

Environmental evidence from Station Yard, Beverley
(YAT/Yorkshire Museum sitecode: 1991.5005)

by

J. B. Carrott, A. R. Hall,
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Summary

Plant and invertebrate macrofossil remains were investigated from a series of samples from a large ditch. They indicate that the lowermost fills formed in clean, well-oxygenated, base-rich water. Later fills give increasing evidence (mainly from snails) for terrestrial habitats. There was little evidence for human activity at any period apart from isolated remains of hemp and flax and small amounts of cinder, coal and brick/tile in the later deposits.

It is considered important that the present material, and any future deposits of this kind exposed by development, should be examined in detail. Such work has, of course, considerable implications for funding.

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22nd May 1991

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Introduction

This report discusses the results of analyses of invertebrate animal and plant remains from deposits excavated from the Station Yard, Beverley site (YAT/Yorkshire Museum sitecode: 1991.5005). The deposits were taken from a large ditch (10 m wide and 2 m deep), thought by the excavator to be associated with the Preceptory of Holy Trinity, Beverley.

Methods

Subsamples of raw sediment were examined in the laboratory for plant and invertebrate animal remains. The sedimentary characteristics of all the 15 samples were recorded and all but one (which was not selected for detailed analysis and where there was too little sediment to be sieved to 1 mm) were processed further.

A 'rapid assessment' was carried out on the five samples for whose analysis funding was available. For these, a 'test' subsample (Kenward *et al.* 1986) of 1 kg was taken and processed by paraffin flotation (Kenward *et al.* 1980) to extract insect remains. Plant remains were recorded from the residues.

Vouchers of raw sediment were retained for all the samples and the remainder (if any) hand-washed (to 1 mm) to recover shell and any artefacts present and to examine the nature of the sediment.

The samples and results of the analyses

The analyses carried out on each sample, and the remains recovered, are described below, together with a laboratory description of the sediment. A brief archaeological description and/or interpretation of the context, or the excavator's request for information, is given in brackets where available.

The samples from contexts 2006 to 2013 inclusive and from context 2019 are all fills of cut context 2015. The order in which the samples from area 2 (context numbers 2000+) are discussed follows the excavator's phasing in a vertical sequence from lowest to highest within the ditch.

Context 1005 [Ditch?]

Sample 15: Mid grey, moist, crumbly becoming plastic when handled, slightly silty clay with intimately mixed patches of orange-brown, crumbly clay. Stones of 2-6 mm and 20-60 mm were present, together with wood fragments and flecks of mortar. There was insufficient material available to sieve to 1 mm after removal of a 'voucher', but it seems likely that this was more or less natural clay subsoil with some (?ancient) contamination with occupation material.

Context 2006 [Is this natural or re-deposited natural?]

Sample 6: Mid, very slightly purplish grey-brown, moist, stiff and plastic, slightly silty, clay. Stones of 2-6 mm were common in the sample, with traces of stones 6-60 mm. The sample did not have the right texture to be boulder clay appearing more like primary ditch fill. There was no apparent evidence of human activity.

The 5 kg subsample sieved to 1 mm gave a modest residue with no evidence for biological remains; most of it comprised rounded pebbles up to 50 mm diameter, and there were traces of coal. It seems likely that this was a or slump dump of natural boulder-clay at the margins of the ditch, a suggested by the stratigraphy (it immediately overlay the natural bedrock into which the ditch had been cut).

Context 2019 [lowermost ditch fill]

Sample 9: Mid grey-brown, moist, brittle to soft and sticky when handled, clay, silt with sulphide black, reduction/oxidation indications, internally. Freshwater snails were present in the sample.

The 'test' subsample gave a large flot, almost wholly comprising invertebrate remains. The latter consisted mostly of fragments from insect larvae and pupae. There were abundant mites and some water-flea resting-eggs (*Daphnia ephippia*). Beetles were present in moderate numbers, there being a mixture of aquatics (for example the water bug *Hesperocorixa* sp.), denizens of aquatic-marginal habitats (such as *Dryops* sp. and *Lesteva ?longoelytrata*), and terrestrial forms. Within this last group, there were small numbers of decomposers and plant-feeders, and a single woodworm (*Anobium punctatum*), but the numbers were so small that it would be unwise to attempt to reconstruct the surroundings of the depositional basin from these remains.

