

Assessment of biological remains from samples of
Roman to medieval riverside deposits at North Street, York
(YAT/Yorkshire Museum code 93.1)

by

John Carrott, Allan Hall, Michael Issitt,
Harry Kenward and Steyen Lancaster pl

Summary

Samples of raw sediment and sieved residues from thirty contexts of Roman to medieval date from excavations in North Street have been examined and prioritised. Material has potential for the investigation of (a) the kinds of waste materials dumped onto the waterfront; (b) on the basis of the identification of the waste material, something of human activity; (c) the environment in which the deposits accumulated; and (d) water quality and river levels.

The preliminary evidence gathered during this assessment suggested that there was stable manure (for the Roman period) and waste from dyeing and wool processing (from the Anglo-Scandinavian). Aquatic plants and insects may have originated through flooding or have lived *in situ* at the river margins.

It is predicted that 73 GBA and 31 BS samples merit investigation in the main post-excavation phase.

Authors' address:

Environmental Archaeology Unit
University of York
Heslington
York YO1 5DD

(0904) 433844-51
Fax: (0904) 433850

Prepared for:

York Archaeological Trust
Piccadilly House
55 Piccadilly
York YO1 1PL

December 14, 1993

Assessment of biological remains from samples of Roman to medieval riverside deposits at North Street, York (YAT/Yorkshire Museum code 93.1)

Introduction and methods

This report deals with the assessment of the bioarchaeological potential of a series of samples from excavations at North Street, undertaken under the direction of Rhona Finlayson (York Archaeological Trust) in 1993. Thirty contexts selected by her have been investigated by means of (a) 'general biological samples' (GBAs) of raw sediment; and (b) the residues from bulk-sieved (BS) samples of approximately 30 l., sieved on-site to 1 mm. Hand-collected bone is considered in a separate report.

Subsamples from the selected GBAs have been examined primarily for plant and insect macrofossils; on the basis of the results of these investigations, tests for the presence of eggs of intestinal parasitic worms were not made. The BS residues were examined to obtain a record of the general nature of the inclusions in the deposits.

Following description of the sediment in the selected GBA samples in the laboratory, using a standard *pro forma*, 1 kg 'test' subsamples were processed according to methods outlined by Kenward *et al.* (1980) and Kenward *et al.* (1986). For many samples, 'washovers' rather than paraffin flots were obtained where it seemed unlikely that much organic material was present.

BS residues were checked briefly for their content of biological remains and other components and the abundance of these recorded using a three-point scale.

Results

The following account summarises the results of the assessment of GBA subsamples and BS residues in chronological order. For each context, the archaeological context group, pottery date and context type (all based on information provided by the excavator) are given, together with a laboratory description.

Group: 1

Date: natural

Context type: natural drift

Context: 1494

Sample: 274 GBA

Mid orangeish-brown, unconsolidated, soft, slightly clay sand. This sample was small (less than 1 kg) and not investigated further. It appeared most unlikely to contain useful macrofossil remains.

No BS sample taken.

Group: 2

Date: Late C2nd AD

Context type: silt sand & organic build up

Context: 1459

Sample: 263 GBA

Mid grey-brown to orange-ish (on sandy surfaces), brittle (locally layered), working slightly plastic, sandy silt with a little herbaceous detritus, and traces of stones 2-20 mm, and rotted wood and twig fragments.

There was a rather large assemblage of well-preserved plant remains in this subsample, with several taxa taken as indicators of grassland habitats of various kinds and perhaps redeposited from herbivore dung (most abundant were purging flax, *Linum catharticum*, self-heal, *Prunella vulgaris*, buttercups, *Ranunculus* Section *Ranunculus*, sheep's sorrel, *Rumex acetosella* agg. and sea arrow-grass, *Triglochin maritima*, and there was a single ribwort, *Plantago lanceolata*, seed). There were also moderate numbers of grass/cereal chaff fragments (especially glume bases which might be wheat) and much of the organic component of the subsample consisted of 'grass-like' material, together with some wood and one or two small fragments of what might have been peat. The taxa listed above represent a range of possible soil types, *Triglochin* being characteristic of the upper parts of salt-marshes and a taxon recorded regularly from Roman and sometimes also medieval deposits in York, and suspected of having arrived in the city in herbivore dung from animals grazing on salt-marsh. Another plant recorded in moderate amounts was flax, *Linum usitatissimum*.

Very similar material to this was recorded extensively at the General Accident site at 24-30 Tanner Row (Hall and Kenward 1990) from deposits of similar date to these at North Street. It may be no coincidence that the flax seeds from North Street were of a similar size and shape to those from Tanner Row, and distinctively different from those recorded in medieval deposits.

The large flot (consisting mostly of plant debris) gave a modest-sized group of insect remains, including beetles which may have originated in stable manure.

Sample: 262 BS

The residue of about 2 l. was mostly of buff shelly oolitic limestone to about 30 mm, with traces of brick/tile and wood, and a few fragments of peaty material.

