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**Evaluation of biological remains from
further excavations at the Paragon BMW
showroom, Citadel Way, Kingston-upon-
Hull**
(site code: BMW2003)

PRS 2004/31

Evaluation of biological remains from further excavations at the Paragon BMW showroom, Citadel Way, Kingston-upon-Hull (site code: BMW2003)

by

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Summary

Twelve bulk sediment samples and very small quantities of hand-collected shell and bone, recovered from deposits encountered during further excavations at the site of the Paragon BMW showroom, Citadel Way, Kingston-upon-Hull, were submitted to PRS for an evaluation of their bioarchaeological potential. The deposits were of post-medieval to modern date, with many being associated with the Citadel (a late 17th century artillery fort) or the earlier (mid 16th century) Hull Castle.

Plant remains were present and mostly well preserved in most of the samples examined. The more substantial assemblages gave evidence largely consistent with the archaeological interpretation of the excavator, showing—in addition to aquatic deposition of some of the sediments (or components thereof)—a brackish influence which presumably relates to flooding from the tidal river nearby. Invertebrate (especially insect) remains showed very variable preservation even within single deposits. Aquatics predominated, with very abundant ostracods in some cases and, in common with the plant remains, some brackish water taxa present (notably amongst the snails). The rather limited terrestrial components of the assemblages suggested an intensively managed environment whose vegetation was restricted to weedy grassland (possibly grazed). Invertebrate taxa favoured by intensive human occupation were virtually absent.

The assemblages of plant and invertebrate remains probably do not warrant further examination unless there are particular archaeological questions to address and it is thought worthwhile to prepare a report for publication. In this event a proper record should be made of selected material. The hand-collected shell and vertebrate assemblages were very small, of no real interpretative value and require no further work.

KEYWORDS: PARAGON BMW SHOWROOM; CITADEL WAY; KINGSTON-UPON-HULL; EVALUATION; POST-MEDIEVAL; MID 16TH CENTURY TO MODERN; PLANT REMAINS; INVERTEBRATE REMAINS; VERTEBRATE REMAINS

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Introduction

A further archaeological excavation was carried out by Humber Field Archaeology, at the Paragon BMW showroom, Citadel Way, Kingston-upon-Hull (NGR TA 1051 2872), between the 3rd and the 14th of November 2003.

The site overlies parts of a late 17th century artillery fort (the Citadel), close to its northern bastion, and adjoins the eastern side of the mid 16th century Hull Castle, a blockhouse forming part of the Henrician defences later incorporated into the Citadel. Hull Castle is a scheduled ancient monument (County Monument HU 142). Two trenches were excavated. Preliminary evidence gave post-medieval to early modern (16th century to 19th/20th century) dates for the deposits, many of which were associated with Hull Castle of the Citadel.

Twelve bulk sediment samples ('GBA'/'BS' *sensu* Dobney *et al.* 1992) and very small quantities of hand-collected shell and bone, were submitted to Palaeoecology Research Services Limited (PRS), County Durham, for an evaluation of their bioarchaeological potential.

Methods

Sediment samples

All of the sediment samples were inspected. The lithologies of nine of the samples were recorded, using a standard *pro forma*, prior to processing of subsamples broadly following the techniques of Kenward *et al.* (1980; 1986).

The flots and washovers resulting from processing were examined for plant and invertebrate macrofossils. The residues were

examined for larger plant macrofossils and other biological and artefactual remains.

Plant remains (and the general nature of the wet residues, flots and washovers) were recorded briefly by 'scanning', identifiable taxa and other components being listed directly to a PC using *Paradox* software. Notes on the quantity and quality of preservation were made for each fraction.

Insects in the flots were recorded using 'assessment recording' *sensu* Kenward (1992), creating a list of the taxa observed during rapid inspection of the flot, with a semi-quantitative estimate of abundance, and a subjective record of the main ecological (e.g. aquatics, grain pests) or indicator/activity (e.g. for stable manure, Kenward and Hall 1997) groups present. A record of the preservational condition of the remains was made using scales given by Kenward and Large (1998). This scheme provides scales for chemical erosion and fragmentation (0.5-5.5, the higher figure representing the greatest degree of damage), and colour change (0-4), in each case giving a range and a value for the position and strength of the mode (Kenward and Large 1998, tables 2, 3 and 5-7).

Where the residues were primarily mineral in nature they were dried, weighed and the components recorded in brief.