The residue was small (mainly sand) and rich in snails. There were also abundant ostracods and a variety of plants in small numbers. Plants of aquatic and aquatic-marginal habitats were limited to the pondweed *Potamogeton crispus* (fruits and possibly also vegetative remains were recorded) and hornwort (*Ceratophyllum* sp(p)). Amongst the terrestrial plants there were several taxa that might have grown in disturbed places nearby, especially stinging nettle (*Urtica dioica*); however, of these 'weeds', at least half were taxa whose seeds or fruits are parachuted and they may thus have travelled some distance. The nettle fruits may have originated in plants growing naturally in fen or fen woodland, the habitat of this plant before man created suitable environments near habitation. A single half-achene of hemp (*Cannabis*) is the only good evidence for human activity—this might, for example, have originated in a hemp crop retted in this ditch at some distance from the point of deposition, but a single specimen is of limited interpretative value. The remains of woody plants—ash (*Fraxinus*) 'keys', tree leaf fragments, and a possible hawthorn 'seed'—probably indicate the presence of some woodland or scrub within the catchment of the ditch.

The sample of 3.5 kg sieved to 1 mm gave a minute residue of only a few grammes. It consisted mainly of snails of species indicating rather clean, slow-flowing, well-oxygenated, base-rich water with little evidence for human activity. Amongst the non-biological components, there was a little coal and some tiny brick/tile fragments (<2 mm) which, if not contaminants introduced during excavation, suggest some occupation. The possibility that such minute fragments were wind-blown or carried some distance by water cannot be ruled out, however.

Context 2011

Sample 5: Very dark grey, moist, crumbly, very sandy, silt with occasional patches of pure silt and some lumps with a dark core oxidising to grey-brown. Very small, small and medium-sized stones, twig fragments and brick/tile were present in the sample as were abundant freshwater snails.

This sample was not selected for assessment and there was too little left after removal of a 'voucher' for sieving to 1 mm.

Context 2013

Sample 8: Dark olive-grey-brown, moist, brittle to soft and slightly sticky when worked, slightly humic, slightly clay, silt with some reduction/oxidation indicated by slight internal darkening. Freshwater snails were common in the sample.

There was a large flot almost wholly consisting of invertebrate remains, with abundant fragments of filmy transparent cuticle which presumably originated from insect larvae or pupae. Both *Daphnia ephippia*

and ostracod valves were abundant. Preservation of the insect remains was rather good. There were numerous aquatic beetles and bugs, including *Hydrobius fuscipes*, *Colymbetes fuscus*, the 'back-swimmer' *Notonecta* sp. and, significantly, at least two individuals of *Oulimnius ?tuberculatus*, which is associated with flowing water (or lake shores). The remaining aquatics were all rather tolerant beetles and bugs likely to be found in still or gently-flowing water that was not too polluted. Species likely to have lived at the edge of water included *Cyphon* sp., a saldid bug and *Lesteva* sp. There was a single specimen of *Blethisa multipunctata*, which Lindroth (1985) suggests is usually found 'on marshy soil in fens at the margins of lakes and slowly running rivers, etc., usually in sun-exposed sites with mossy ground'.

Terrestrial beetles were not very numerous, but included a few decomposers, plant-feeders, and others.

The small residue contained abundant snails and ostracods, with some plant detritus and a trace of sand. The plant remains were abundant and varied. There were large numbers of fruits and probably also vegetative remains of *Potamogeton crispus* and fruits of *Ceratophyllum* spp., indicative of open water; fruits of both water-plantain (*Alisma* sp(p).) and water-crowfoot (*Ranunculus* Subgenus *Batrachium*) which might indicate open water or water-marginal habitats; and fruits of ash, docks and stinging nettles and bud-scales of oak, pointing to the presence of some wooded land vegetation in the vicinity with perhaps some areas of disturbance. Unusually, the insects provide no amplification of this picture of the vegetation.

The snails from the 4 kg subsample sieved to 1 mm were, apart from a single land snail, all freshwater taxa of diverse kinds. There was some evidence from the snail assemblage for drying mud in the area. Non-biological evidence for human activity was present in the form of a little brick/tile (to 65 mm in maximum dimension).

Context 2027

Sample 14: Mid grey (internally black indicating reduction/oxidation), moist, brittle to crumbly, sandy, silt. Freshwater snails were abundant and brick/tile fragments (including one large fragment) were present in the sample. There was insufficient material available to sieve to 1 mm after removal of a 'voucher'.

