

**Evaluation of biological remains from excavations at NCP car park site,
Skeldergate, York (site code: YORYM 1999.844)**

by

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Summary

A series of sediment samples and some associated spot find samples, eleven boxes of hand-collected bone, and one box of hand-collected shell, from deposits (principally of medieval and post-medieval date) revealed by excavations at NCP car park site, Skeldergate, York, were submitted for an evaluation of their bioarchaeological potential.

Several of the deposits from these trenches were rich in plant remains if not almost wholly consisting of plant material; preservation was often extremely good. In some cases, there seemed to be litter-rich assemblages of the kind interpreted as stable manure, with suites of insects to match (although if this was stable manure, it was probably not allowed to accumulate for excessively long periods). In other cases the principal components appeared to have come from textile dyeing and, perhaps, tanning.

A very small shell assemblage was recovered, dominated by well preserved edible shellfish (primarily oyster) indicating exploitation of this food resource by humans. The assemblage was too small to be of any further interpretative value.

A moderate-sized and, for the most part, well preserved assemblage of bone was recovered from medieval and early post-medieval deposits. The bulk of the material represented the main domestic species (cattle, caprovid and pig), whilst small quantities of goose and chicken bones were also present. The assemblage from Trench 2 included a discrete dump of caprovid metapodials, possibly representing waste from the processing of skins. However, there was no evidence for systematic commercial activities being undertaken in the vicinity. Preliminary observations suggest that a large proportion of the assemblage was more likely to be domestic household refuse, with a small component of butchery waste. Fish remains were well preserved and fairly numerous. Species present included both large and small gadids, herring and eel.

In the light of the dating and the probability that Anglo-Scandinavian deposits lie immediately beneath these early post-Conquest layers, no development should be permitted which does not either guarantee preservation in situ or allow for properly-funded excavation (with a suitable post-excavation budget for analysis of biological remains from a large number of contexts). To damage these deposits without full investigation would be to do a great disservice to York's archaeology.

KEYWORDS: NCP CAR PARK; SKELDERGATE; YORK; EVALUATION; ROMAN; MEDIEVAL; POST-MEDIEVAL; PLANT REMAINS; CHARRED PLANT REMAINS; INVERTEBRATES; SHELLFISH; VERTEBRATE REMAINS; STABLE MANURE; ?SKINNING; ?TANNING; ?HORNWORKING

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11 September 2000

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Introduction

An archaeological evaluation excavation was carried out by York Archaeological Trust at the site of the NCP car park, Skeldergate, York (NGR: SE 6013 5154), between 22 May and 7 July 2000.

A series of sediment samples ('GBA'/'BS' and 'SPOT' *sensu* Dobney *et al.* 1992), one box (total volume of shell of approximately 10 litres), and eleven boxes (each of approximately 20 litres) of hand-collected bone, from nine trenches, were recovered from the deposits. Most of the pottery recovered from this excavation suggests a late 11th to late 13th century date for most of the features encountered during excavation. Later medieval and post-medieval deposits appear to have been truncated by construction and use of the area in the 19th/20th century. Trench 4 was the only trench to reach natural deposits and encounter earlier deposits of ?Roman date.

All of the material was submitted to the EAU for an evaluation of its bioarchaeological potential.

Methods

Sediment samples

The sediment samples were inspected in the laboratory. Thirteen of the samples were selected for investigation and their lithologies were recorded, using a standard *pro forma*, prior to processing, following the procedures of Kenward *et al.* (1980; 1986), for recovery of plant and invertebrate macrofossils. The flots, washovers and residues were examined for plant remains. The flots and washovers were also examined for invertebrate remains, and the residues

were examined for other biological and artefactual remains. The spot samples were also examined.

Two of the sediment samples and four of the spot find samples were examined for the eggs of intestinal parasitic nematodes and other microfossils using the 'squash' technique of Dainton (1992).

Table 1 shows a list of the submitted samples and notes on their treatment.

Hand-collected shell

One box of hand-collected shell (representing material from 63 contexts in nine trenches) was submitted. Brief notes were made on the preservational condition of the 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; 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.

Brief notes on preservation and species representation were made for the scanned material.

Results

Sediment samples

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

Context 4038 [lower fill of large pit, pottery spot date C16th/17th]
Sample 40/T (2 kg sieved to 300 microns with paraffin flotation and washover)

Moist, mid to dark grey-brown (with orange mottling), crumbly (working plastic), sandy clay silt. Limestone (to 80 mm), charred twigs, fragments of fish and mammal bone, and ?eggshell were present in the sample.

There was a very large residue of about 750 cm³ of which about 200 cm³ comprised a washover of coal (to 40 mm) and charcoal (to 20 mm) with some cinders, bone, and shell; the rest was mainly sand and gravel with a large lump of limestone (to 80 mm). Some mineral-replaced seeds and seed fragments (including ?fig, *Ficus carica* L.) and concretions containing wheat/rye (*Triticum/Secale*) 'bran', presumably represent very strongly decayed faecal material. The only other uncharred plant remains were traces of seeds of toad rush, *Juncus bufonius* L. The flot contained only traces of very decayed invertebrate cuticle.

A total of 35 mammal, bird, and fish bones were recovered from this sample. Most of the fish bone fragments were unidentified, the exception being a small gadid vertebra.

Context 5022 [dumping, pottery spot date C11th/12th]
Sample 31/T (2 kg sieved to 300 microns with paraffin flotation and washover)

Moist, yellow-grey with charcoal rich patches and fragments of charred twig.

The very large residue of about 600 cm³ was mostly calcareous material in amorphous lumps to 50 mm, which may have been lime (rather than mortar: it did not appear to contain quartz sand grains), together with some charcoal (to 20 mm). The washover of about 100 cm³ consisted of more charcoal amongst which were some charred slender twig fragments up to about 309 mm in length some of which, at least, appeared to be dyer's greenweed (*Genista tinctoria* L.). There were also two rounded uncharred structures which seemed to be fronds of duckweed, *Lemna*, perhaps imported with water for some process (such as dyeing). There were very few other charred or uncharred plant remains. Three fish bones were present, one of which was a ?flat fish (Pleuronectidae) vertebra.