Hand-collected shell

A small quantity of hand-collected shell from four contexts was submitted. Brief notes were made on the preservational condition of the hand-collected shell and the remains identified as closely as possible within the constraints of the assessment.

Hand-collected vertebrate remains

Records were made of the hand-collected vertebrate remains concerning the state of preservation, colour of the fragments, and the appearance of broken surfaces ('angularity'). Other information, such as fragment size, dog gnawing, burning, butchery and fresh breaks, was noted, where applicable. Fragments were identified to species or species group using the PRS modern comparative reference collection. The bones which could not be identified to species were described as the 'unidentified' fraction. Within this fraction fragments were grouped into categories: large mammal (assumed to be cattle, horse or large cervid), medium-sized mammal (assumed to be caprovid, pig or small cervid).

Results

Sediment samples

The results are presented in approximate chronological order of context. Archaeological information, provided by the excavator, is given in square brackets. A brief summary of the processing method and an estimate of the remaining volume of unprocessed sediment follows (in round brackets) after the sample number.

Context 2020 [pre-Citadel rampart open ground associated with Hull Castle; mid 16th to late 17th century]

Sample 6/T (3 kg sieved to 300 microns with washover; approximately 4 litres of unprocessed sediment remain)

Moist, light to mid brown to light to mid grey, brittle to crumbly (working more or less plastic), silty clay. Stones (2 to 20 mm), including very rotted chalk, and flecks of charcoal were present.

The very small residue (dry weight of 0.10 kg) was mostly of sand, with a few stones. Coal, cinders, brick and tile were present.

This subsample yielded a very small washover of a few ml of coal, cinder, and brick/tile (all up to 5 mm in maximum dimension), with a single unidentified small bone.

Context 1020 [turflin/old ground surface below Citadel ramparts; mid 16th to late 17th century]

Sample 12/T (3 kg sieved to 300 microns with paraffin flotation; approximately 4 litres of unprocessed sediment remain)

Moist, mid brown to mid grey-brown, brittle (working more or less plastic), silty clay. Patches of fine herbaceous detritus were present within the matrix and were darker grey-brown (mid to dark) in colour. Brick/tile and vivianite were present.

The very small residue of about 100 ml consisted of organic debris and some brick/tile fragments, the larger organic material being mainly caddis larva cases with some peat (and some fragments of compressed plant detritus that might have originated as reworked occupation material rather than peat). There were rather large numbers of somewhat eroded and/or silt-coated seeds (preserved by anoxic waterlogging) of a small range of plants entirely consistent with flooding of a grass turf, the dumping of waterlain silt onto turf, or deposition of remains from an area of cropped grassy vegetation into a ditch or pond. The more frequent remains were water crowfoot (*Ranunculus* Subgenus *Batrachium*), buttercups (*Ranunculus* Section *Ranunculus*) and silverweed (*Potentilla anserina* L.), with many well-preserved grass (Gramineae) caryopses of perhaps only a few species. The only other frequent taxon was knotgrass (*Polygonum aviculare* agg.), most likely to have grown in turf that was trampled or in otherwise disturbed areas.

Much the same range of plant remains was observed in the large flot, which was rich in fruits and seeds as well as appreciable numbers of insect and other invertebrate remains. Preservation of invertebrates was exceptionally variable, from pristine to very decayed (E 1.0-5.5, mode 2.0 distinct; F 1.0-5.5, mode 3.0 weak). The decay appeared likely to have occurred in antiquity. Ecologically, the fauna was restricted. A range of remains attested to aquatic deposition, notably some *Daphnia* ephippia (water flea resting eggs), caddis fly cases and a few beetles. A few species would have exploited waterside habitats, including mud. 'Dry land' was represented by various species tolerant of disturbance, including modest numbers of dung beetles. There was almost no evidence of species typically associated with buildings, however. There is probably little value in further investigation of this material unless to address a specific archaeological problem, in which case further sediment should be processed to recover larger numbers of remains.

Context 1009 [turflin facing Citadel rampart; late 17th century]

Sample 9/T (3 kg sieved to 300 microns with washover; approximately 3 litres of unprocessed sediment remain)

Moist, light to mid brown to mid grey-brown, brittle to crumbly (working soft then more or less plastic), silty clay to clay silt. Small clasts of light brown clay (to 8 mm) were present, stones (20 to 60 mm), shell flakes and ?ancient rootlets were all present.