Group: 6

Date: Late C2nd

Context type: dump

Context: 1460

Sample: 257 GBA

Rather heterogeneous, light brown to dark grey-brown to dark brown (overall a light/mid grey-brown with greyer and browner patches), brittle, slightly layered to crumbly, working

plastic, very sandy clay with traces of stones 6-60 mm, and of wood and charcoal.

A small assemblage of moderately well-preserved plant remains was recovered from the small washover, whilst the rather large residue of approximately 50% sand and gravel to 25 mm and 50% charcoal, included moderate numbers of reasonably well preserved charred cereal grains and traces of brick/tile and wood. Amongst the uncharred remains were moderate numbers of *Rumex acetosella* and some *Linum catharticum* (cf. sample 263), together with a single bog rosemary, *Andromeda polifolia*, a raised-bog peat plant recorded regularly from Roman deposits in York. The remaining taxa were essentially weeds or wetland taxa of no particular interpretative value.

Only part of the washover was examined for insect remains. Small numbers of beetles and fly puparia were present and it was estimated that the entire washover would contain sufficient remains for interpretation.

Samples 259 BS

The large residue of about 7 l. consisted largely of stones and contained several cobbles to 30 mm; in addition, there were traces of pot, brick/tile, iron nails, wood, charcoal, mammal bone (including burnt bone) and oyster shell.

Group: 8

Date: Late C2nd

Context type: make up of embankment

Context: 1455

Sample: 254 GBA

Mid grey-brown (with areas of grey and brown), brittle (slightly layered in places), clay silt with traces of stones 2-20 mm, and of rotted mortar/plaster, brick/tile and charcoal.

The rather small residue of sand and gravel (to 30 mm) also yielded traces of bone, charcoal and brick/tile, with a very small washover, mostly of fine plant detritus but also containing at least two charred barley grains giving evidence of having started to germinate.

Only part of the washover was examined for insect remains. There were small numbers of poorly preserved beetles; the entire washover would probably give a small but interpretable group.

Sample: 255 BS

There was about 4 l. of residue after sieving, including some angular limestone to 150 mm and rounded pebbles. Otherwise there were only traces of brick/tile and mammal bone.

Group: 13

Date: C4th

Context type: naturally deposited river sand

Context: 1440

Sample: 246 GBA

Light/mid grey-brown, crumbly (working plastic and soft), sandy clay silt.

The small washover contained moderate numbers of elder (*Sambucus nigra*) seeds and very decayed stinging nettle (*Urtica dioica*) achenes; the residue was of sand with traces of gravel and charcoal. No more than traces of possible arthropod cuticle were observed in the washover.

Sample: 247 BS

The residue was very small (less than 0.5 l.) and consisted mostly of angular stone and gravel with a little brick/tile, pottery, coal, mammal bone and oyster shell.

Group: 14

Date: C8th

Context type: dump

Context: 1437

Sample: 243 GBA

Light/mid grey-brown (more grey internally and with paler coating of lumps of sediment with sand grains), sandy silty clay (more clayey and sandy in places), with a trace of charcoal.

There was a modest-sized washover from this subsample, most of it fine plant detritus, but with several elder seeds and traces of stinging nettle achenes and deadly nightshade (*Atropa bella-donna*) seeds. In the residue of quartz sand were traces of burnt and unburnt mammal bone, charcoal and some more (very fresh-looking) elder seeds. No invertebrate remains were observed.

Sample: 242 BS

The residue was small (less than 1 l.) and contained small numbers of angular oolite stones and a few rounded pebbles, with traces of brick/tile, charcoal, mammal bone and oyster shell. The <2 mm fraction was characterised by an abundance of rounded clasts rich in vivianite.

Group: 17

Date: C8th

Context type: build up

Context: 1433

Sample: 239 GBA

Dark brown to grey-brown, brittle, slightly layered, moderately humic sandy clay silt, with traces of stones 2-6 and 20-60 mm, and of vivianite and charcoal.

The very small flot contained seeds of several weeds of waste ground and cultivated soils, mostly in very small numbers. The residue was small and composed of sand with traces of gravel with bone, coal and charcoal. There were only a few fragments of poorly preserved insect cuticle in the flot.

Sample: 240 BS

There was a residue of about 2 l. remaining after sieving. It was quite rich in angular oolitic limestone fragments with some rounded pebbles. There were traces of brick/tile, pottery, charcoal, and mammal bone. As in sample 242, the <2 mm fraction contained an abundance of vivianite-rich clasts.

Group: 18

Date: C9th

Context type: dump

Context: 1429

Sample: 232 GBA

Rather heterogeneous dark grey, crumbly (working soft and slightly sticky) sandy clay with lumps of buff rotted mortar abundant and a trace of brick/tile.

