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**An evaluation of biological evidence
from excavations at the Fiat Garage site,
84 Piccadilly, York (YAT site code 1991.16)**

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Summary

Assemblages of plant and invertebrate remains from a series of samples from medieval silts, probably forming in the King's Fishpool, and from overlying 19th century dumps and some other contexts are described. The 'pond silts' are felt to be of importance in understanding the history of the pool and should receive further attention if possible.

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Methods

A series of twenty samples from boreholes and trial holes at 84 Piccadilly was submitted by YAT for examination of their potential for analysis of plant and invertebrate remains. All were inspected in the laboratory and a sediment description recorded; twelve of them were selected for further analysis in which 1 kg subsamples were disaggregated, sieved and subjected to paraffin flotation (Kenward *et al.* 1980) to extract insect remains. Both the flots from this process and the residues were examined for plant remains and molluscs. A series of heavily contaminated samples was also obtained by augering (AH/HK) from a platform at the base of trial Area 8. These auger samples were merely described in the laboratory and no further analyses performed; they are considered at the end of this report. The sequence of samples which follows is presented in context number order. Relevant information from the excavator appears in brackets.

Results

Context 1005, Sample 4 [borehole 1, 4.40 m above OD]: dark grey-brown, moist, crumbly to brittle, humic sandy silt with traces of mottles at centimetre scale, traces of stones 6-20 mm, wood, bone, pot, and perhaps also charcoal and plant detritus.

The very small flot and rather large residue yielded quite an extensive plant macrofossil assemblage dominated by certain or probable weeds of cultivated or waste ground, particularly swine-cress (*Coronopus squamatus*) and stinging nettle (*Urtica dioica*). The presence of several taxa (mostly in small numbers) of weeds of nutrient-rich substrates perhaps argues for the presence of some kind of midden nearby or of some other source of nitrification. The deposit evidently formed in water, to judge from the presence of ostracods, *Daphnia* ephippia, caddis larva case fragments and freshwater bivalve remains, but a wide range of occupation materials was also represented—including wood chips, abundant charcoal and small amounts of pot, brick/tile, and glassy and metallic slag, suggesting dumping into a body of water. There was almost no evidence for water-plants, however. There were numerous remains of insects and some mites in the flot. No definitely aquatic forms were recognised, although some of the immature insects may have belonged in this category. All the beetles were terrestrial forms. If this material could be tied into an archaeological sequence, further investigation of the biological remains would be worthwhile.

Context 1006, Sample 2 [borehole 1, 3.70 m above OD]: dark yellow-brown to light to mid grey-brown, moist, stiff (becoming slightly plastic when worked), rather heterogeneous clay silt, perhaps laminated in places, with traces of stones 6-20 mm and a trace of bivalve shell.

The small flot and residue gave small plant macrofossil assemblages including terrestrial (weed) and aquatic/waterside taxa, mostly in small numbers and of no particular interpretative value. There was a little charcoal and pottery, brick/tile and mussel shell, indicative of

occupation materials. There were no recognisable arthropod remains.

Context 1007, Sample 3 [borehole 7, 3.40 m above OD]: a large fragment of elm (*Ulmus* sp.) wood.

Context 2010, Sample 1 [borehole 2, 3.24 m above OD]: mid brown, moist, stiff to plastic or crumbly, humic clay silt with a few stones 2-6 cm, a large fragment of brick and a piece of pulverised wood. No further analysis undertaken.

Context 5008, Sample 5 [borehole 5, 4.11 m above OD]: dark grey (oxidising to mid to dark brown), moist, stiff (becoming plastic when worked), silty clay with a few wood fragments, freshwater bivalve shell fragments, vivianite and traces of very decayed herbaceous detritus. No further analysis undertaken.

Context 5009, Sample 6 [borehole 5, 3.81 m above OD; very similar to 5008]: lithology as for **sample 5**, but more sandy in parts and with more woody and herbaceous plant detritus.