The flot contained only a few scraps of very decayed insect cuticle.

Context 5039 [?build-up over floor, pottery spot date C11th/12th]
Sample 38/1 (1 kg sieved to 300 microns with paraffin flotation)

Moist, with two major components of, fine and coarse herbaceous and woody detritus, and mid yellowish brown, crumbly to soft (working plastic), humic sandy clay silt, and a minor component of dark grey, sandy clay silt. Overall, the sample had a rather brittle (in places) and slightly compressed texture with hints of layering (somewhat 'floor-like'). Fragments of mortar/plaster and brick/tile were present.

The moderate-sized to large residue of about 400 cm³ contained about 150 cm³ of mortar-like lime concretions (similar to those from Sample 31) to 25 mm, and some sand. The organic fraction mainly comprised very decayed wood (to 40 mm) and bark (to 30 mm), some of the finer wood fragments perhaps being sawdust. There were almost no plant propagules other than moderate numbers of seeds of weld (or dyer's rocket, *Reseda luteola*) in the finest fraction; further weld seeds were encountered in the

flot, along with more fine wood (?sawdust) fragments. Only two unidentified bone fragments were recovered from this sample.

There were small numbers of rather well decayed insect remains, and a few mites, in the very small flot. They had no clear implications, although they did not appear to have originated on a house floor.

Context 7034 [build-up, pottery spot date C11th/12th]

A spot find sample was recovered from this context which contained fragments of very rotted wood.

Context 8018 [wicker pit, no pottery spot date available but dated to C11th/12th stratigraphically]

A spot find of light brown, compressed and brittle, concreted material was recovered from this context. A small fragment was examined by microfossil 'squash' and no eggs of parasitic intestinal nematodes were seen but some live ?soil nematodes were noted.

Context 8060 [dump/occupation deposit, pottery spot date Roman and C11th/13th]

A spot find of a single fragment of nutshell was recovered from this context which was identified as hazel (*Corylus*) nut.

Context 9030 [occupation build-up, pottery spot date C11th/12th]

Sample 1/1 (1 kg sieved to 300 microns with paraffin flotation)

Moist, dark grey-brown (with light to mid brown mottling on mm- and cm-scales), brittle and somewhat soft (working plastic and slightly sticky), slightly humic, sandy clay silt with inclusions of fine sand. Stones (2 to 20 mm), pot sherds, ?fine charcoal, and fragments of mammal bone and marine mollusc shell were present in the sample.

Of the moderate-sized residue of about 200 cm³, about half by volume consisted of charcoal (to 15 mm) with a little very decayed bark and wood (much of the latter as fine fragments). The remainder comprised sand, bone and grit. There were almost no seeds, the flot yielding traces of uncharred elder (*Sambucus nigra* L.) and weld seeds. Invertebrates, too were very rare, and substantially decayed.

Fifteen fragments of well preserved bone were recovered from the residue. Most fragments were unidentified to species, but were assigned to the large

and medium-sized mammal categories. A single woodcock (*Scolopax rusticola* L.) humerus and several herring (*Clupea harengus* L.) vertebrae were noted.

Context 9044 [pit fill, pottery spot date C11th/13th]

Two spot finds, one of 'faecal concretion with mineralised ?skin/?leather' and the other a 'nut', were recovered from this context. A small detached fragment of the concretion was examined by microfossil 'squash' for the eggs of intestinal parasitic nematodes but none were seen. The nut was identified as one half of a walnut (*Juglans regia* L.).

Context 9046 [pit fill above 9053, pottery spot date C11th/12th]

Sample 5/T (3 kg sieved to 300 microns with paraffin flotation)

Moist, mid to dark brown to mid to dark olive-brown, crumbly and slightly sticky (working just soft), humic slightly sandy clay silt with fragments of large mammal and fish bone, and wood and bark, present.

A rather large subsample was processed mainly in order to recover fish bone. There was a very large residue of about 2.2 litres, of which about 500 cm³ consisted of sand, grit, with bone (especially fish), pottery and some eggshell. The rest was mostly bark, charcoal and wood fragments (all to 40 mm), including wood chips, especially in the coarser fractions. There were also some rather decayed, often rounded, fragments of leather (to 25 mm).

Given the abundance of these components, identifiable plant macrofossils were rather sparse, though usually well preserved. Amongst them were some cornfield weed taxa perhaps from straw, and a notable component which may have been associated with textile working (and seen in other deposits in this sequence): fragmentary fruits of teasel, traces of stem of dyer's greenweed and moderate numbers of seeds of weld (there were also fragmentary sheep keds). The small flot added a fruit of agrimony (*Agrimonia eupatoria* L.) which might represent a species brought on a fleece (the fruits are burrs) or one used for dyeing (like weld and greenweed, agrimony furnishes a yellow dye). The other taxa recorded in moderate amounts were hazel nut (usually very well preserved and including at least one specimen of an immature nut) and the moss *Thuidium tamariscinum* (Hedw.) Br. Eur., one of a group of large branching forms commonly encountered in urban occupation deposits and most likely to have arrived from woodland or heathland, either incidentally with some other material, or

brought deliberately, e.g. as toilet tissue or packing. A last category of plant remains was, other than by hazel nut, represented only through traces of apple endocarp ('core') and wheat/rye 'bran'; these were at the level of 'background' and do not imply a faecal content for the deposit, for example (though there were at least two fragments of dog coprolite present).

The flot yielded a useful quantity of insect remains, numerous mites, and a few other invertebrates. Preservation was generally very good. Like the plant remains, the insects appeared to have had mixed origins. Some – for example fragments of the mealworm *Tenebrio obscurus* – may have arrived with food or faeces. Others appear to have been attracted to foul matter, and yet others to have been brought with water (or, less probably, have been attracted to open water in the pit). The aquatics included two *Helophorus* species, *Anacaena*, and an *Ochthebius*. A bark beetle, *Dryocoetinus villosus*, may well have come with the woodland mosses. These insects deserve fuller investigation.