The small washover was rich in fine root fragments and charcoal with a little very decayed wood, a single large charred wheat (*Triticum*) grain and a trace of fish bone. A subsample of the washover examined for invertebrates was unproductive. The residue was rich in gravel (angular and rounded stones to 30 mm) with some sand and traces of clinker/slag, brick/tile, charcoal and mammal bone.

Sample: 233 BS

The large residue of about 5 l. was mostly of angular oolitic limestone and sandstone to about 100 mm with gravel and one very large cobble to 250 mm. With these were traces of brick/tile, pottery, clinker, charcoal and mammal bone and an iron nail.

Group: 19

Date: C9th

Context type: dump

Context: 1413

Sample: 220 GBA

Very heterogeneous, with pale pinkish-grey-brown clasts of ?reworked clay in a matrix of dark grey to black charcoal rich clay silt and layers of yellow ?ash. Perhaps some bone present.

The rather large residue was about 60% sand with moderate amounts of slag to 30 mm, and traces of brick/tile, charcoal and mammal bone. A washover obtained from this was rich in charcoal but yielded no other charred plant remains—there were some uncharred elder seeds and traces of stinging nettle achenes. The small flot also gave elder with traces of fat-hen (*Chenopodium album*). Only traces of poorly preserved insects with no obvious interpretative potential were observed.

Sample: 221 BS

There was a large residue of about 4 l. in volume, much of it angular and rounded stone and pebbles to 100 mm. There were moderate amounts of slag (metallic and glassy in character) and of mammal bone and charcoal, with a trace of brick/tile.

Group: 22

Date: C10th

Context type: dump and river sand

Context: 1390

Sample: 214 GBA

Mid/dark grey-brown, crumbly, brittle sandy silt (with reddish brown patches of sand), with traces of stones 6-60 mm (including rounded pebbles), vivianite, charcoal, rotten wood and mammal bone

The residue and flot between them contained a modest range of identifiable plant remains, including rather common stinging nettle achenes and seeds of orache (*Atriplex*) and fat-hen, with traces of hemp (*Cannabis sativa*) 'seed'. All the other plant macrofossils were weeds of waste ground or cultivated soils. Although quite common, the seeds were mostly rather eroded. About 20% of the rather small residue consisted of charcoal (the rest being sand and gravel to 15 mm) with a single fragment of wood to 40 mm, some mammal bone (to 20 mm) and traces of brick/tile, metallic slag and ?daub. There were small amounts of poorly preserved arthropod cuticle in the flot.

Sample: 215 BS

The residue of about 2.5 l. consisted mainly of angular oolitic limestone and rounded pebbles with moderate amounts of charcoal and traces of brick/tile, metallic slag, wood fragments, mammal bone (some of it burnt) and faecal concretions.

Group: 23

Date: C10th

Context type: build up and dump

Context: 1386

Sample: 210 GBA

Dark grey to black, slightly crumbly (working plastic), rubbing very black, sandy silty clay, with traces of stones 2-60 mm and of rotted mortar/plaster, vivianite, and mammal bone

and probably with much very fine charcoal or soot.

The small washover from this subsample was rich in very decayed fine plant root fragments with many stinging nettle achenes, several hemlock (*Conium maculatum*) fruits (including fragments) and traces of elder, dock (*Rumex*) and blackberry (*Rubus fruticosus* agg.). An aliquot of the washover contained no invertebrate remains. The small residue was mostly sand, with a moderate amount of gravel to 30 mm, and traces of bone and charcoal.

Sample: 212 BS

The large residue of about 4.5 l. was rich in angular oolitic limestone with some sandstone, to 150 mm. There were traces of brick/tile and of mammal bone.

Group: 26

Date: C9th/10th

Context type: build up

Context: 1308

Sample: 204 GBA

Dark grey-brown, brittle to crumbly (working plastic), sandy silty clay, with traces of stones 2-6 and 20-60 mm, and of rotten mortar/plaster, vivianite, charcoal, and mammal bone (a large mandible fragment).

There was quite a large assemblage of reasonably well preserved plant macrofossils in the residue and flot from this subsample, in a matrix that was quite rich in very decayed wood fragments including bark and twigs. Most of the taxa were weeds of waste ground and cultivated soils, the more abundant being annual nettle (*Urtica urens*), which was abundant, stinging nettle, fat-hen, prickly sow-thistle (*Sonchus asper*) and chickweed (*Stellaria media*). There were also frequent seed fragments of corncockle, *Agrostemma githago* and a fruit fragment of black bindweed, *Bilderdykia convolvulus*; fragments of propagules of these cornfield weeds are often associated with cereal bran (typically in faeces), but none was recorded from the present sample. Two plants perhaps of economic use in this sample were hazel (*Corylus avellana*) nutshell and hop (*Humulus lupulus*) achenes.

There were small numbers of insect remains in the flot; although this was not an interpretable group, it would be quick to record and would be a useful representative of small groups from the site.

The residue, which was about 30% by volume sand and gravel to 10 mm, also contained a little brick/tile and charcoal.