The medium-sized residue (dry weight 0.90 kg) was of roughly equal proportions of sand and stones, with a few fragments of unidentified land snails.

The very small washover, of only a few ml in volume, consisted mainly of plant detritus with some small (<5 mm) coal fragments; the former included small (<5 mm) wood fragments and some uncharred seeds, mainly self-heal (*Prunella vulgaris* L.) and a small range of other taxa entirely consistent with a turfline, though with a trace of food remains in the form of endocarp ('core') fragments of apple (*Malus sylvestris* Miller). Preservation was rather poor – there was decay and some reddening/iron salt deposition. A trace of *Sphagnum* leaves may have originated in imported peat (or was perhaps from the same source—faecal waste?—as the apple core fragments, *Sphagnum* having been used as toilet wipes).

Invertebrate remains included a few individuals of the burrowing, and probably intrusive, land snail *Cecilioides acicula* (Müller), fragments of a *Vallonia* ?*costata* (Müller) and a *Helix* sp., and other unidentified terrestrial snail shell fragments. The only insect noted (during checking of the washover) was a single *Megasternum obscurum* (Marsham).

Context 2015 [original turfline of Citadel rampart; late 17th century]

Sample 5/T (3 kg sieved to 300 microns with washover; approximately 3 litres of unprocessed sediment remain)

Just moist, light to mid grey-brown, brittle to crumbly, (working soft), clay silt, with some small clasts (to 10 mm) of mid orange-brown ?indurated clay. Stones (6 to 20 mm) and traces of rotted wood were present.

The small residue dry (weight 0.15 kg) consisted mainly of sand, with a small portion of stones. Traces of brick/tile, coal, cinders and wood fragments were noted.

There was a very small washover of about 15 ml of woody debris (wood fragments up to 20 mm), with a little coal and cinder (both to 5 mm). Other than a single earthworm egg capsule and one unidentified snail, there were no other biological remains.

Context 2021 [upper moat fill; late 17th to early 19th century]

Sample 3/T (3 kg sieved to 300 microns with paraffin flotation; approximately 3 litres of unprocessed sediment remain)

Moist, light to mid brown to light to mid grey-brown, crumbly to unconsolidated, fine sand. Lumps of mid grey clay silt with organic remains (to 15 mm) were present. There were also occasional areas of clay sand from mixing of the major and minor components.

The small residue of about 175 ml comprised woody fragments, the larger ones perhaps mostly bark or woody roots (and fine rootlets, presumably also ancient, were present in the flot). Otherwise, remains were limited to a very few identifiable plant macrofossils of no interpretive value. There was a little gravel, sand and grit.

The small flot consisted of plant debris and a few invertebrates. The latter showed unexceptional preservation (E 2.5; F 3.0; there were too few for a full assessment of preservation). Mites were moderately abundant, but there were only traces of ostracods, and less than ten insects. This fauna was very dilute and has no potential for further analysis.

Context 2016 [?flood deposit above Citadel berm; late 17th to early 19th century]

Sample 1/T (3 kg sieved to 300 microns with paraffin flotation; approximately 5 litres of unprocessed sediment remain)

Moist, light to mid brown to mid grey-brown (occasional black sulphide-stained patches internally), brittle (working soft), very slightly sandy silt (though locally much more sandy). The sample had a slight sulphide smell and freshwater bivalves (*Unionidae* sp. indet.) were present.

There was a very small residue of about 75 ml mainly of freshwater mussel shell fragments with some moderately well preserved *Potamogeton* pyrenes (supporting the interpretation of a freshwater deposit), though the presence of fruits of beaked tassel-weed (*Ruppia maritima* L.) indicates some brackish influence. The few other identifiable plant remains were of rather little interpretive value. Some very fine wood fragments might have originated in sawdust.

The flot was very small and consisted mostly of invertebrate remains, with a little plant debris. Insect preservation was variable, from fairly good to rather poor, with some remains quite strongly fragmented (E 2.5-4.0, mode 3.0 weak; F 2.0-4.5, mode 2.5 weak). This was a waterlain deposit, for there were very large numbers of ostracods (order of 10³), a caddis larva, and

various aquatic beetles and bugs. Terrestrial fauna was very limited. There would probably be little purpose in further analysis of this assemblage, although specialist work on the ostracods could be used to assess water quality, especially salinity.