Context 2009 [Sample taken to ascertain the speed and method of deposition]

Sample 4: Dark grey-brown, moist, crumbly to slightly brittle, silt (much more homogeneous than sample 3). Twig fragments were present, very small wood fragments were common and freshwater snails abundant in the sample.

The 'test' subsample gave a large flot almost exclusively of invertebrate remains (with only a few plant macrofossils, including a pod segment of the cornfield weed wild radish, *Raphanus raphanistrum*, not otherwise observed in this sequence of deposits). There were also many planorbid snails. *Daphnia* ephippia were abundant and there was a single statoblast of *Lophopus*, a primitive colonial aquatic animal. Aquatic insects were numerous but most were eurytopic species typical of deposits laid down in still or fairly still conditions. There were, however, at least two *Oulimnius ?tuberculatus*, indicative of flowing water. Also recorded were small numbers of waterside insects and a variety of terrestrial forms. The plant-feeders included at least two species associated with nettles. The small weevil *Tanysphyrus lemnae* was moderately abundant; as its name suggests, it is associated with duckweed, *Lemna* spp. (recorded in trace amounts amongst the plant remains from this subsample).

Of entomological interest, but of uncertain implications, were some remains of the burrowing beetle *Anommatus duodecimstriatus*.

The modest residue was rich in wood and twig fragments in the >4 mm fraction (the largest twig fragment was about 30 mm long and 15 mm in diameter) and in snails. Plant macrofossils were abundant, especially fruits of water-plantain, stinging nettle, and pondweed (mainly *Potamogeton crispus*, as before), and seeds of willow-herb (*Epilobium* sp(p).), elder (*Sambucus nigra*; some of the twig fragments were also identified as elder). The assemblage gave good evidence for open water, marginal vegetation, and woodland or scrub nearby. There were a few weeds, as in earlier deposits, and the presence of elder twigs and seeds perhaps

points to a degree of disturbance, too. This view of the surroundings as supporting weedy vegetation rather than, for example, pasture or woodland margins, is reinforced by the rather narrow range of plant-feeding insects recorded.

The 4.5 kg subsample sieved to 1 mm gave quite a large residue of snails, twig fragments and plant detritus, with some chalk gravel to 30 mm. If the last of these were not thrown into the ditch, its presence in this silt suggests periods of faster water flow (cf. the record of *Oulimnius* from the test subsample), though sand—which might be expected to have been deposited too under such circumstances—was not recorded. The snails were a mixture of land and freshwater types, mainly the latter (which suggested a clean ditch); the land snails indicated a well-vegetated terrestrial environment. There was a piece of brick/tile up to 95 mm maximum dimension and some other fragments to 8 mm, and a worn vertebra of a gadid (cod family) fish, but otherwise evidence of occupation material was lacking.

Context 2008

Sample 3: Mid to dark, grey-brown, moist, plastic to slightly brittle, heterogeneous, slightly clay, silt with abundant centimetre-scale mottling throughout produced by black, sulphide staining. In places the sediment was much more clayey and occasionally more humic or more sandy. Freshwater snails were abundant in the sample with some wood fragments (?elder) and one very large fragment of brick/tile also present.

This sample was not selected for assessment but was subjected to a rapid examination by sieving to 1 mm. The 4 kg subsample gave a rather large residue of gravel with rounded sandstone and angular chalk to 100 mm. There were a few fragments of bone, a little brick/tile to 10 mm, and a large piece of ?daub to 100 mm, together with traces of coal and ?cinder, indicating some occupation debris to have been deposited here. The plant macrofossils were almost wholly aquatic or waterside taxa, however—primarily bur-reed (*Sparganium* sp(p).), water-plantain and water-crowfoot, with rather limited evidence for terrestrial plants. The small assemblage of snails, again a mixture of land and freshwater types, indicates that the ditch was less clean than previously. The land snails were typical of Roman or medieval urban deposits in the region.

Context 2012

Sample 10: Dark grey-brown, moist, crumbly and somewhat layered, humic silt with occasional sandy patches. Twig and wood fragments, tiny fragments of brick/tile, a large piece of flint (60-200 mm size range) and partings with pale coloured, compressed monocot fragments were present in the sample which also contained abundant freshwater snails.

There was a very large flint from the 'test' subsample, which was full of coarse root fragments and other plant detritus and very rich in insect remains, including numerous excellently preserved beetles. There were abundant *Daphnia* ephippia and aquatic insects; as in the case of the earlier deposits examined for insects, still or sluggish, somewhat weedy water is indicated. This subsample provided a specimen of *Blethisa multipunctata*, also present in sample 8 (context 2013, above). There were quite large numbers of terrestrial insects from a rather wider range of habitats than seen in the earlier layers.