Sample: 205 BS

There was a large residue of about 3.5 l. consisting mostly of stones, including some very large (up to 150 mm) angular oolitic limestone fragments and rounded cobbles. With these was an abundance of wood fragments and traces of brick/tile, charcoal and mammal bone.

Group: 29

Date: C9th/10th

Context type: build up

Context: 1293

Sample: 196 GBA

Dark grey-brown, crumbly (though heavily trowelled), sandy silt, with traces of stones 2-20 mm (including rotten limestone), and of rotted wood and twig fragments and oyster shell fragments.

The large residue contained about 20% by volume of sand and gravel to 20 mm, with traces of mammal bone and brick/tile. The remainder was very decayed wood to 35 mm, much of which proved on closer inspection to be bark. The plant macrofossils present were restricted to a few taxa of limited interpretative value, whilst the small flot gave a large assemblage, all in very small numbers, and mostly 'weeds' familiar from many urban archaeological deposits with anoxic preservation. There appeared to be some tiny pellets of very decayed wood in the finest fractions, perhaps 'frass' from wood under attack by arthropods.

The small group of insects present in the flot would almost certainly only be of value as representative of 'dilute' assemblages from the site.

Sample: 197 BS

The rather large residue of about 5.5 l. included several lumps of limestone and sandstone to 150 mm and an abundance of wood fragments. Mammal bone was quite well represented and there were traces of brick/tile, pottery, slag, a metal object, and charcoal. The sediment was not completely disaggregated.

Group: 31

Date: C10th

Context type: build up & dump

Context: 1283

Sample: 184 GBA

Dark grey-brown, crumbly, moderately humic sandy clay silt with a little herbaceous detritus locally, traces of stones 20-60 mm, and of brick/tile, charcoal, wood and twig fragments, hazel nutshell, fish bone and fly puparia.

The large residue was about 5% by volume sand with a little gravel to 10 mm, but consisted mainly of wood fragments, especially in the >4 mm fraction. These had a characteristically 'flaky' appearance and some seemed to be chips from working. There was also a moderate amount of bark and some twig fragments. Preservation of other plant remains was good and there was a modest assemblage of taxa from the residue and flot which included several aquatic and waterside taxa (water plantains, *Alisma* and *Baldellia*, and water-dropworts, *Oenanthe* spp.), some likely to have originated in marshes or wet meadows (lesser spearwort, *Ranunculus flammula*, marsh pennywort, *Hydrocotyle vulgaris*,

spike-rush, *Eleocharis palustris*, and marsh lousewort, *Pedicularis palustris*) and an assortment of weeds of waste ground and cultivated soils. There were also several well-preserved moss fragments of taxa likely to have grown in fen or marsh habitats. At least one-and-a-half hemp achenes were present and a few fragments of stem which might have been from a clubmoss (*Diphasium* or one of its relatives) and at least one small stem fragment which might have been dyer's greenweed (*Genista tinctoria*). These two latter taxa have been recorded in many deposits of C9/10th date in York and it is certainly important to establish from an examination of more material whether the identifications can be substantiated.

Only part of the flot was examined for invertebrate remains. There were abundant insects including a rich beetle assemblage from natural habitats and decomposing organic matter. There were hints of insects from dye-plants and the processing of wool. This assemblage would require detailed analysis.

Sample: 187 BS

The large residue of about 5 l. included several large fragment of angular limestone and sandstone to 150 mm. There were also moderate amounts of wood, charcoal and mammal bone, and traces of brick/tile, bird and fish bone and oyster shell.

Group: 32

Date: C10th

Context type: dump

Context: 1278

Sample: 163 GBA

Black indurated, fibrous, compressed coarse herbaceous detritus (including 'straw'), with some dark brown patches and patches of mid/dark grey-brown sandy silt and buff ash and traces of stones 2-60 mm.

The large residue and flot were rich in plant material; indeed, organic remains made up about 90% of the former. Much of the >4 mm fraction consisted of very decayed wood, whilst the 2-4 mm fraction had a moderately large component of straw-like material. Most of the identifiable plant remains were of aquatic or waterside taxa, notably *Oenanthe*, with bogbean, *Menyanthes*, spike-rush, and marsh pennywort, as in sample 184. Also present were moderate numbers of very well preserved sterile thalli (submerged leaves) of ivy-leaved duckweed, *Lemna trisulca*. This last is a species of duckweed characteristic of still or slowly-moving water in ponds and ditches. Terrestrial taxa were few and, of these, almost none were cornfield weeds, suggesting that the straw was perhaps not from cereals but might have been cut reed or some other wetland vegetation.

The flot contained an assemblage of insect remains of interpretable size and excellent preservation. It suggested aquatic deposition of terrestrial debris, including perhaps somewhat foul matter.

No BS sample taken.

Group: 33

Date: C10th

Context type: dump

Context: 1281

Sample: 167 GBA

Rather varicoloured, but essentially dark grey-brown to light brown to buff, with patches of light grey to black, brittle, sandy clay silt, with traces of stones 2-60 mm (including oolitic limestone), rotted wood, and a mammal tooth.