Considerable amounts (approximately 310 fragments) of well preserved bone were recovered from this sample, much of it from fish. The latter included the remains of herring (*Clupea harengus* L.), eel (*Anguilla anguilla* (L.)) and large Gadidae. Several of the gadid vertebrae showed characteristic damage consistent with having been eaten and a number of the mammal fragments were acid etched. Bearing in mind the size of the fragments, it is likely that these fragments were eaten by a dog.

Context 9053 [fill of large pit, pottery spot date Roman, C10th/11th and C11th/12th]
Sample 8/1 (1 kg sieved to 300 microns with paraffin flotation and microfossil 'squash')

Moist, dark brown (paler internally), compressed and brittle, fine and coarse herbaceous detritus with some localised patches of mineral material (possibly ashy). Fly puparia were common and nutshell and burnt mammal bone present in the sample. A small subsample of herbaceous stems was removed and examined as a separate spot find.

This subsample yielded a very large residue of about 750 cm³ of woody and herbaceous detritus with a small proportion, perhaps 10-15% by volume, of sand and grit. The bulk of the herbaceous material appeared to consist of debris from hay and straw litter amongst which were many fly puparia. The more abundant remains were culm (stem) fragments and culm-nodes ('knees') of grasses and/or cereals, seeds of the arable weeds corncockle (*Agrostemma githago* L.) and stinking mayweed (*Anthemis cotula* L.) and

uncharred grains and bran fragments of wheat/rye. Most of the other taxa identifiable to genus or species would have grown in cornfields or hay meadows, but there were other components which may have been other types of litter: wood chips, bracken (*Pteridium aquilinum*) stalk fragments, bog myrtle (*Myrica gale* L.) leaves and a variety of mosses of tree bark and other woodland habitats. The number of plants which might be considered as litter of one kind or another was very high (38), well above the mean for a wide range of early medieval sites in York, and close to values obtained for richly organic deposits at 4-7 Parliament Street (Hall and Kenward 2000a), the most litter-rich contexts so far recorded in York at this (or any) period. Remains indicative of grazing land and turf generally were rather well represented, as were woodland plants (mainly mosses). At least two fruits of fullers' teasel (*Dipsacus sativus* (L.) Honckeney) may indicate a textile working activity to add to the evidence for dyestuffs from several contexts at this site.

Altogether the plant material gave a strong impression of having come together in stable manure. The insect assemblage supported this to a substantial extent, for there were small numbers of some species regarded as typical of foul, open-textured, decaying matter (several *Cercyon atricapillus*, *C. terminatus*, *Carpelimus fuliginosus*, and *Oxytelus sculptus*), some which may have come with hay (*Sitona* and *Apion* sp.), and others which may have come in water (directly, or via animal faeces, having been accidentally drunk: a colymbetine water beetle and *Lesteva* sp.). All but one of the fifteen fragments of bone recovered from this sample were unidentified; the single identified remain was a herring (*Clupea harengus* L.) vertebra.

The microfossil 'squash' was mostly organic detritus with a little inorganic material. Phytoliths, fungal spores, pollen grains, and diatoms (several forms) were all noted, together with two *Trichuris* and one *Ascaris* eggs. The polar plugs of both *Trichuris* eggs had been lost but they were otherwise fairly well preserved and measurable. Living soil nematodes were also seen in fairly large numbers (more than 12 on a single slide).

Assuming this deposit to have included stable manure, it may have been from a stable which was cleaned out fairly regularly so that large insect populations did not build up. Analysis of insect remains from a larger subsample is desirable.

Sample 8/SPOT

This mat of small woody stems was collected as a spot find from within Sample 8. It consisted of a clump about 100 x 100 x 20 mm, easily separating

when washed; the stems were mainly aligned but not apparently twisted in any way. All the material appeared to be *Genista tinctoria*, amongst which were every size of stem from very coarse basal branching stems down to the finest twigs. The only other remains in the sample were some grass/cereal culm fragments and two kinds of moss.

Spot finds

Three spot finds were also recovered from this context. These were of 'hazel nut', 'coprolite', and 'detritus'. The identification of the hazel nut shell was confirmed; the remains consisting of two small fragments and one whole nut. The 'detritus' spot sample appeared to consist primarily of fragments of hazel nut shell in a matrix of waterlogged humic silt. The coprolite was examined by microfossil 'squash'; no eggs of parasitic intestinal nematodes were seen but the find had the appearance of a dog coprolite (a lack on parasite eggs is not unusual in faecal remains of this type).

Context 9064 [fill of large pit, pottery spot date C10th to 11th/12th]

Sample 21/1 (1 kg sieved to 300 microns with paraffin flotation)

Moist, dark grey-brown, brittle to crumbly (working soft), humic sandy silt/sandy silty amorphous organic material with small patches of grey silt. Limestone (20 to 60 mm), fragments of brick/tile, wood, twigs, bone fragments, and ?ash were present in the sample.

The large residue of about 500 cm³ consisted largely of wood fragments (to 50 mm) with some bark (to 30 mm) and charcoal (to 20 mm), with less than 100 cm³ of sand. Preservation of plant material was very good: some hazel nutshell was in a pristine condition (and it may be of some significance with regard to dating that there were no signs on the nutshell fragments of apical cut marks, a feature frequently recorded from material of Anglo-Scandinavian date in York, e.g. Kenward and Hall 1995; Johnstone *et al.* 2000). The concentration of identifiable plant remains was not especially high, however. Those taxa recorded might mostly have arrived in litter of some kind (the overall tally for 'litter taxa' was 28), with the numbers of plants from grazing land/turf rather more prominent than for other sites of this period (as in the case of the sample from 9053).

The large flot contained numerous well preserved insect remains, as well as many mites. Foul matter, perhaps open textured and resembling stable manure, was indicated by many of the recorded species. Full

recording of insects from a larger subsample is desirable.

Two adults of the sheep ked, *Melophagus ovinus*, were recovered.

Bone from the sample was well preserved and included a number of burnt fragments and several which showed acid etching to the surface of the bone. Herring (*Clupea harengus* L.) and eel (*Anguilla anguilla* (L.)) vertebrae were present within the small assemblage.