Identifiable plant macrofossils were quite abundant in the small flot and moderately large residue (the latter consisting mainly of wood fragments and herbaceous detritus). There was a mixture of terrestrial weed taxa, especially stinging nettle, annual nettle (*Urtica urens*), weld (*Reseda luteola*) and stinking mayweed (*Anthemis cotula*) and aquatics, represented by frequent fruits of pondweeds (*Potamogeton* and *Zannichellia*) with white water-lily (*Nymphaea alba*) also recorded. Some vegetative material of *Potamogeton* was also present, indicating deposition in standing or slow-moving water. Again, occupation debris were recorded, including charcoal up to 30 mm in maximum dimension, pottery, and a leather fragment. There were rather frequent fragments of seed capsule of linseed or flax (*Linum usitatissimum*), likely to have originated in textile manufacture or oil production, and it is interesting in this context to note the record of frequent weld seeds and two teasel (*Dipsacus*) fruits (of which one, at least, may have been fullers' teasel, *D. sativus*). Both the latter plants may have been connected with textile making.

The flot was rich in insect remains, including numerous immatures. There were moderate numbers of beetles and some bugs, together with a human flea (*Pulex irritans*), a probable *Melophagus ovinus* (sheep ked) and a bee (not certainly identifiable as honeybee, however). There were some water beetles and corixid bugs, indicative of aquatic deposition, probably in still water. The terrestrial insects probably originated rather randomly, perhaps with a component from rubbish dumping as a variety of typical medieval urban forms was present.

Context 5013, sample 7 [borehole 5, 2.21 m above OD]: mid brown, moist, plastic to stiff to sticky clay with traces of wood fragments.

A small but rather distinctive assemblage of plant remains was recorded from the small flot and very small residue, with several taxa forming a group characteristic of alder carr—alder (*Alnus glutinosa*) itself, with gipsywort (*Lycopus europaeus*) and skull-cap (*Scutellaria*

galericulata). With these were a few probable weed taxa, but no evidence of occupation material, suggesting accumulation of this deposit under more or less natural conditions. There were moderate quantities of insect remains, including some fly puparia and an assortment of aquatic and terrestrial beetles. The aquatics included an elminthid, indicative of flowing water, but perhaps originating at some distance, while the terrestrial forms included a variety of decomposers and phytophages.

Context 8020, sample 8 [fill of C19th wooden drain]: dark grey, waterlogged silt with abundant freshwater bivalve and gastropod molluscs.

This deposit was a most unusual and distinctive one, being composed very largely of whole and very well preserved freshwater molluscs, mostly bivalves (*Pisidium* sp(p).), but including many *Planorbis* spp. and *Lymnaea* spp. Other invertebrates included an abundance of ostracods, with *Daphnia* and a variety of 'bryozoa'—*Lophopus crystallinus* and *Cristatella mucedo* resting spores were positively identified, but spores of at least one other kind were present, together with abundant branched tubular structures which may have been bryozoon. These tubes included small numbers of ovoid dark-coloured structures which may have been some form of resting egg. These require further investigation. Plant remains were limited to a very few leaves of yew (*Taxus baccata*) and some small fragments of wood, including oak and pine, and of charcoal. There were very few insects, but these included several aquatics.

The wood used to make the drain apparently comprised at least three members, since three types of wood were identified by Mrs R. Gale, formerly of the Jodrell Laboratory, Royal Botanic Gardens, Kew. Samples from the base and one side were elm (*Ulmus*), a sample from the other side was oak (*Quercus*) and one from the lid was birch (*Betula*).

Context 8037, sample 9 [C19th, though with redeposited C13th pottery]: light to mid brown, moist, plastic to slightly sticky sandy clay with moderate numbers of stones 6-20 mm, perhaps till or reworked till. No further analysis undertaken.

Context 8039, sample 10 [fill of blocked C19th ceramic drain]: mid to dark grey, waterlogged sandy silt with traces of stones 2-6 mm, abundant stones 6-20 mm and traces of wood fragments.