About 30% of the residue was sand with a little bone and charcoal. The remainder was very decayed wood to about 20 mm, with a modest range of plant taxa representing weedy and waste ground vegetation, and cultivated land. The assemblage was very typical of many urban occupation deposits.

A small group of insects was present in the flot. Most were typical of occupation sites. A larger subsample would probably give an assemblage of interpretative value.

Sample: 169 BS

The residue of about 3 l. included some large angular limestone fragments, but otherwise had only traces of brick/tile, pottery, wood fragments, charcoal, and mammal and fish bone.

Group: 34

Date: C11th

Context type: dump

Context: 1262

Sample: 150 GBA

Mid/dark grey-brown (with some small buff patches and locally darker material), crumbly (working slightly plastic and also sticky), very stony, sandy clay silt with traces of stones 2-60+ mm, charcoal, mammal bone and oyster shell fragments, and some white flecks.

Only traces of elder and rush seeds were recorded from the very small flot and the residue was mostly of sand with some grey, very calcareous concretions to 40 mm, along with a little bone (including burnt fragments), charcoal and stone (to 30 mm). The few insect remains in the flot were very rotted and probably represented, in the main, 'urban' taxa. They were of limited potential.

Sample: 152 BS

There was about 3 l. of material in the residue, including small angular limestone fragments and a few rounded pebbles. Also rather common were charcoal and large mammal bone fragments and there were traces of brick/tile.

Group: 36

Date: C11th-12th

Context type: dump

Context: 1224

Sample: 144 GBA

Dark grey-brown, crumbly, slightly humic, slightly clay silt with traces of stones 20-60 mm, and of brick/tile, mammal bone and eggshell (and with a separate subsample including patches of eggshell fragments provided within a polyethylene bag in the GBA sample tub by the excavator).

The organic fraction of the residue (about 40% by volume) was mostly charcoal, with moderate numbers of very decayed hazel nutshell fragments. The other plant macrofossils were essentially weeds of waste places and cultivated soils and offered little interpretative information. The < 1 mm fraction was rich in what seemed to be 'frass' from arthropod attack on wood (cf. sample 196, context 1293). The flot contained a very small group of poorly preserved insects with little interpretative potential.

Sample: 145 BS

The moderately large residue of 3.5 l. included abundant angular stones to 30 mm with moderate amounts of wood, charcoal and mammal and fish bone and traces of brick/tile, pottery and oyster shell.

Group: 37

Date: C11th-12th

Context type: dump & alluvial sand

Context: 1195

Sample: 136 GBA

Dark grey-brown, brittle and slightly layered working crumbly, moderately humic sandy clay silt, with traces of stones 2-60 mm, and of 'straw', nutshell and well-preserved mammal bone.

About 90% by volume of the residue from this subsample was organic material, mainly wood and bark fragments to about 20 mm. There were also moderate numbers of well preserved hazel nutshell fragments. Most of the identifiable plant macrofossils were weed taxa, only stinging nettle and orache reaching more than trace levels. The presence of moderate numbers of capsule fragments of linseed/flax, *Linum usitatissimum*, in this assemblage perhaps indicates disposal of occupation debris rather than retting of flax stems in the river.

There was a small group of poorly preserved insects typical of occupation sites in the flot, with a mixture of decomposers and outdoor forms. Although a larger subsample might produce an interpretable group, intensive examination would probably not be worthwhile.

Sample: 128 BS

There was about 3 l. of residue, a good proportion of it angular and rounded stones to about 40 mm, with mammal bone. Present in very small amounts were brick/tile, pottery, wood, charcoal and fish bone.

Group: 38

Date: C11th-C12th

Context type: dump/ build up

Context: 1185

Sample: 119 GBA

Mid/dark grey-brown, crumbly, slightly humic sandy silt, with traces of stones (including pebbles) 2-60 mm, and of rotted mortar/plaster, brick/tile, charcoal, and mammal and bird bone.

Of the large organic component in the residue of this subsample (about 90% by volume), much was wood, including bark and twig fragments, up to approximately 30 mm. There were traces of coal, pottery, bone and charcoal with sand and gravel to 15 mm. The plant macrofossils included several typically cornfield weeds, notably corn marigold (*Chrysanthemum segetum*) with some weeds of less clearly-defined habitat preferences and one or two taxa which might indicate wetland habitats. Linseed was present—the only overtly 'useful' plant.

The flot included a modest but varied group of insects. Some, perhaps, originated in dumped organic matter, but there was probably also a component from nearby semi-natural habitats. It might be useful to process a larger subsample in order to obtain a more clearly interpretable assemblage.

Sample: 120 BS

In the residue of about 3.5 l. volume, there were moderate amounts of wood, and mammal and fish bone, with traces of pottery and charcoal and a few angular and rounded stones to 30 mm.