Sample 16/1 (1 kg sieved to 300 microns with paraffin flotation)

Moist, very dark brown, slightly sandy amorphous organic material and fine and coarse herbaceous and woody detritus. Stones (2 to 6 mm), twigs, fragments of mammal and fish bone, and ?mortar/plaster were present in the sample.

Insect remains were present in the flot in quite large quantities, and their preservation quite good. Mites and fly puparia were numerous. The beetles suggested fairly foul conditions, and subjectively these might be invaders of something like stable manure. There were 'several' *Platystethus degener*, generally regarded as associated with waterside mud. While it may have bred in damp places on archaeological sites, it may have been caught up when water was collected from shallow wells or the river edge.

Spot finds

Two spot finds were also recovered from this context. One find of two 'nut fragments' was identified as fragments of hazel nut. The other find was of a dry, concreted lump of compressed organic matter; this had the appearance of being faecal in nature and included embedded fragments of 'straw' and occasional ?hairs. A small fragment of the concretion was examined by microfossil 'squash' but no eggs of intestinal parasite eggs were noted. The concretion was flecked with white modern mould.

Context 9083 [fill of large pit, pottery spot date C11th/12th]

Sample 23/T (1 kg very carefully disaggregated through 300 micron sieve with paraffin flotation)

The deposits consisted of compressed woody plant stems with some humic matrix, very little else being visible on inspection in the laboratory. About 2 litres of sediment (weight 1 kg) taken for examination of

plant and invertebrate macrofossil remains, the sample initially being disaggregated very carefully to avoid damage to delicate fossils.

The bulk of the twiggy debris in this sample was stems of dyer's greenweed, alongside which twig epidermis fragments were frequent and basal stem fragments moderately abundant. There was also a single leaf of this plant. The basal parts of the greenweed appeared to consist of multiple stemmed 'stumps' somewhat like minute coppice stools; this may indicate that plants had been repeatedly cut for their upper stems before finally being uprooted or cut at the very base at ground level (although plants growing in pastures might, one presumes, produce a similar effect, through repeated grazing by stock).

Most of the other plant material present probably arrived as litter in the form of straw and hay, though there was a large component of uncharred cereal chaff and some uncharred wheat/rye grains which might indicate animal feed. There was a little concretion of plant material in places, perhaps consistent with the presence of faeces.

The flot consisted mostly of rather soft fibrous plant material, making sorting for invertebrates difficult. There were rather few insects, but preservation was mostly good. There were hints of decaying matter resembling stable manure, notably from *Cercyon atricapillus* and *Oxytelus sculptus*, but a larger subsample would have to be analysed to confirm this.

A single mammal vertebra was recovered from this sample.

Sample 26/1 (1 kg sieved to 300 microns with paraffin flotation)

Moist, dark brown (sometimes olive internally), compressed, fine and coarse herbaceous detritus (locally more intensely humified) with some twigs present.

A second sample from same context as 23 was examined to check the heterogeneity of this pit fill (samples had been collected from different depths through the fill). This assemblage proved to be much less dominated by woody twigs and was more 'strawy', although rich in remains of *Genista*. Thus the very large residue of about 900 cm³ included uncharred cereal rachis ('ear stalk') fragments from straw and a wide variety of remains probably brought with hay, or perhaps even turf/grazing land³⁴ taxa were counted as possibly representing 'litter' of some kind, of which hay, straw turf, grazing and woodland categories were all well represented. That animal faeces may have been present is suggested by the

results of a 'squash' performed on a lump of undisaggregated sediment rich in wheat/rye bran which gave a ratio of *Ascaris* to *Trichuris* eggs of 4:1 (16 *Ascaris* to 4 *Trichuris*, quite possibly indicating the presence of pig faeces, cf. Hall and Kenward 2000b).

This subsample produced numerous well preserved insect remains, with a number of taxa indicative of foul conditions. *Cercyon analis*, found in decaying matter of many kinds, was abundant, but when (as here) found with smaller numbers of *C. haemorrhoidalis*, *Platystethus arenarius*, *C. terminatus* and *C. unipunctatus*, can be seen as part of a foul-matter community. This was probably the fauna of stable manure which had not been exposed for too long: detailed analysis of insects from a larger subsample is desirable.

Spot finds

Two spot finds were also recovered from this context. One of 'nutshell' consisted of two fragments of hazel nut and a single cherry (*Prunus*) stone. The other was a concretion with embedded wood fragments, cherry stones, and charcoal; this almost certainly contained faecal material but no eggs of parasitic intestinal nematodes were seen in a 'squash' prepared from a small piece of the find. Some live soil nematodes and fungal hyphae were noted, however.

Context 11074 [dump/build-up, no pottery spot date]
Sample 57/1 (2 kg sieved to 300 microns with paraffin flotation and washover)

Moist, mid to dark brown (internally mid grey-brown), crumbly (working soft and plastic), moderately humic, sandy clay silt. Stones (6 to 20 mm), mortar/plaster, brick/tile, fragments of fish and mammal bone, and localised hints of charcoal were present in the sample.

There was a moderate-sized residue of about 275 cm³, mostly sand and gravel, with a very small washover of a few cm³ of charcoal and uncharred elder seeds; the tiny flot contained a few more of these seeds and a trace of scraps of invertebrate remains.

This sample produced a very small assemblage of vertebrate remains, amounting to 13 fragments. Most of the fragments were unidentified to species, but were assigned to the large and medium-sized mammal categories.

Context 11075 [pit fill/dump, no pottery spot date]

Sample 59/1 (2 kg sieved to 300 microns with paraffin flotation and washover)

Moist, dark brown, soft (working plastic), sandy silty amorphous organic material with an ash/fine charcoal component and some stones (2 to 20 mm).

The moderate-sized residue of about 350 cm³ yielded a washover of about 100 cm³, mostly charcoal (to 15 mm) with traces of several types of charred cereal grain; the rest comprised sand and gravel with some fish bone (to 5 mm). There was a modest-sized assemblage mainly of uncharred weed seeds and a few probable food plants, but with some evidence of mineral replacement and more material preserved by charring (including, unusually, a single achene of pot marigold, *Calendula officinalis* L., and traces of grass or cereal culm). The very small flot contained more charred grains and some weed seeds, together with a few insect remains, all very decayed.

