

A brief examination of the occurrence of different parts of the skeleton for caprovids showed a prevalence of mandibles and lower limb elements. Cattle remains, however, included a range of elements and, although bones representing butchery waste were numerous, meat-bearing bones were also relatively common.

*Group 10: Anglo-Scandinavian dump and isolated post – late 9<sup>th</sup> to early 10<sup>th</sup> century*

Thirty-six fragments were recovered from Context 1005, which was a deposit sealing the whole trench. The major domesticates were identified and the unidentified fraction was mainly composed of large and medium-sized mammal rib, shaft and vertebra fragments. Additionally, several antler fragments, again probably from antler working, were recorded as ‘small finds’ during the excavation (these were not submitted to PRS).

## Discussion and statement of potential

Plant remains were well preserved, sometimes extremely well preserved, in all but one of the seven samples examined via a 1 kg subsample. For the most part they represented food remains in faeces, for the most part presumably human, and a modest range of taxa were present from staples (cereal 'bran') and pulses (?pea, bean) to vegetables (leek) and flavourings (dill, coriander, celery seed, and summer savory), with woodland/heathland/fenland mosses often recorded from deposits of this period and traces of dyeplants and perhaps other taxa associated with textile working (repeatedly recorded from Anglo-Scandinavian York, cf. Hall and Kenward 2000b and forthcoming).

Insect remains in these samples exhibited stunning preservation, of a kind rarely approached at Coppergate (Kenward and Hall 1995), though equalled in material from a site at 4-7 Parliament Street (Hall and Kenward 2000a); it is consistent with a growing suspicion that there is a band of exceptional organic preservation in York on the ridge between the south-west end of Parliament Street and Spurriergate. Honeybees were noted from three of the samples, which accords with a growing pattern for this area of Anglo-Scandinavian York (Hall and Kenward 2000b and forthcoming; Kenward in press b). Clearly this is an important site in relation to our understanding of land use in Anglo-Scandinavian York, providing valuable data relevant to the testing of hypotheses put forward by Hall and Kenward (2000b and forthcoming).

All but one (that from Context 1048) of the 'GBA' samples contained some eggs of intestinal parasitic worms. In two cases, Contexts 1012 and 1059, the numbers were small and might be attributed to a 'background' level, but in the remaining four deposits a significant faecal component was indicated. The *Trichuris* eggs seen were generally very well preserved, often retaining

both polar plugs. Comparison of these eggs (via a few spot measurements) with data for modern trichurids (Ash and Orihel 1984; Kassai 1998) indicated that the eggs seen were almost certainly of either *Trichuris trichiura* (Linnaeus) or *T. suis* (Schrank), the whipworms of humans and pigs respectively, or perhaps of both. It is particularly difficult to distinguish these two species purely by visual examination of their eggs as the normal size range for the eggs of *T. trichiura* is a wholly contained subset of that for *T. suis*. When, as here, large numbers of measurable trichurid eggs are present, a statistical approach to their identification, or the determination of the presence of more than one population, may be attempted, but this is beyond the constraints of an assessment. Similarly, the eggs of the ascarids *Ascaris lumbricoides* (Linnaeus) and *A. suum* (Goeze), the roundworms of humans and pigs, respectively, (though some parasitologists believe that there is just one species of *Ascaris* that infests both humans and pigs) are morphologically almost identical. Taylor (1955) has remarked (in relation to medieval remains) that a high ratio of *Ascaris* to *Trichuris* eggs, as is the case with Context 1089, may indicate pig rather than human faeces. Conversely, the ratio observed in the samples from Contexts 1016, 1043 and 1070 may suggest their faecal content to be of primarily human origin.

All of the hand-collected shell was of generally rather poorly preserved oyster, mostly from deposits of Anglo-Scandinavian date. The small quantity of remains recovered and their poor condition render the assemblage of little interpretative value. However, it seems likely that all of the oyster shell derives from human food waste, and its presence indicates the importation of this coastal resource.