Group: 39

Date: C12th

Context type: dump/ build up

Context: 1180

Sample: 113 GBA

Dark brown (more or less grey-brown in parts), crumbly (slightly layered, locally), sandy, slightly clay silt with a trace of ?herbaceous detritus and traces of stones 2-20 mm, brick/tile, and mammal and fish bone.

The rather large residue was about 20% sand and gravel to 15 mm, with traces of mammal bone, brick/tile and pot. Much of the organic fraction was wood and bark, with traces of poorly preserved hazel nutshell and a small assemblage of plant remains of no interpretative value; seed density appeared to be very low, although preservation was quite good. From the flot, it was clear that a proportion of the finer organic material in this sample was root fragments.

A few insect remains were recorded from the flot, but they were probably of little interpretative value.

Sample: 114 BS

The residue, of about 2.5 l., was mostly wood with moderate amounts of stones (to 30 mm), mammal and fish bone and pottery, with traces of brick/tile, charcoal and shellfish.

Group: 42

Date: C12th

Context type: build up/ dump

Context: 1165

Sample: 97 GBA

Dark grey-brown (with some paler patches of sand), brittle (locally layered, working plastic), sandy clay silt with some herbaceous detritus and traces of rotten mortar/plaster, and of brick/tile, charcoal and mammal bone (and ?also eggshell).

The residue was quite large and contained about 5-10% by volume of sand and gravel to 10 mm. Much of the organic component was very decayed wood, and there were moderate numbers of very decayed hazel nutshell fragments. The plant macrofossil assemblage otherwise consisted of a small range of taxa of no particular character and many of the seeds were not well preserved.

The flot contained a small, mixed insect group, principally taxa typical of intensive occupation deposits. It is likely that a larger subsample would give an interpretable group.

Sample: 98 BS

There was only about 1 l. of residue in which charcoal and mammal bone were moderately common, but otherwise there were only traces of stones, brick/tile, pottery, mortar/plaster and fish bone.

Group: 44

Date: C12th

Context type: dump/ build up

Context: 1154

Sample: 81 GBA

Mid grey-brown (with paler and darker areas), crumbly, clay sand with traces of brick/tile, vivianite and charcoal

In the modest-sized residue of about 50% sand 50% fine wood and charcoal fragments, there were traces of coal, vivianite and bone. The small washover contained fine root fragments with moderate numbers of elder seeds and a small assemblage of what were essentially weed taxa and a single charred wheat or barley grain. It contained only a few insects per unit volume, but the whole assemblage might be interpretable.

Sample: 84 BS

Most of the residue of about 1.5 l. was very decayed wood with moderate amounts of bone and charcoal, a few angular to rounded stones and pebbles to 35 mm and traces of brick/tile and pottery.

Group: 45

Date: C12th

Context type: build up

Context: 1145

Sample: 73 GBA

Dark grey-brown, brittle (working crumbly), sandy clay silt, with traces of stones 20-60 mm and of rotted mortar/plaster, of brick/tile, pot and wood.

There were few identifiable plant remains in the residue, which was approximately 60% by volume sand and gravel to 15 mm. There was rather a large proportion of undisaggregated sediment suggesting that the material had not broken down easily. Mammal and fish bone, charred and (very decayed) uncharred hazel nutshell, and fish scale were all present, together with moderate amounts of charcoal and roots. The few seeds present were of no interpretative value and seed density seemed to be very low.

A very small group of poorly preserved 'urban' insect taxa was recorded from the flot; a larger subsample *might* give an interpretable assemblage.

Sample: 74 BS

There was a rather large residue of about 4.5 l. including moderate numbers of angular stones and rounded pebbles to 30 mm, and moderate amounts of brick/tile, pottery, wood (mostly small and very decayed fragments) and charcoal. Traces of mammal and fish bone were also present.

Group: 47

Date: C12th-C13th

Context type: alluvial sand

Context: 1136

Sample: 66 GBA

Mid/dark grey-brown (with some lighter and darker patches), brittle (working slightly plastic), clay sand with traces of stones 2-6 mm and of charcoal.

Although fine plant detritus was abundant in the small washover, there were no identifiable plant macrofossils apart from traces of elder seed; the small residue was of sand with traces of bone, coal and charcoal. Only part of the washover was examined for invertebrates. There were a few arthropods and a statoblast of *Cristatella mucedo*.

Sample: 67 BS

The residue stolen from the site during the excavation and was not therefore available for examination.

Group: 50

Date: Late C13th

Context type: build up

Context: 1118

Sample: 43 GBA

Light/mid grey-brown (with black bands and some paler patches), brittle, layered, silty sand with traces of stones 20-60 mm and of brick/tile.

Very little of this sample remained as either residue or washover. part from sand and gravel to 20 mm, the former included traces of fish bone, wood, charcoal and brick/tile whilst the washover had a few plant remains of no particular interpretative value, being mostly of very decayed wood with a little herbaceous detritus. Preservation was poor and the material all had a silty coating suggesting it might have been reworked. Insects and other arthropods were not very abundant and were poorly preserved, but this subsample or a larger one might give an interpretable group. Subjectively, the beetles were ecologically mixed.