Thirty fragments of bone, all of which were well preserved, were recovered from this sample. Half of the fragments were the remains of fish, including, herring (*Clupea harengus* L.) vertebrae and premaxilla.

Context 12006 [pottery spot date C13th/14th]

Two land snail shells were collected as a spot find; a well preserved *Discus rotundatus* (Müller) and a fragment of *Oxychilus* sp. These remains were probably of modern origin.

Context 12008 [pottery spot date C14th]

A single, ?modern, rather fragmentary land snail (*Cepaea/Arianta* sp.) was collected as a spot find.

Context 12034 [dumping, pottery spot date C14th]

A single ?modern *Helix aspersa* Müller land snail was recovered and submitted as a spot find.

Context 12044 [organic part of dump, pottery spot date C11th/13th]

Sample 54/T (2 kg sieved to 300 microns with paraffin flotation and washover)

Moist to wet, mid to dark grey, just crumbly (working plastic and sticky), sandy clay silt. Stones (20 to 60 mm), fragments of mortar/plaster and brick/tile, and fish bone were present in the sample.

The large residue of about 500 cm³ produced a small washover (about 15% by volume) of very decayed woody detritus, including bark and wood (to 15 mm) and charcoal (to 15 mm). The rest was mainly sand,

gravel and further charcoal. A prominent feature of the identifiable plant remains were the abundant weed seeds, though otherwise there were just seeds of a few weeds, though of these there were moderate numbers of two taxa typical of drying mud at pond margins: celery-leaved crowfoot (*Ranunculus sceleratus* L.) and goosefoot (*Chenopodium* Section *Pseudoblitum*) perhaps most likely brought in water or on muddy feet. Some fine wood fragments may represent sawdust.

The flot yielded only traces of invertebrate remains, all well-decayed. There were traces of bark sclereids, and a *Trox scaber* (Linnaeus); when present in larger amounts, this association may be characteristic of refuse in or from tanning pits.

Context 12046 [build-up or dump, no pottery spot date]

Sample 55/T (1 kg sieved to 300 microns with paraffin flotation and microfossil 'squash')

Moist, compressed, fine and coarse herbaceous detritus with wood, twigs, fragments of bone, and limestone present.

The very large residue of about 600 cm³ (mostly consisting of woody and herbaceous detritus) included about 150 cm³ of sand and charcoal. The twiggy fragments present appeared mostly to be very decayed *Genista tinctoria*, and these and the abundant seeds of weed (and perhaps even some stem fragments of this latter plant) perhaps point to the deposit being largely waste from a dyebath used to impart a yellow colour. There were rather few other remains.

The flot contained a modest-sized group of well-decayed insect remains. The composition of this assemblage appeared to be somewhat unusual, probably indicative of fairly foul conditions. This fauna should be investigated through a larger subsample.

The microfossil 'squash' was mostly organic detritus with a little inorganic material. Phytoliths, fungal spores and hyphae, diatoms (several forms) and pollen grains were all present as were live soil nematodes. No eggs of intestinal parasitic nematodes were seen.

Hand-collected shell

Small quantities of hand-collected shell (mostly amounting to only a few valves or fragments of valves of shellfish) were recovered from 63 contexts. Preservation was rather variable (ranging from poor to very good) but predominantly good. All of the

material was assessed and the taxa identified as closely as possible.

The mollusca from all of the contexts included oyster shell. Most of the recovered shell was of edible shellfish from deposits of medieval to post-medieval date. Oyster was, by far, the most commonly represented taxon with other edible species – cockle (*Cerastoderma edule* (L.)) and mussel (*Mytilus edulis* L.) – also present in some of the contexts.

Oyster shell was, on the whole, quite well preserved. 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 some of the valves and some appeared to have been charred. There was very little (or no) evidence of damage to the valves (e.g. polychaet worm burrows, dog whelk holes) or encrustation (e.g. by barnacles) by other marine biota.

Four contexts (9045, 9053, 9083, and 12044) gave a few remains of freshwater mussel. These were mostly highly fragmented and were not identified further.

The very few recovered land snails were of common, and mostly highly eurytopic, taxa (e.g. *Helix aspersa* Müller – the ‘garden snail’). Additionally, these remains may well have been modern and, in any event, were of no interpretative value.

Hand-collected vertebrate remains

Vertebrate material was recovered from a total of nine trenches and amounted to 11 boxes (each box approximately 20 litres) of bone. Table 2 shows the amount of material recovered from each trench.

Trench 1

Fifteen deposits produced a very small assemblage, amounting to half a box (each box of approximately 20 litres) of bone. Most of the vertebrate remains were recovered from pit fills and ‘build-up’/‘garden soil’ deposits of medieval date. Preservation of the material from this trench was mainly good, although some fragments, particularly from the levelling deposits, did have a rather battered appearance. Colour of the fragments was typically fawn, although dark brown fragments were recorded within the vertebrate remains recovered from Sample 59 (Context 11075).

Material from the recorded contexts (11033 and 11070) produced the usual range of domestic species,

including the remains of cattle, caprovid and pig. A single fragment of cattle cranium (from Context 11070) exhibited a series of small perforations in the nuchal region of the occipital portion of the skull. The aetiology of this condition is unknown but has been discussed at length by Brothwell *et al.* (1996). Cat bones were identified from Context 11033.

The recorded material only produced six measurable fragments and two mandibles with teeth *in situ* of use for providing age-at-death and biometrical data. As this represents approximately three quarters of the total assemblage from this trench, few additional measurable fragments would be expected from the unrecorded portion.

The bone assemblage from this trench was too small for meaningful interpretation and if the pits were for refuse as suggested by the excavator, then disposal of waste associated with bones was not their primary function.

Trench 2

This trench produced one of the larger assemblages of bone, amounting to one and three-quarters boxes, representing 14 deposits of mainly 11th to 14th century date. Approximately two-thirds of this material (4 contexts) was recorded, most of which was recovered from Context 12006 (13th/14th century).