The vertebrate assemblage showed that these deposits were rich in extremely well-preserved bone. Despite the presence of residual Roman pottery, the bones showed little indication of residual or redeposited material. Since dog gnawing was uncommon it is likely that the

remains were quickly incorporated into the deposits and were not left exposed for any length of time. Cattle were the most dominant species throughout, which was also the case at the nearby site of Coppergate (O'Connor 1989). Caprovids and pig were present in similar amounts, whilst other species were far less numerous. The butchery practices that were observed in the vertebrate assemblage from High Ousegate were very similar to those noted from other sites in York, particularly from the material recovered from St Saviourgate (Carrott *et al.* 1998) and those from Hungate (in particular YORYM 2000.7, Jaques *et al.* 2000). A number of different economic activities appear to have been responsible for the remains recovered from these deposits. One component was 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. Some domestic food waste was also apparent. Clearly, several related activities were being undertaken in the vicinity and the features excavated were typically used for the disposal of refuse of both a domestic and commercial nature.

## Recommendations

Despite good preservation, it is probably not worth carrying out further archaeobotanical analysis of the present material, though an effort should be made to examine material from the full range of other types of contexts, if sampled (we have really only looked at pit fills here). As recommended above, most of the samples assessed here demand further, detailed, investigation for insects, however, and any other samples from the site should be assessed and analysed fully where appropriate. Publication of material such as this is highly desirable.

Three of the samples (from Contexts 1016, 1043 and 1089) gave sufficient well-preserved *Trichuris* eggs to warrant further attention.

Measurements of those eggs retaining both polar plugs might allow a determination of the likely source (or sources) of the faecal content of these deposits to be attempted via statistical means.

No further work is recommended for the hand-collected shell.

The vertebrate assemblage, though not particularly large, does show some potential for providing both archaeological and zooarchaeological information. Despite the recovery from York of a number of vertebrate assemblages of a similar date and nature to those discussed here (Dobney and Jaques 1993; Carrott *et al.* 1995, 1998; Jaques *et al.* 2000), most remain unpublished. A more detailed examination of assemblages from individual features and context types may help with the interpretation and identification of some of the activities being undertaken. It is recommended that a detailed archive be made of all well-dated material including age-at-death and biometrical data for the main domesticates for the purposes of comparanda.

## Retention and disposal

All samples of deposits from this excavation, and fossils extracted from them, together with all of the hand-collected material, should be retained for the present.

## Archive

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

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Table 1. Summary information for microfossil ‘squash’ samples from 28-29 High Ousegate, York. Key: organic = approximate percentage of ‘squash’ composed of organic detritus; inorg = approximate percentage of ‘squash’ which was of inorganic material; ?phyt = ?phytolith or ‘plant silica’ fragments; live = live soil nematodes; Trichuris – sub-columns indicate numbers of eggs with 0, 1 or 2 polar plugs intact; f = few (up to 3 individuals); s = some (4 to 20); m = many (21 to 50).

Context	Sample	Group	organic	inorg	pollen/spores	?phyt	live	Trichuris			Ascaris
								0	1	2	
1012	2	9	90	10	s	s	-	-	1	2	3
1016	3	9	90	10	-	-	11	3	6	17	4
1043	4	5	90	10	-	s	2	2	7	5	1
1048	6	2	90	10	m	m	1	-	-	-	-
1059	5	7	80	20	-	-	10	-	-	2	2
1070	10	5	90	10	-	-	9	25	7	3	5 or 6
1089	11	2	90	10	s	-	-	6	6	6	24

Table 2. Summary information for the hand-collected shell from excavations at 28-29 High Ousegate, York, by context. A ‘?’ before numbers indicates possible numbers (e.g. ‘3/?4 = definitely 3, possibly 4). Key: ‘Cn’ = Context number; u/s = unstratified; ‘left’ = number of left (or lower) valves; ‘right’ = number of right (or upper) valves; ‘in’ = number of valves of indeterminate side; ‘meas’ = estimated number of valves intact enough to be measured; ‘e’ = average erosion score for valves; ‘f’ = average fragmentation score for valves; ‘kn’ = number of valves showing damage characteristic of the oyster having been opened using a knife or similar implement; ‘worm’ = number of valves showing damage by polychaet worms; ‘barn’ = number of valves with barnacles; ‘dog’ = number of valves showing damage from dog whelk boring; ‘fr’ = number of valves showing fresh breakage; ‘wt’ = total weight of shell in grammes.