Sample: 44 BS

The residue was tiny (< 0.5 l.) and was mostly angular and rounded gravel with traces of brick/tile, and mammal and fish bone.

Group: 53

Date: Late C13th

Context type: build up

Context: 1113

Sample: 38 GBA

Light/mid grey-brown (darker grey internally), crumbly to stiff (working plastic) clay sand (more purely sandy and clayey in places), with no inclusions.

The very small residue was of sand with a trace of coal and brick/tile and a possible iron object. There was a fragment of charred hazel nutshell in the washover, but otherwise only a little charcoal and vivianite.

Sample: 40 BS

A tiny residue of < 0.25 l. was obtained from this sample, in which there was coarse sand and a little gravel, a ?iron nail, and traces of brick/tile, charcoal and mammal bone.

Group: 57

Date: Late C13th

Context type: build up

Context: 1090

Sample: 24 GBA

Strongly mottled at 10 mm scale (gleyed), mid red-brown to mid blue-grey, crumbly, slightly clay sand with traces of stones 2-20 mm, green-glazed pot and charcoal.

No identifiable plant remains were recorded from the residue of sand and gravel, which also contained traces of brick/tile and bone, or from the washover which was mostly charcoal with a little ?burnt soil.

Sample: 25 BS

There was about 0.75 l. of residue of which most was angular and rounded stones and pebbles. Traces of brick/tile and mammal bone (including burnt and unburnt fragments) were also present.

Group: 64

Date: Late C13th/14th

Context type: build up

Context: 1056

Sample: 14 GBA

Mid grey-brown, brittle to crumbly, ?very slightly clayey sand with no inclusions.

There were no organic remains in the subsample examined; apart from sand and a little gravel to 20 mm, only a trace of coal (smaller than 5 mm) was recorded from the residue; no washover or flot had been taken.

Sample: 15 BS

The small residue of about 0.75 l. was mostly angular ?rotted mortar or iron pan (sand grains concreted in a ferruginous matrix) with traces of brick/tile, coal and charcoal.

Group: 65

Date: Late C13th/Early C14th

Context type: build up

Context: 1044

Sample: 8 GBA

Mid greyish-brown, crumbly (working plastic), sandy silty clay with traces of stones 2-6 mm, charcoal and mammal bone.

The modest-sized residue of quartz sand also contained a trace of stone to 30 mm, brick/tile and coal; there was only a little charred organic material in the washover.

Sample: 6 BS

The small residue of about 1 l. proved not to have been very well washed. It was mostly of angular stones and rounded pebbles, with traces of brick/tile and coal.

Implications for further work

Many of the deposits examined gave assemblages of plant and invertebrate remains which were clearly or probably of value in understanding the way the sediments accumulated. A proportion of the samples were effectively barren of (plant or animal) macrofossils; these were mainly in the upper part of the sequence (C12-14th).

Purpose of further work

Two main kinds of evidence would accrue from further investigation of this sequence. Firstly it will be possible to determine the kinds of waste dumped onto the waterfront, and from the waste material to infer something of human activity. The preliminary evidence gathered during this assessment suggested that there was stable manure (for the Roman period) and waste from dyeing and wool processing (from the Anglo-Scandinavian). Fuller analysis of the deposits rich in fossils preserved by anoxic waterlogging would undoubtedly amplify this picture.

The second principal kind of evidence would concern the environment into which waste was being dumped. Aquatic plants and insects may have originated through flooding or have lived *in situ* at the river margins. Fuller study of these remains in conjunction with sedimentological work (and perhaps also analyses of other groups such as diatoms and ostracods) should determine their origin and thus provide evidence concerning water quality and river levels.

Proposed strategy for further work

The assessment has shown that good preservation of interpretatively significant remains occurs somewhat unpredictably in the deposits (although good preservation is generally related to high organic content), and it is recommended that, for insect remains, at least, an extensive set of the samples is surveyed by means of test subsamples, with selection of

those to be recorded more fully. This could be achieved by selection amongst the samples processed for plant remains as well as those explicitly selected for analysis of insects (see Table 2). Table 1 summarises the priorities assigned to plant, insect and other biological remains in the GBA samples. First priority samples are those believed to offer very good potential for interpretation and the recovery of significant archaeological information. Second priority samples may give useful information and should be examined if possible. Third priority samples may give useful information only in terms of the accumulation of data at the level of phase or feature type. Table 2 presents extrapolations for the whole body of 132 sampled contexts on the basis of the 'sample' assessed.

Priorities assigned to plant, vertebrate and other biological remains and the predicted numbers of contexts at each priority for the BS samples are given in Tables 3 and 4.

It is assumed that YAT will organise work on diatoms and/or ostracods in consultation EAU on the basis of contacts already established.