The bones from this trench were well preserved, although it was noted that some of the deposits contained fragments that had a slightly battered appearance and the occasional fragment with rounded edges. Colour of the fragments did vary from fawn to brown to dark brown, with material from Contexts 12034 and 12044 showing considerable variation within each assemblage.

Evidence of butchery was recorded on 20-50% of all fragments from Contexts 12038 and 12044, but was less extensive for other assemblages from this trench. Examples of split radii and astragali and heavily chopped pelvis fragments were observed. Dog gnawing was noted but affected few bones.

The assemblage from this trench was characterised by numerous caprovid metapodials, a large number of which were complete, recovered from Context 12006. Of the 68 fragments identified as caprovid, 58 were metapodials (28 metacarpals, 30 metatarsals). Differentiation of the bones using modern reference specimens suggested that most of the animals represented were sheep, with the exception of a single metatarsal which was tentatively identified as goat (on the basis of its general morphology; the diagnostic distal articulation being absent). No caprovid phalanges were recovered, but this may be

the result of the bias towards larger fragments introduced by hand-collection. These remains probably represent the waste from tanning or from skin/hide preparation. Several caprovid metapodials were noted from some of the scanned contexts 12011 and 12034 within this trench, whilst two fallow deer metapodials were identified from Contexts 12006 and 12008. Additionally, a goat horncore, chopped across the base, was recovered from Context 12034, this may also represent waste from craft activities.

Three of the sheep metatarsals showed areas of swelling of varying severity on the proximal, posterior aspect of the shaft. This took the form of a vertical ridge of highly remodelled bone positioned parallel with and medial to the position of the median extensor tendon. Similar lesions have been recorded on caprovid metapodials from other sites in York, including bones from previous excavations in Skeldergate (O'Connor 1984).

Trench 3

A very small quantity of bone, amounting to half a box, was recovered from five deposits of medieval and early post-medieval date. Features in this trench were of a structural nature and excavation was only undertaken to the top of the structures. This probably accounts for the small number of fragments recovered. All the material was briefly scanned.

Preservation of the fragments was, overall, good, with only colour showing some variation with contexts. Much of the material represented large and medium-sized mammal rib, shaft and vertebra fragments, with only a few bones identified to species. These included the remains of cattle, caprovid, pig, chicken and goose. The bulk of the material from this trench appears to be derived from domestic refuse, although the small size of the assemblage renders it of limited interpretative value. Few measurable fragments, or mandibles with teeth *in situ* were recovered.

Trench 4

A total of one and three-quarters boxes (representing 17 contexts) of bone were recovered from this trench. Deposits of medieval and post-medieval date were encountered relating mainly to backyard activities, characterised by a series of pits and dump deposits. Residual Roman pottery was identified throughout the deposits. Over 70% of the material came from two contexts (4035 and 4038), both of which were of probable early post-medieval date. Material from these two deposits was recorded, whilst the remaining material was scanned.

The recorded assemblage was well preserved and uniformly fawn in colour. Material from Context 4035 was fairly fragmented, with 20-50% of all fragments being <5 cm in any dimension. Fragments from this deposit were heavily butchered and the high degree of fragmentation may be a result of this. Evidence of butchery included chopped cattle humerus and femur fragments and longitudinally split vertebrae. Most of the scanned material showed similar preservation, with the exception of Context 4020. The vertebrate remains from this deposit were battered in appearance and rather eroded.

The species present included the usual range of domestic animals, with cattle and caprovid remains predominating. An increase in the number of fragments representing juvenile and immature cattle (when compared with the earlier material from this site) was recorded. This is a trend that has been noted at other sites of post-medieval date (Albarella and Davis 1996; Dobney *et al.* 1996) and has been interpreted as evidence of dairying, with the consequent surplus of calves for veal. Context 4038 produced a cat humerus with knife marks on its shaft; this may be evidence of skinning. Bird and fish remains were also identified, fish being particularly numerous. Many of the fish bones were unidentified ribs, spines and finrays, but those that could be identified included the remains of large and small gadids (cod (*Gadus morhua* L.) and ?whiting (cf. *Merlangius merlangus* (L.)). A single fragment representing the flat fish family (Pleuronectidae), was provisionally identified as flounder (cf. *Platichthys flesus* (L.)).

A fallow deer humerus (*Dama dama* (L.)) was recorded from Context 4038, whilst a third phalanx (also fallow deer) and an antler fragment (too small to determine from which cervid species it came) were noted from scanned context 4020. Another wild species was present in the form of a ?teal (*Anas crecca* L.) coracoid recovered from Context 4032.

Although the recorded assemblage amounted to 412 fragments, only 33 of these were measurable. Additionally, 8 mandibles with teeth *in situ* of use for providing age-at-death data were recorded.

Trench 5

Seventeen contexts, dated to the medieval and post-medieval periods, produced three quarters of a box of bone. Archaeological deposits from this trench

All the material from this trench was briefly examined. Fewer than 10 fragments were recovered from most of the bone-bearing deposits. Preservation

of the assemblage was excellent, with most fragments being in pristine condition. Colour was slightly more variable, but was mainly dark brown, variations being related to the waterlogged nature of the deposits. Butchery marks were noted throughout and included split cattle radii and evidence for the deliberate removal of caprovid horncores from the rest of the skull. The latter may hint at craft working activities (such as hornworking) in the vicinity.

Species identified included the remains of cattle, caprovids and pigs. Small quantities of bird and fish remains were present, most of the fish fragments probably representing gadids.

Of the 56 identifiable fragments (from a total of 147), seven were measurable and two were mandibles with teeth *in situ*.

This small assemblage consisted of a mixture of refuse, which included domestic and butchery waste, with possibly a small component of craftworking debris. There is no evidence from these deposits for the dumping of substantial quantities of bone from commercial activities.

Trench 6

The deposits from this trench were of medieval and post-medieval date and associated with an oven or hearth. Only nine contexts from Trench 6 produced material, amounting to just a quarter of a box of bone. The bulk of the assemblage was unidentified, representing large and medium-sized mammals. A single context, 6008, produced many small fragments, including the remains of birds and fish, almost certainly representing household refuse. Very few measurable fragments were observed and little information can be obtained from such a small assemblage.