The rather large residue contained large amounts of dicot (probably tree/shrub) leaf fragments and a rather rich macrofossil assemblage including large amounts of several aquatics: fruits and perhaps also vegetative fragments of *Potamogeton crispus*, fruits of *Zannichellia* and *Alisma*, seeds of duckweed (*Lemna* sp(p).—the weevil *Tanysphyrus lemnae* was also present, cf. sample 4). Ephippia of *Daphnia* and earthworm egg capsules were also rather common, the former indicating an aquatic environment, the latter probably pointing to inwash of soil from the banks of the ditch. Other plant taxa included some marginal aquatics and shallow-water species, fen and wet woodland types and a number of tree and shrub species. As before, there were a few 'weed' taxa, some of which may have exploited natural ditch-bank or woodland edge habitats in the vicinity, although they may point to some low-level disturbance by man. A single capsule fragment of flax, presumably cultivated flax, *Linum usitatissimum*, is firmer—though still slender-evidence for human activity. Like the hemp achene from sample 9, this may have originated in a crop retted in the ditch some distance from the site of sampling.

A 2 kg subsample was washed to 1 mm. The modest residue was rich in snails and root fragments with only a trace of brick/tile (to 4 mm) and a small range of identifiable plant macrofossils. There was also a fragment of a bone from a young cat and some frog bone. The snails were diverse, but mainly freshwater taxa, and included a species (*Segmentina nitida*) that was formerly much more widespread but which is found today only in a few well-oxygenated base-rich drains in the East Anglian Fens. Amongst the plant remains, there was a very well-preserved fruitstone of wild plum ('bullace', *Prunus domestica* ssp. *insititia*) and some hawthorn (*Crataegus monogyna*) 'seeds'. These were presumably from local vegetation and, in the absence of other evidence, do not indicate refuse from human occupation.

Context 2007

Sample 2: Dark brown, moist, crumbly, heterogeneous, humic silt with localised grey-brown patches of higher mineral and lesser organic content. Small freshwater snails and bivalves were abundant in the sample which also contained stones 2-20 mm (including chalk pebbles), twig and wood fragments, herbaceous detritus and some brick/tile.

A 2.5 kg subsample remaining after taking a 'voucher' was washed to 1 mm. The rather small residue consisted mostly of small fragments of what appeared to be sandy peat, up to about 8 mm in maximum dimension. These were probably reworked material from eroding peaty soil in the vicinity of the ditch. Also present were small amounts of chalk gravel (to 40 mm) and brick/tile (to 65 mm) and two large twig fragments. There were few plant macrofossils, of no particular interpretative value, and the small snail assemblage comprised a mixture of land and freshwater taxa, the former typical of urban occupation deposits, the latter small-bodied types of 'slum' habitats.

Context 2010 [Sample taken to ascertain the speed and method of deposition]

Sample 1: Mid to dark, slightly olive, grey-brown, moist, crumbly to brittle (but plastic when handled), heterogeneous, clay, silt with locally diffuse, dark yellow-brown patches. Stones 2-6 and 20-60 mm (including chalk), small wood fragments, snails and small freshwater bivalves, brick/tile and vivianite were present in the sample.

The 4.5 kg of sediment left after taking a 'voucher' subsample were sieved to 1 mm. There was quite a large residue, mostly consisting of chalk gravel and stones (including a flint) to about 40 mm across and brick/tile (to 35 mm), with a little coal and cinders. There were apparently no biological remains other than a few bone fragments and a few snails, all of them land taxa indicating well-vegetated surroundings. (The freshwater bivalves observed in the raw sediment were evidently not present in this subsample.)

It appears that contexts 2007 and 2010, the latest extant fills of 2015 before the recut 2014, represented a phase of progressive terrestrialisation with some coarser mineral material being deposited, though no large-scale dumping of refuse.

Context 2026

Sample 13: Dark grey-brown, moist, crumbly to brittle becoming slightly plastic when handled, humic silt with some parts black internally indicating oxidation. The overall appearance of this sediment was 'coarser' than that of lower sample numbers. Wood fragments (including some large fragments) and freshwater snails were common and twig fragments, brick/tile and some thin patches of monocot fragments were present in the sample.