Very few identifiable plant remains were observed in the very small flots and small residue; the latter consisted mostly of gravel and sand, with a little brick/tile, charcoal, coal, metallic slag, mortar and some flattish fragments of what appeared to be pyrites-rich concretions (pyritisation of some of the plant remains, including wood fragments, was also noted). With the exception of a single hop (*Humulus lupulus*) achene, almost all the fruits and seeds were of taxa commonly recorded from urban archaeological deposits and had an essentially 'weedy' character, but are of little interpretative value. By contrast, the small number of insect remains represented a limited aquatic fauna (with traces of terrestrial or waterside forms). A notable record was a thorax of the pond skater *Velia* sp., not previously recorded at York.

Context 8044, sample 11 ['clay dumping' of C19th date, though with C13th pottery]: a mixture of two deposits—a light to mid brown, moist, plastic sandy clay and a slightly more yellow brown silty sand, probably stratified rather than jumbled.

Almost no plant remains were recorded from the tiny flot and small residue of sand and gravel. The former gave only tiny charcoal fragments, the latter traces of coal and charcoal and a single persicaria (*Polygonum persicaria*) fruit. There were no more than traces of insect cuticle.

Context 8045, sample 12 ['mixed material' between clay dumping 8044 and pond silts 8048 *et seq.*; C19th but with C13th pottery]: mid to dark grey to grey-brown, moist, stiff silt (though with an incipient 'earthy' texture, at times brittle but becoming plastic when worked); this sediment gave the impression of a water-lain silt which became 'terrestrialised', perhaps supporting vegetation (there was evidence of root penetration).

There was a modest assemblage of plant macrofossils in the small flot and residue, including terrestrial and waterside taxa but very little evidence of true aquatics. The presence of moderate numbers of earthworm egg capsules is consistent either with a deposit that became an active soil or one formed from soil redeposited in water. Other invertebrates included several *Cristatella* statoblasts (indicative of aquatic deposition) and a variety of beetles, mainly terrestrial.

Context 8047, sample 13 ['similar to 8045 and immediately above pond silts proper']: lithology as sample 12 but less crumbly, more plastic, sometimes more earthy (as 12), sometimes less so; one lump revealed a slight stratification such as is observed in 'trampled' sediment. No further analysis undertaken.

Context 8048, sample 14 ['top of pond silts'; C14/15th pottery]: black, oxidising to mid to dark brown (oxidation seems to be ancient as well as post-excavation), just moist, stiff to crumbly (turning plastic when worked), clay silt with traces of freshwater mollusc shell and some vivianite; rich in sulphides.

The origin of this deposit as water-lain is clear from the presence of freshwater snails (*Lymnaea* spp. and *Planorbis* spp.) and bivalves, and a range of remains of aquatic plants of which the most frequent were pondweeds (*Potamogeton* and *Zannichellia*) and yellow water-lily (*Nuphar lutea*). The other more abundant plant taxa suggested damp to waterlogged soils with some input of nutrients and form a group typical of drying mud at the edges of ponds—*Chenopodium rubrum*, *Rumex maritimus*, *Rorippa islandica*, and *Ranunculus sceleratus*, for example. A small component were probably weeds of dry land from further afield. There were numerous *Daphnia* (water flea) ephippia of more than one kind, and a variety of aquatic insects indicating still to sluggish water. Terrestrial forms were present in small numbers only.

Context 8049, sample 15 [pond silts with a large number of shells; C14/15th pottery]: black (oxidising to mid to dark brown) humic silty clay with much crushed freshwater bivalve shell.

The proportion of terrestrial plant taxa in the flot and residue from this sample was rather larger than in sample 14, with only rather small numbers of aquatic and waterside types. Although occupation materials were limited to a trace of possible cinder, there was a single hemp (*Cannabis sativa*) achene and traces of two taxa from peatland—a leaf of cross-leaved heath (*Erica tetralix*) and leaves of *Sphagnum* sp., perhaps introduced from peat within dumped occupation debris upstream. There were numerous arthropod fragments, particularly fly pupae, several *Daphnia* ephippia, a corixid bug and a few terrestrial forms.