Context 2014 [turfline of extended/refurbished rampart; early 19th century]

Sample 4/T (3 kg sieved to 300 microns with washover; approximately 3 litres of unprocessed sediment remain)

Moist, mid brown to mid grey-brown, crumbly (working soft), silt. Stones (2 to 6 mm) and ?egg shell were present. Poorly preserved freshwater mussels (Unionidae sp. indet.) were also present (to 40 mm but certain to separate into fragments as the surrounding matrix is disaggregated).

The medium-sized residue (dry weight 0.40 kg) was of roughly equal proportions of sand and stones. Brick/tile, cinders, wood fragments and land snails (1 *Vallonia ?excentrica* Sterki and 2 ?*Aegopinella nitidula* (Draparnaud)) were present, and fragments of freshwater mussel shell were abundant.

There was a small washover of about 40 ml of grassy detritus and some snail shells. There was some rusty iron deposition, but other parts of same fragments were blackish and presumably sulphide impregnated. Much of the material appeared to be rhizome and culm fragments, consistent with an origin in turf. There were also some fragments of 'wormed' wood (to 30 mm) and wood chips to 10 mm. The few seeds present were mostly rather eroded: they included taxa likely to have grown in turf (such as self-heal, buttercups and grasses), but with some weeds and aquatics. The last group contained some indicators of brackish/marine influence (*Ruppia*, again, and horned pondweed, *Zannichellia*, from flooding from the tidal river nearby?).

The snails included single individuals of *Vallonia ?costata*, *Cochlicopa ?lubrica* (Müller), a small hydrobiid (?*Hydrobia ventrosa* (Montagu)), a small freshwater bivalve (*Pisidium* sp.), and fragments of two ?*Oxychilus cellarius* (Müller). Remains of about 10 beetles and bugs were picked out during checking of the washover for plant remains; they were from open-air habitats, probably including grassland. This mix of grassland and fresh/brackish water invertebrates supports the suggestion of flooding given by the plant remains.

Context 2031 [clay dump extending the front of the rampart, ?upcast from moat scouring; early 19th century]

Sample 7/T (3 kg sieved to 300 microns with washover; approximately 2 litres of unprocessed sediment remain)

Moist, light to mid orange-brown to mid grey-brown to mid grey, brittle to crumbly (working soft), ?slightly clay slightly sandy silt. Stones (2 to 6 mm) and freshwater molluscs were present.

The small residue (dry weight 0.28 kg) was of roughly equal parts stones and sand, with abundant freshwater mussel fragments.

This sample yielded a very small washover of about 15 ml of fine woody fragments and some seeds and fruits; the material was all somewhat reddened and may have undergone some recent decay. There were rather frequent remains of grass fruits, pondweed pyrenes and seeds of orache (*Atriplex*), which, with remains of *Ruppia* and *Zannichellia*, and some indicators of disturbance, are consistent with an interpretation of moat upcast.

The washover yielded only a trace of insect remains, though including a very pale orange elytron which appeared to be *Sitophilus granarius* (Linnaeus), the only grain pest or domestic insect from the site. There were many unidentified shell fragments, but the only identifiable mollusc remains were small hydrobiids—perhaps ten in total including ?*Potamopyrgus jenkinsi* (E. A. Smith) and ?*Hydrobia ventrosa*.

Context 2032 [clay dump extending the front of the rampart, ?upcast from moat scouring; early 19th century]

Sample 8/T (3 kg sieved to 300 microns with washover; approximately 3 litres of unprocessed sediment remain)

Moist, light to mid brown to light to mid grey-brown, brittle to crumbly (working soft and somewhat plastic), silty clay to clay silt. Herbaceous detritus was present and freshwater mussels were common.

The medium-sized residue (dry weight 0.74 kg) was mostly of sand and stones. Brick/tile and mortar/plaster fragments were present. Fragments of freshwater mussel shell (58 g) were abundant and there was a single small hydrobiid (?*Hydrobia ventrosa*).

There was a small washover of about 25 ml of woody and herbaceous detritus with some snails (approximately 25 small hydrobiids, probably all *Hydrobia ?ventrosa*), pondweed and grass fruits and a small range of other remains indicating aquatic deposition with some brackish influence. There was a single well-preserved fig seed, the sole evidence for food from human occupation in the vicinity. Otherwise there were traces of coal, cinders and small (<5 mm) wood fragments.