A subsample of 3.5 kg was washed to 1 mm after taking a 'voucher' subsample. The rather large residue contained a lot of twig fragments and roots and in general terms looked most like the residue from the subsample from sample 10 (context 2012, on the other side of the ditch at about the same stratigraphic level). The frequent snails were a mixture of about equal proportions of land and freshwater forms, suggesting the ditch received some inwash or dumping from occupation levels. There were only traces of brick/tile fragments (to 15 mm) and a little chalk gravel (to 30 mm) and coal.

The plant remains included rather few wetland taxa, the most abundant being celery-leaved crowfoot (*Ranunculus sceleratus*), a species exploiting drying mud with some disturbance and eutrophication. Land taxa included quite large numbers of seeds of elder and of white bryony (*Bryonia cretica* ssp. *dioica*), unlikely to have grown very close to water, but perhaps bird-sown. Other frequently occurring seeds from berries were black nightshade (*Solanum nigrum*) and hawthorn, so perhaps bird roosts in trees above the ditch are indicated. A few more indicators of disturbed land habitats are present here than in earlier deposits; some, such as *Chenopodium murale*, are typical of nutrient-rich habitats such as waste heaps and middens.

Context 2025 [Sample taken to ascertain the process of deposition of the sample, its nature and date]

Sample 12: Dark brown, moist, brittle becoming plastic when handled, humic silt with some reduction/oxidation indicated by dark sulphide patches and some lumps showing external darkening. Freshwater snails were common in the sample with some stones 2-20 mm also present.

The 3.5 kg subsample sieved to 1 mm gave a rather small residue which was quite rich in snails. There was some chalk gravel (to 20 mm), a little brick/tile (to 30 mm) and traces of wood and twig fragments. There was also some slightly concreted material that may have been reworked soil. The snails were mostly land taxa with a few freshwater species typical of disturbed, moist 'slum' habitats, perhaps even where there was intermittent drying. The few plant macrofossils, however, were of *Sparganium* and *Potamogeton*, which suggest an aquatic environment of deposition, although they may have been dispersed by rising water and deposited secondarily.

Context 2022 [Waterlogged organic material. Deposition date?]

Sample 11: Mid grey-brown, moist, stiff to plastic when handled and slightly brittle to crumbly in places, heterogeneous (mainly textural), silty, clay with slight grey-brown, centimetre scale mottling. Stones in the 2-60 mm size range, a trace of vivianite and, in places, ?empty root channels lined with darker material were present in the sample.

A 5 kg subsample was washed to 1 mm, and it gave a modest residue consisting almost exclusively of gravel and stones, including many obvious glacial erratics. There were traces of brick/tile (to 20 mm) and a little frog bone, some coal (to 15 mm) and cinder. All of the few snails were land taxa, indicating disturbed, probably man-made habitats, and very like the assemblage from sample 1 (context 2010, see above).

Context 2001 [Earliest fill of recut 2014; What is it?]

Sample 7: Mid to dark, olive-grey-brown internally sulphide black, moist, brittle to plastic, humic, slightly clay, silt. Stones 2-6 mm and traces of brick/tile and herbaceous detritus were present in the sample. This was a remarkably pure silt very similar to sample 5 (context 2011, see above).

The 1 kg 'test' subsample gave quite a large flot almost exclusively of insect remains. There were immense numbers of *Daphnia* ephippia and ostracod valves were very abundant. The insects also indicated aquatic deposition, with several small *Helophorus* sp. and several other aquatics, including *Tanytarsus lemnae*. The few terrestrial insects could mostly have lived amongst weedy vegetation, but there were specimens of ?*Hylastes* sp. and *Leperisinus varius*, both bark beetles, the latter most commonly encountered boring in ash.

The residue was small but was quite rich in plant detritus, including some twig fragments to 100 mm and modest amounts of sand (the latter had been conspicuously rare in earlier deposits). There was also a little charcoal (to 15 mm). The residue contained quite large numbers of plant macrofossils, the most abundant being land or marsh taxa—weeds, such as orache (*Atriplex* sp(p).) and stinging nettle, aquatic or aquatic-marginals like *Alisma* sp. and *Ranunculus sceleratus* and the fen/stream-bank plant meadowsweet (*Filipendula ulmaria*). The presence of frequent *Daphnia* ephippia and ostracods indicates deposition in water, but with a considerable contribution from nearby terrestrial vegetation. There was no good evidence for dumping of human refuse, though, from the identifiable plant remains (or from the insect from the flot).