Trench 7

Medieval and early post-medieval backyard activities, pits, dumping and some structural sequences were recorded from this trench. The vertebrate remains amounted to three-quarters of a box, representing 17 contexts. None of the bones were recorded in detail but material from each context was quickly scanned.

Overall material from this trench was less well preserved than bones from the other trenches (with the exception perhaps of some of the material from Trench 8). Fragments from these deposits were rather battered in appearance and some of the bones had concreted lumps of ?mortar attached to them. A similar range of species to those from the previous

trenches was identified. Two almost complete sheep skulls were noted, both with horncores deliberately removed. One sawn and worked red deer (*Cervus elaphus* L.) antler fragment was observed from Context 7031, a single gadid cleithrum being identified from the same deposit.

This small assemblage produced 11 measurable fragments.

Trench 8

Deposits from this trench were largely 11th-13th century in date, representing both structural and backyard activities. Two and a half boxes of bones were recovered from 31 contexts. Four contexts (8028, 8031, 8060 and 8081), amounting to 263 fragments (approximately 1 box) were recorded in some detail, whilst material from nine other deposits was scanned.

Most of the assemblages (recorded or scanned) were noted as having 'good' preservation, only some of the material from Contexts 8063 and 8081 was less well preserved and contained bones which were battered in appearance. Concretions were observed on bones from several of the scanned assemblages. Some variation of colour was seen within the scanned material (Contexts 8063 and 8065).

A similar range of species to those identified from the other trenches was recorded. Common domesticates were present, with cattle and caprovid remains making up the largest proportion of the material. Single fragments of cat and duck (*Anas* sp.), and a small number of chicken and goose fragments were also recovered. Large fish remains were noted, again representing gadids, in this case cod (*Gadus morhua* L.) and haddock (*Melanogrammus aeglefinus* (L.)).

Twenty-one of the bones from the recorded assemblage were measurable, and nine mandibles with teeth *in situ* were noted.

Trench 9

The vertebrate assemblage recovered from this trench amounted to two and a quarter boxes, representing 21 contexts. Most of the deposits from which bone was recovered were again associated with backyard activities or structural sequences and were of medieval date (mostly 11th-12th century). Material (amounting to one box) from three of the deposits, Contexts 9046, 9064 and 9083, was recorded in some detail, and bones from nine other contexts were scanned.

Vertebrate remains from this trench showed excellent preservation, with some bones having an almost 'greasy' appearance. Although most fragments were dark brown, some variation of colour was apparent within material from individual contexts. This variability of colour is likely to be the result of the organic nature of the waterlogged deposits rather than indicative of reworked material. Little dog gnawing was evident and fresh breakage was negligible.

A high proportion of butchered bones was recorded (20-50% of all fragments in some cases), including split and heavily chopped cattle shaft fragments. Additionally, vertebrae representing large and medium-sized mammals were longitudinally and transversely chopped indicating the splitting and processing of carcasses. A pair of cat mandibles showed traces of knifemarks, which could represent evidence for skinning.

A typical range of species was present, representing the major domesticates (cattle, caprovid and pig). Skeletal element representation for cattle and caprovids showed a predominance of head and distal limb bones (non-meat-bearing), although domestic household refuse was indicated by the presence of some meat-bearing elements and the numerous rib and vertebra fragments within the 'unidentified' fraction. Kitchen and table refuse is also indicated by the remains of chicken, geese and hare (*Lepus* sp.). Carcass preparation of birds and smaller mammals would have been minimal, and most skeletal elements would be expected in household rubbish.

Not surprisingly, the hand-collected fish bones were again mostly large gadids and included cod (*Gadus morhua* L.), ling (*Molva molva* L.) and haddock (*Melanogrammus aeglefinus* L.). A few of these fragments showed evidence of butchery. As noted above, Samples 5, 8 and 21 (Contexts 9046, 9053 and 9064) produced fragments representing herring and eels, clearly demonstrating the potential of these deposits for the recovery of fish remains.

A single carpometacarpal identified as turkey (*Meleagris gallopavo* L.) was noted from Context 9044 (scanned), dated to the 11th-13th centuries. This fragment is of potential significance since turkeys are a New World species thought to have been introduced into this country in the 16th century.

These deposits produced a varied assemblage which obviously included much domestic/kitchen refuse. Butchery waste is indicated though by the presence of the non-meat bearing elements of cattle and caprovids. Thirty-two measurable fragments and four mandibles with teeth *in situ*, of use for providing biometrical and age-at-death information, were noted from the recorded assemblage.

Discussion and statement of potential

Several of the deposits from these trenches were rich in plant remains if not almost wholly consisting of plant material; preservation was often extremely good. In some cases, there seemed to be litter-rich assemblages of the kind interpreted as stable manure, with suites of insects to match (although if this was stable manure, it was probably not allowed to accumulate for excessively long periods). In other cases the principal components appeared to have come from textile dyeing. To judge from the dyeplant taxa present, and from what we know of the evidence for dyeplants from medieval York (cf. Hall and Kenward 2000b), the deposits dated to the 11th/12th century by pottery seem, as suggested by the lack of Anglo-Scandinavian sherds, likely to have formed after the Norman Conquest rather than before.

The shell remains were mostly of oyster (and other edible shellfish) many of which showed evidence of having been opened by humans. The assemblage is too small to be of interpretative value beyond indicating the rather modest exploitation of this food resource.

Deposits from Skeldergate produced a moderate-sized assemblage of bone, the bulk of which was tightly dated to late 11th - late 13th century. Preservation of the bones varied from trench to trench, with the best preserved remains from Trenches 5 and 9. Bones from Trenches 7 and 8 generally showed poorer preservation, but only a few contexts yielded bones that were battered and eroded in appearance. Dog gnawing was present but was not extensive. It seems likely that most bones were fairly quickly incorporated into the deposits and that little reworking of the material occurred.