Costings

Costings for work on GBA and BS samples are presented in Tables 5 and 6, on the assumption that all first and second priority contexts for any material will be examined. This gives predicted totals of 73 GBAs and 31 BSs. These costs are calculated on the basis of salary costs plus overheads on 14.12.93 and do not include VAT.

These costs do not include any work which might be carried out on diatoms and ostracods, both of which groups may well provide significant information concerning water quality and flow, and especially salinity.

Disposal/retention

A decision concerning the long-term storage of material should not be made until further analyses have been carried out. It seems unlikely, however, that more than perhaps ten 'voucher' samples of raw sediment would deserve retention for their content of macrofossils.

The nature of many of the sediments and the condition of macrofossils in them indicate that further work should be carried out on the GBA samples within the next 2-3 years and certainly no more than five years, providing storage in cool, dark conditions is maintained. The wet BS residues should be dried sooner rather than later (i.e. within the next 6-12 months) to halt decay.

Archive

Records of the assessment, extracted biological remains, and residues, washovers and flots from 'test' subsamples of the GBAs are retained in the Environmental Archaeology Unit. These subsamples were processed using very rapid methods and the residues were dried to

facilitate storage. In view of this, fresh subsamples would need to be processed for any fuller analysis. Storage of BS residues and of raw sediment samples is undertaken by York Archaeological Trust.

References

Hall, A. R. and Kenward, H. K. (1990). Environmental evidence from the Colonia: General Accident and Rougier Street. *The Archaeology of York* 14 (6), 289-434 + Plates II-IX + Fiche 2-11. London, Council for British Archaeology.

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

Kenward, H. K., Engleman, C., Robertson, A., and Large, F. (1986). Rapid scanning of urban archaeological deposits for insect remains. *Circaea* 3 (for 1985), 163-72.

Table 1. Prioritisation of archaeological potential of macrofossils from the assessed GBA samples from North Street. Key: priority 1 (high), 2 (medium) or 3 (low); N - no remains observed; '-' - remains may be present but not noted as significant.

Context	Sample	Priority			Comments
		Plants	Insects	Others	
1044	8	N	N	N	
1056	14	N	N	N	
1090	24	N	N	N	
1113	38	N	N	N	
1118	43	3	2	-	
1136	66	3	3	3	
1145	73	3	2	-	
1154	81	3	2	-	
1165	97	2	2	-	
1180	113	3	3	-	
1185	119	2	1	-	
1195	136	1	2	1	freshwater molluscs
1224	144	2	3	-	
1262	150	3	3	-	
1278	163	1	1	1	diatoms and cladocerans?
1281	167	2	2	-	
1283	184	1	1	1	pursue unusual cylindrical capsule
1293	196	2	3	-	
1308	204	1	2	-	
1386	210	2	N	N	
1390	214	2	N	1	traces of arthropod cuticle only; check faecal concretions
1413	220	3	3	-	
1429	232	3	N	N	
1433	239	3	N	N	traces of arthropod cuticle only
1437	243	3	N	N	
1440	246	3	N	N	
1455	254	3	2	-	
1459	263	1	1	1	parasite eggs from concretions?
1460	257	1	1	-	
Totals (%)					
1		6 (21)	5 (17)	4 (14)	
2		7 (24)	8 (28)	1 (3)	
3		12 (41)	6 (21)	1 (3)	

Table 2. Predicted number of GBA samples at each priority in the whole body of samples. Number of samples with priority 1 or 2 for any category is 16, giving a prediction of 73.

Priority	Plants	Insects	Others
1	27	23	18
2	32	36	5
3	55	27	5

Table 3. Prioritisation of archaeological potential of plant and animal remains from the assessed BS samples from North Street. Key: priority 1 (high), 2 (medium) or 3 (low); N - no significant remains observed.

Context	Sample	Priority			Comments
		Plants	Vertebrates	Others	
1044	6	N	N	N	
1056	15	N	N	N	
1090	25	N	3	N	
1113	40	3	3	N	
1118	44	N	3	N	
1145	74	2	3	N	
1154	84	2	1	N	
1165	98	2	2	N	
1180	114	2	1	3	marine mollusc
1185	120	2	1	N	
1195	128	3	2	N	
1224	145	2	1	3	marine mollusc
1262	152	2	1	N	
1281	169	3	3	N	
1283	187	2	1	3	marine mollusc
1293	197	1	2	N	
1308	205	1	3	N	
1386	212	N	3	N	
1390	215	2	1	1	faecal concretions
1413	221	3	2	N	
1429	233	3	3	N	
1433	240	3	3	N	
1437	242	3	3	3	marine mollusc
1440	247	3	3	3	marine mollusc
1455	255	N	3	N	
1459	262	3	N	N	
1460	259	3	3	3	marine mollusc
Totals (%)					
1		2 (7)	7 (26)	1 (4)	
2		8 (30)	4 (15)	0	
3		10 (37)	13 (48)	6 (22)	