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Environmental evidence from Adams Hydraulics I (Y.A.T/Yorkshire Museum sitecode: 90.13)

by

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Summary

This report discusses the results of analyses of invertebrate animal and plant remains from deposits excavated from the Adams Hydraulics I (code: 90.13) site. Overall, excavation at this site may be expected to result in only relatively modest amounts of environmental work: the possibility of discovering deep features with good waterlogged preservation must be recognised, however, and a contingency cost should be included to cover this.

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Introduction

This report discusses the results of analyses of invertebrate animal and plant remains from deposits excavated from the Adams Hydraulics I (code: 90.13) site.

Methods

Sub-samples of raw sediment were examined in the laboratory for plant and invertebrate animal remains. A 'rapid assessment' was carried out on fifteen of the samples. 'Test' sub-samples of 1 kg were taken and processed by paraffin flotation (Kenward *et al.* 1980) to extract insect remains. Plant remains were recorded from the flots from paraffin flotation and from the residues or washovers of the residues.

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 is given in brackets where available. The samples are presented in context order.

Context 1005 [Pit fill, 11th century]

Sample 2: Mid grey-brown, moist, crumbly, sandy, clay, silt. Fragments of mortar and large and medium-sized rounded cobbles were present in the sample.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. The flot contained only traces of undiagnostic organic remains. A washover (to 300 microns) was performed on the residue to separate the small amount of organic material so that this could be examined wet. The remainder of the residue was then dried prior to examination. The washover was mostly of small fragments of charcoal and the small residue (dry weight 128 g) consisted mainly of small unidentifiable bone fragments (including 1 tooth of a ?pig), a few pieces of brick/tile and small stones (to 15 mm).

Context 1007 [Backfill of 11th century pit]

Sample 5: Mid grey-brown, dry to moist slightly plastic crumbly, sandy, clay, silt. Brick/tile, mortar, medium-sized stones, large fragments of bone (including burnt bone) and grey ?ash patches were present in the sample.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. The flot contained only one earthworm egg capsule and traces of other, undiagnostic, organic remains. The small residue was dried and weighed (dry weight 260 g) before being examined. The residue consisted mostly of small (less than 4 mm) undisaggregated sandy concretions thought to be sand in a calcareous matrix rather than mortar. Also present in the residue were small and large (to 150 mm) bone, brick/tile, stone (various types to 30 mm) and pottery (of which two pieces were removed to be returned to the excavator).

Context 1025 [Pit fill of late 12th/early 13th century]

Sample 6: Mid/dark grey-brown, moist, slightly plastic crumbly, slightly sandy, clay, silt. Large bone fragments and pieces of pot (two of which were removed and returned to Y.A.T) were present, while flecks of mortar were common in the sample.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. There were traces of charcoal in the flot, but nothing else. A washover (to 300 microns) was performed on the residue to separate the lighter organic fraction so that this could be examined wet, whilst the bulk of the material was dried prior to examination. The washover consisted mostly of fine charcoal and contained no identifiable remains. The very small residue (dry weight 88 g) was composed of charcoal with some small bone fragments, coal, gravel and stone (to 25 mm).

Context 1031 [Backfill of pit, presumed late medieval]

Sample 8: Mid/dark grey-brown, moist, slightly plastic crumbly, slightly sandy, clay, silt. Large bone fragments, brick/tile, flecks of mortar and medium-sized stones were present in the sample.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. Only traces of charcoal were present in the flot. A washover (to 300 microns) was performed on the residue to separate the lighter organic fraction so that this could be examined wet, whilst the bulk of the material was dried prior to examination. The washover was mostly charcoal with some small fragments of brick/tile and a few charred grains. The very small residue (dry weight 85 g) consisted mostly of gravel (less than 10 mm) and charcoal, with a little micaceous sandstone (to 30 mm), brick/tile and tiny bone fragments.

Context 1043 [Possibly Anglo-Scandinavian, could be levelling or agricultural]

Sample 14: Mid orange grey-brown moist, plastic, crumbly, sandy, silty, clay with slight grey-brown/orange-brown (1 mm to 10 mm scale) mottling. Medium-sized stones were present and brick/tile and flecks of mortar were common.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. The flot contained traces of charcoal and unidentifiable plant tissue. The residue contained very little organic material and was dried prior to examination. This residue was small (dry weight 149 g) and consisted of a little stone, gravel and badly eroded small bone with one angular tile fragment (to 50 mm).

Context 1048 [Backfill of a large rubbish pit late 14th century, containing slag, charcoal, burnt sand and copious bone]

Sample 10: Mid grey-brown with much black (soot/charcoal) and orange (burnt soil), crumbly, slightly clay, sandy, silt. Clasts of light grey-brown clay were present and large bone fragments and charcoal were abundant in the sample.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. The flot contained a moderate amount of charcoal but no other organic remains. The residue was dried and weighed prior to examination. This large residue (dry weight 300 g) comprised coal, cinders and large and small pieces of bone (including fish bone) with a little brick/tile represented by angular fragments.