		Oyster valves											
Cn	Group	left	right	in	meas	e	f	kn	worm	barn	dog	fr	wt
u/s	-	1	1	0	1	2	1	?1	-	-	-	?1	97
1005	10	0	0	3	0	3	3	-	-	-	-	-	26
1015	9	1	1	0	2	2	1	-	-	-	-	-	61
1016	9	3	2	1	?2	2	1	1	-	-	-	-	130
1019	8	1	0	1	0	3	2	?1	-	-	-	-	41
1020	8	0	0	1	0	2	3	-	-	-	-	?1	6
1021	8	1	2	1	1	1	2	?1	-	-	-	?1	48
1043	5	4	5	5	?1	3	2	3	-	1	-	1	247
1045	5	0	1	0	0	2	2	?1	-	-	-	-	16
1047	4	0	0	1	0	3	3	-	-	-	-	-	5
1048	2	4	7	11	0	3	2	?1	-	-	-	2	321
1049	2	26	22	9	?2	3	2	5	?1	1	-	7	1216
1055	2	4	1	1	0	3	2	?2	-	-	-	-	146
1057	1	0	1	3	0	1	3	?2	-	-	-	1	57
1058	1	2	2	2	0	2	3	2	-	1	-	1	92
		47	45	39	4/?9			11/?20	?1	3	-	12/?15	2509

Table 3. Contexts from which bone was recovered, together with the number of fragments (excluding antler), measurable bones and mandibles with teeth in situ from excavations at 28-29 High Ousegate, York. Key: No. frags = number of fragments; No. mands = number of mandibles with teeth in situ; No. meas = number of measurable bones.

Group	Context	Context type	No. frags	No. mands	No. meas
1	1054	floor surface	4	0	0
1	1058	floor surface	20	0	0
1	1061	layer	1	0	0
1	1051	occupation layer	4	0	0
1	1057	occupation layer	16	1	2
2	1049	pit fill	113	3	8
2	1055	pit fill	31	1	2
2	1089	pit fill	1	0	0
2	1048	pit fill	166	4	8
4	1047	levelling deposit	11	0	2
5	1045	pit fill	27	2	3
5	1080	pit fill	10	0	1
5	1043	pit fill	139	1	10
5	1070	pit fill	9	3	0
7	1038	cobbled surface	3	0	0
7	1042	cut fill	8	0	1
8	1019	dump	25	3	5
8	1020	dump	15	0	1
8	1021	occupation layer	34	0	5
8	1022	occupation layer	32	0	4
9	1066	?pit fill	31	2	4
9	1037	cut fill	10	0	3
9	1017	pit fill	11	1	0
9	1015	pit fill	4	0	0
9	1016	pit fill	26	5	3
9	1012	pit fill	67	3	4
9	1006	pit fill	32	0	11
10	1005	levelling	36	1	2
<b>Totals</b>			<b>886</b>	<b>30</b>	<b>79</b>



Table 4. Hand-collected vertebrate remains (excluding antler fragments) by stratigraphic group from excavations at 28-29 High Ousegate, York.

Species		1	2	4	5	7	8	9	10	Total
<i>Felis f. domestic</i>	cat	2	-	-	-	-	-	-	-	2
<i>Equus f. domestic</i>	horse		2					1	-	3
<i>Sus f. domestic</i>	pig	6	17	1	9		2	17	3	55
<i>Cervus elaphus</i> L.	deer	1	-	-	-	-	-	-	-	1
cf. <i>Cervus elaphus</i> L.	?red deer	-	-	-	-	-	-	1	-	1
<i>Capreolus capreolus</i> (L.)	roe deer	1	-	-	-	-	-	-	-	1
<i>Bos f. domestic</i>	cattle	6	43	2	38	3	31	47	4	174
Caprovid	sheep/goat	2	16	-	12	1	5	17	1	54
<i>Anser</i> sp.	goose	1	3	-	-	-	1	-	-	5
<i>Anas</i> sp.	duck	-	-	-	1	-	-	-	-	1
<i>Gallus f. domestic</i>	chicken	1	-	2	1	-	-	1	-	5
Unidentified fish		-	10	-	-	-	-	-	-	10
Unidentified		25	220	6	124	7	67	97	28	574
<b>Total</b>		<b>45</b>	<b>311</b>	<b>11</b>	<b>185</b>	<b>11</b>	<b>106</b>	<b>181</b>	<b>36</b>	<b>886</b>