Context 8050, sample 16 ['pond silts', C14/15th]: dark grey to grey-brown, oxidising to mid brown, just moist, stiff (almost cheesy) humic silty clay. No further analysis undertaken.

Context 8052, sample 17 ['pond silts', C14/15th]: mid to dark grey-brown to brown (somewhat darker internally), just moist, stiff, cheesy to plastic (when worked), humic silty clay with a trace of mollusc shell.

The tiny residue yielded a very small assemblage of plant remains—about 1 cm³ of herbaceous and woody detritus with some of the same terrestrial and waterside mud taxa seen in samples 14 and 15. At least one *Daphnia* ephippium, one ostracod and a few terrestrial beetles were noted from the flot. It is not clear why there should be such a small organic content in a deposit so similar to the overlying humic silts in which fossils were quite common.

Context 8053, sample 18 [?buried soil; perhaps pre-Conquest]: dark grey-brown (slightly darker internally), cheesy-brittle (becoming plastic on working, though with an incipient crumb structure) humic silty clay with white flecks (?rotted shell) and some vivianite. No further analysis undertaken.

Context 8054, sample 19 [as 8053]: mid to dark grey-brown nearly wet plastic to crumbly humic clay sand with a large slab of limestone to 20 cm, traces of stones 2-6 cm, twig fragments to 1 cm diameter and a little bone >2 cm. No further analysis undertaken.

Context 8055, sample 20 [?as 8053]: dark grey-brown, just moist, crumbly humic clay silt with moderate numbers of stones 6-20 mm; crumbliness seems to be the result of ped formation since it is otherwise evidently quite rich in clay.

The very small flot and rather large residue gave quite a large assemblage of plant remains, including rather a lot of wood fragments and some charcoal. Most of the fruits and seeds were of taxa commonly recorded from urban occupation deposits, the most frequent being stinging and annual nettles, water-pepper (*Polygonum hydropiper*), persicaria and fat-hen (*Chenopodium album*). Taken together, they give an impression of originating in an occupation surface with some seasonal waterlogging. A single *Planorbis* ?*carinatus*, a freshwater snail, was also recorded. The few insects in the flot probably were mostly typical urban forms, including *Anobium punctatum*, the woodworm, although there were no abundant decomposers. *Daphnia* ephippia, a corixid bug and a single water beetle suggested aquatic

deposition.

Hand-augered deposits

The sequence encountered was as follows (suggested context equivalents from the hand-excavated sequence in the same location are given in brackets):

3.36-2.94 m above OD: very dark grey (oxidising dark grey-brown), moist, plastic humic clay silt with traces of vivianite. [8048]

2.94-2.64 m above OD: lithology essentially as above though with some freshwater bivalve shell fragments. [8049]

2.64-2.49 m above OD: dark grey-brown, moist, plastic, humic, slightly sandy clay silt with traces of bivalve shell fragments. [8050]

c. 2.41 m above OD: dark grey-brown, just moist, crumbly (friable, becoming plastic when worked), slightly sandy silt with traces of stones 6-20 mm, limestone > 1 cm, fragments of rotted sandstone and mollusc shell fragments. [8053]

c. 2.36 m above OD: dark grey, moist, crumbly (friable, earthy), humic, slightly sandy silt with traces of limestone > 1 cm and bone fragments > 2 cm. [8053]

c. 2.06 m above OD: mid grey-brown, moist, plastic to sticky, sandy clay with small fragments of limestone and bone > 2 cm. [8054]

Implications

The sequence of deposits representing the probable infilling of the King's Fishpool is clearly of importance, especially in relation to deposits of similar stratigraphic context upstream (as seen in excavations at Adam's Hydraulics, Garden Place, and Dundas Street: Alldritt *et al.* 1990; Carrott *et al.* 1990; 1991; Hall *et al.* 1990). It is essential that any opportunity to make further investigation and analysis of these deposits offered by excavation at the Fiat Garage site be grasped.

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