Context 1050 [Thick deposit, 10th century. Levelling or agricultural derivation]

Sample 9: Mid orange grey-brown moist, crumbly, slightly brittle sandy, clay, silt. Small stones, mortar and brick/tile were present in the sample.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. There were no organic remains in the flot other than traces of charcoal. A washover (to 300 microns) was performed on the residue to separate the lighter organic fraction so that this could be examined wet, whilst the bulk of the material was dried prior to examination. The washover was very small, consisting of fine charcoal with a little fine, unidentifiable plant detritus and amphibian bone. The very small residue (dry weight 86 g) contained a little stone, charcoal, brick/tile and small bone with a few small, brown ?concreted fragments (to 10 mm).

Context 1051 [Backfill of a post-hole. A coprolite spot sample was taken from this context]

Sample 11: A spot sample of a roughly cylindrical, 30 mm by 15 mm, object, apparently a coprolite. The composition of this sample, consisting largely of bone fragments, suggests that it is probably a dog coprolite.

Sample 12: Mid grey-brown, moist, sticky, plastic, sandy, silty, clay. Charcoal, brick/tile, flecks of mortar and small stones were present and large stones (represented by two angular fragments) were common.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. The flot from this sample was effectively barren. A washover (to 300 microns) was performed on the residue to separate the lighter organic fraction so that this could be examined wet, whilst the bulk of the material was dried prior to examination. The washover was very small and consisted of mostly fine chalk, with a little unidentified, fine plant detritus. The residue was small (dry weight 122 g) and was composed of bone (mostly small angular fragments to 30 mm), with a little brick/tile and stone (to 15 mm).

Context 1056 [Presumed to be a natural water-laid deposit (sealed by 0.5 metre of clean clay which contained no artefacts). Abundant snails and organic material]

Sample 13: Mid grey-brown, moist, plastic, slightly brittle, silty, clay. Large and small bone fragments; one medium-sized (to 40 mm) angular fragment of mortar and vivianite were present and snails were abundant.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. Three planorbid snails were present in this flot as well as an extremely large number of ostracods, and some *Daphnia*. There were a few remains of aquatic and terrestrial insects none, of which were indicative of urban conditions. This small residue had a large organic content and was therefore examined wet. Amongst the plant remains there were large numbers of aquatic and waterside taxa - celery-leaved crowfoot (*Ranunculus sceleratus*) and foals watercress (*Apium nodiflorum*) - together with smaller numbers of duckweed (*Lemna* sp(p)), marsh lousewort (*Pedicularis palustris*), water crowfoot (*Ranunculus* sub. g. *Batrachium*) and water dropwort (*Oenanthe* sp(p)). There were also a few weeds of cultivated and waste places, but wetland taxa predominated and there were many ostracods and *Daphnia* ephippia, together with some foraminifera indicating deposition in a permanent standing body of water with little or no evidence of human activity in the area.

Context 2036 [15th/16th century pit fill]

Sample 1: Dark grey, moist, plastic, crumbly, slightly sandy, silty, clay. Medium-sized stones, large bone fragments and mortar were present and pieces of brick/tile were abundant in the sample.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. The flot contained traces of undiagnostic organic material, charcoal and one indeterminate insect fragment. A washover (to 300 microns) was performed on the residue to separate the lighter organic fraction so that this could be examined wet, whilst the bulk of the material was dried prior to examination. The washover consisted mostly of small pieces of charcoal with a little plant detritus including coarse fragments of ?root epidermis. The small residue (174 g dry weight) contained some brick/tile, charcoal and a little small bone (some burnt), mortar, coal, cinder and stone (including gritstone to 30 mm).

Context 2038 [Possibly slot fill 13th century. A spot sample (sample 4) of unidentified organic material was taken from this context]

Sample 3: Mid grey-brown, moist, slightly plastic crumbly, sandy, silty, clay. Brick/tile, mortar, medium-sized stones and lumps of slightly reddish, grey-brown, silty clay were present in the sample.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. This flot contained a few earthworm egg capsules, traces of charcoal and fragments of unidentifiable plant tissue. A washover (to 300 microns) was performed on the residue to separate the lighter organic fraction so that this could be examined wet, whilst the bulk of the material was dried prior to examination. The small washover was mostly fine charcoal. The small (dry weight 105 g) residue contained a little brick/tile, mussel shell, charcoal, small bone and gritstone (to 25 mm).

Context 2038 [Possibly slot fill 13th century. A spot sample of unidentified organic material was taken from this context]

Sample 4: A spot sample, consisting of small (2-3 mm) fragments of black, amorphous organic material. This was thought to be peat or mor humus.

Context 2065 [late 15th/16th century. Horticultural soil?]