However, the turkey carpometacarpal identified from Context 9044 (pottery spot date 11th-13th century) does throw some doubt on the dating of this deposit. As previously mentioned, historical records suggest that this species, a native of America, was not found in this country until the early to mid 16th century (Allison 1985). Without a radiocarbon date it is impossible to be certain whether or not this bone is intrusive to the deposit, as its preservation and general appearance showed little difference to other vertebrate remains from the deposit. A 15th century deposit from previous excavations at Skeldergate (1973-5) also produced a turkey bone. Here it was interpreted as an intrusive element within the deposit (Allison *op. cit.*).

Most of the deposits producing bone were pitfills and dumps associated with 'backyard' activities. This interpretation can be corroborated to a certain extent by the vertebrate remains. With the exception of material from Trench 2, no dumps representing commercial waste were identified. Most of the bones appeared to represent domestic household or kitchen waste, with only a small component of primary butchery waste.

The accumulation of caprovid metapodials from Trench 2 (Context 12006) is clearly waste from a more specialised activity. Both primary butchers' waste and/or hide preparation could produce this kind of refuse. A similar concentration of metapodials was recovered from late medieval deposits at 58-9 Skeldergate. O'Connor (1984, 22) interpreted these as 'residue from the collection and processing of sheep skins'. Later deposits at this site provided evidence for continued activities of a comparable nature. The evidence from Skeldergate points to a use of some of the area for minor industrial enterprises associated with tanning and the production of leather.

Fallow deer remains were identified from Trenches 2 (Contexts 12006 and 12008) and 4 (Contexts 4020 and 4035). The cervid metapodials and third phalanx may be related to the hide processing activities already discussed, but the humeri fragments are more likely to represent food waste. Evidence for the consumption of venison may hint at high status occupation. Remains of hare (Context 9064) and woodcock (Context 9030), also generally regarded as high status foodstuffs, possibly support this interpretation.

Quite large numbers of fish bones were recovered from this site, particularly from Trench 9. An assemblage characteristic of medieval sites, including the remains of large gadids (cod, ling and haddock), herring and eel, was identified. Fish remains from other sites in York of medieval date (O'Connor 1991) have shown the beginnings of large scale exploitation of deep water marine fisheries, representing a shift in emphasis from locally available freshwater, estuarine and inshore marine species (Dobney unpublished). Systematically recovered fish assemblages of medieval date are rare and there is a lack of understanding of the exploitation of past fish stocks and the trade/supply relationships between the coastal fisheries and the urban settlements.

Recommendations

Plant and insect remains from selected samples should be investigated fully, both to amplify the archaeological information from them (and to tie the results with those from the analyses of plant remains), and to provide data for future synthesis.

Shell, though present in only small quantities, was, in general, well preserved in the deposits. Further excavation should provide for recovery of similar concentrations of shell (by volume) and for

post-excavation study of this material if significant quantities are indicated.

It is clear that the deposits show potential for producing a large, well preserved and tightly dated vertebrate assemblage, including a sizeable fish component. Further excavation should make provisions for a systematic sampling strategy to be employed and for a comprehensive post-excavation programme. Together with information from other sites in York, the current material could provide important data for comparison and synthesis. A basic archive should be made of the well-dated material from the present assemblage, which should include biometrical and age-at-death data.

In the light of the dating and the probability that Anglo-Scandinavian deposits lie immediately beneath these early post-Conquest layers, no development should be permitted which does not either guarantee preservation *in situ* or allow for properly-funded excavation (with a suitable post-excavation budget for analysis of biological remains from a large number of contexts). To damage these deposits without full investigation would be to do a great disservice to York's archaeology.

Retention and disposal

None of the current material should be disposed of: the samples should be stored in cool dark conditions pending fuller investigation.

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 Mark Johnson and David Brinklow of York Archaeological Trust for providing the material and the archaeological information, and to English Heritage for allowing AH and HK to contribute to this report.

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Table 1. List of examined sediment and spot find samples from excavations at NCP car park site, Skeldergate, York, with notes on their treatment.

Context	Sample	Notes
4038	40	3 kg sieved to 300 microns with paraffin flotation
5022	31	2 kg sieved to 300 microns with paraffin flotation
5039	38	1 kg sieved to 300 microns with paraffin flotation (x 3)
7034	-	Spot sample examined
8018	-	Spot find examined by microfossil 'squash'
8060	-	Spot find of 'nut fragment' examined
9030	1	1 kg sieved to 300 microns with paraffin flotation
9044	-	Spot find of 'faecal concretion with mineralised ?skin/?leather' examined by microfossil 'squash'
9044	-	Spot find of nut shell examined
9046	5	3 kg sieved to 300 microns with paraffin flotation
9053	8	1 kg sieved to 300 microns with paraffin flotation (x 3) and microfossil 'squash'
9053	-	Spot find of 'coprolite' examined by microfossil 'squash'
9053	-	Spot find of 'hazel nut' examined
9053	-	Spot find of 'detritus' examined
9064	16	1 kg sieved to 300 microns with paraffin flotation (x 3)
9064	21	1 kg sieved to 300 microns with paraffin flotation (x 3)
9064	-	Spot find of 'nut fragments' examined
9064	-	Spot find examined
9083	26	1 kg sieved to 300 microns with paraffin flotation (x 3)
9083	-	Spot find of concretion containing 'bone and nutshell' examined by microfossil 'squash'
9083	-	Spot find of 'nutshell' examined
11074	57	2 kg sieved to 300 microns with paraffin flotation
11075	59	2 kg sieved to 300 microns with paraffin flotation
12006	-	Snail spot find examined
12008	-	Snail spot find examined
12034	-	Snail spot find examined
12044	54	2 kg sieved to 300 microns with paraffin flotation
12046	55	1 kg sieved to 300 microns with paraffin flotation and microfossil 'squash'

Table 2. Quantities of hand-collected vertebrate remains recovered from excavations at NCP car park site, Skeldergate, York, by trench.

	No. boxes (each box approx. 20 litres)
Trench 1	0.5
Trench 2	1.75
Trench 3	0.5
Trench 4	1.75
Trench 5	0.75
Trench 6	0.25
Trench 7	0.75
Trench 8	2.5
Trench 9	2.25