Sample 7: Mid brown to dark grey-brown moist to wet, sticky, plastic to crumbly, sandy, silty, clay. Shellfish, medium-sized stones and one very large fragment of brick/tile were present and fragments of mortar were common.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. The flot contained only traces of undiagnostic organic material and charcoal. A washover (to 300 microns) was performed on the residue to separate the lighter organic fraction so that this could be examined wet, whilst the bulk of the material was dried prior to examination. The small washover was mostly fine charcoal and ?coal. The modest residue (dry weight 227 g) was mostly coal, cinder and stone (including coarse micaceous sandstone to 40 mm), with a little brick/tile (to 40 mm), mortar, chalk, charcoal and small bone (including bird bone). A single nail, which was also found in the residue, was removed to be returned to the excavator.

Context 3068 [Possibly naturally deposited river silts. Presumably in King's Fishpool. Very late 15th century]

Sample 15: Light grey-brown, moist, sticky, plastic, slightly sandy, clay, silt. Shellfish, flecks of mortar and one large (to 150 mm) gritstone cobble were present in the sample.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. The flot from this sub-sample contained a moderate amount of rootlet fibres and a small quantity of charcoal. A washover (to 300 microns) was performed on the residue to separate the lighter organic fraction so that this could be examined wet, whilst the bulk of the material was dried prior to examination. The small washover contained fine plant detritus (stinging nettle was represented), *Daphnia* ephippia and a little fine charcoal. The small (dry weight 145 g) residue contained one very large green-glazed pot fragment (to 120 mm), which was removed to be returned to the excavator. The rest of the residue consisted of a little stone, angular pieces of brick/tile, mortar, coal, cinder and charcoal.

Context 3080 [One of a series of spits through deposits thought to be backfill of King's Fishpool. 14th century, few artefacts present. Silting or dump?]

Sample 16: Mid grey-brown, moist, plastic, slightly crumbly brittle, sandy, silty, clay to clayey silt with patches of darker, crumbly, humic silt. Small and medium-sized stones, brick/tile, flecks of mortar and small fragments of bone were present.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. The flot consisted mostly of plant rootlets, of which there was a modest quantity. There were traces of poorly preserved aquatic and terrestrial insects and some *Daphnia* ephippia, the latter suggesting aquatic deposition of the sediment. A washover (to 300 microns) was performed on the residue to separate the lighter organic fraction so that this could be examined wet, whilst the bulk of the material was dried prior to examination. The rather large (approximately 60 ml) washover was mostly plant detritus (less than 2 mm) including apple (*Malus sylvestris*) endocarp ('core'), oak (*Quercus* sp(p).)budscapes, stinging nettle (*Urtica dioica*), silverweed (*Potentilla anserina*), yellow-rattle (*Rhinanthus minor*) and elder (*Sambucus nigra*). The small (dry weight 255 g) residue contained coal, small bone and stone (chalk and angular oolitic limestone), but the main component was large (to 100 mm) angular fragments of tile.

Context 3081 [Sample taken to ascertain whether this is a naturally 'ponded' silt or a deliberately dumped deposit within the King's Fishpool. Stakes and wickerwork survived within this context]

Sample 17: Mid grey-brown, moist, plastic, brittle, clay, silt. Uncompressed patches of light brown plant detritus were also present. Fragments of brick/tile and patches of darker brown humic silt were present.

A 1 kg 'test' sub-sample (/T) was processed by paraffin flotation to extract insect remains. The moderately large flot consisted mostly of rootlets. *Daphnia* ephippia (resting eggs) were abundant and there was a modest group of aquatic insects. A few waterside and terrestrial forms were also noted.

Preservation of all the remains was rather good and the composition of the flot clearly indicates an aquatic deposit. There was a very small residue, mostly consisting of fine plant detritus. Amongst the moderately abundant 'seeds' stinging nettle (*Urtica dioica*) was rather common, with smaller numbers of orache (*Atriplex* sp(p).) and a few each of dock (*Rumex* sp(p).), fat hen (*Chenopodium album*), chickweed (*Stellaria media*), red shank (*Polygonum persicaria*) and thistle (*Carduus/ Cirsium* sp(p).). These and the *Daphnia* ephippia and earthworm egg capsules, also present in the sample, suggest deposition into water of essentially terrestrial sediments and biota. The modest numbers of seeds of water blinks (*Montia fontana* ssp. *chondrosperma*) probably indicate areas of short wet turf in the vicinity.

Implications

Further study of larger sub-samples from two of the samples, sample 13 from context 1056 and sample 17 from context 3081, is highly desirable. In particular, processing of a larger quantity of sediment from sample 17 could yield an interpretable assemblage of invertebrate remains. A more detailed study of the plant remains from sample 16 context 3080 could also produce an interpretable assemblage. Overall, then, excavation at this site may be expected to result in only relatively modest amounts of environmental work: the possibility of discovering deep features with good waterlogged preservation must be recognised, however, and a contingency cost should be included to cover this.

References

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