About 20 beetle taxa were represented in material picked out during checking of the washover for plant remains. They included plant feeders, waterside species, and dung beetles. The remains were fairly well preserved and, with hind sight, this sample would perhaps have been better subjected to paraffin flotation.

Hand-collected shell

Small quantities of hand-collected shell were recovered from four post-medieval/modern contexts in Trench 2. Context 2020 gave remains of two *Helix ?aspersa* Müller land snails, likely to be of recent origin. The remaining three contexts (2016, 2032 and 2033) each contained fragmentary remains of freshwater mussel (Unionidae sp. indet.) representing perhaps ten individuals in total (most being from Context 2032). Context 2033 also contained a single common mussel (*Mytilus edulis* L.) valve.

Hand-collected vertebrate remains

Five deposits at this site produced a total of seven fragments of bone. Preservation was, on the whole, good. Both pig and caprovid remains were identified, together with several large mammal fragments. Details can be found in Table 1.

Discussion and statement of potential

Plant remains preserved by anoxic waterlogging were present and generally well preserved in most of the samples examined. The more substantial assemblages gave evidence largely consistent with the archaeological interpretation of the excavator, showing—in addition to aquatic deposition of some of the sediments (or components thereof)—a brackish influence which presumably relates to flooding from the tidal river nearby.

Invertebrate (especially insect) remains showed very variable preservation even within single deposits, although most of the decay probably occurred during deposition (cf. the arguments presented by Kenward and Hall, in press). One very restricted group of insects showed more general decay which may have been recent (from Context 2031; the condition of the plant material from this sample likewise

suggested recent decay). Aquatics predominated, with very abundant ostracods in some cases and, in common with the plant remains, some brackish water taxa present (notably amongst the snails). The rather limited terrestrial components suggested an intensively managed environment whose vegetation was restricted to weedy grassland, possibly grazed. The components of the fauna favoured by intensive human occupation were virtually absent.

The hand-collected shell remains were rather too few to be of any great interpretative value but were, again, primarily of aquatics.

The vertebrate remains from this excavation form too small an assemblage to provide any interpretative information. Preservation, however, was good, showing that these deposits have some potential for the survival of bone.

Recommendations

The assemblages of plant and invertebrate remains probably do not warrant further examination unless there are particular archaeological questions to address and it is thought worthwhile to prepare a report for publication. In this event a proper record should be made of selected material (which should include a review of similar deposits encountered by previous excavations at this site, the biological remains from which are reported by Hall *et al.* 2001a and b).

The hand-collected shell and vertebrate remains do not warrant further consideration.

Retention and disposal

All of the current material should be retained for the present.

Archive

All material is currently stored by Palaeoecology Research Services (Unit 8, Dabble Duck Industrial Estate, Shildon, County Durham), along with paper and electronic records pertaining to the work described here.

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References

- Dobney, K., Hall, A. R., Kenward, H. K. and Milles, A. (1992). A working classification of sample types for environmental archaeology. *Circaea, the Journal of the Association for Environmental Archaeology* **9** (for 1991), 24-6.
- Hall, A., Rowland, S., Kenward, H. and Carrott, J. (2001a). Evaluation of biological remains from excavations at Citadel Way, Kingston upon Hull (site code: BMW2001). *Reports from the Environmental Archaeology Unit, York*, **2001/37**, 4 pp.
- Hall, A., Kenward, H., Jaques, D. and Carrott, J. (2001b). Evaluation of biological remains from further excavations on land adjacent to Paragon BMW, Citadel Way, Kingston upon Hull (site code: BMW2001). *PRS* **2001/03**.
- Kenward, H. K. (1992). Rapid recording of archaeological insect remains - a reconsideration. *Circaea, the Journal of the Association for Environmental Archaeology* **9** (for 1991), 81-8.
- Kenward, H. and Hall, A. (1997). Enhancing bioarchaeological interpretation using indicator groups: stable manure as a paradigm. *Journal of Archaeological Science* **24**, 663-73.
- Kenward, H. and Hall, A. (in press). Actively decaying or just poorly preserved? Can we tell when plant and invertebrate remains in urban archaeological deposits decayed? *Proceedings of the PARIS II Conference*.
- Kenward, H. and Large, F. (1998). Recording the preservational condition of archaeological insect fossils. *Environmental Archaeology* **2**, 49-60.
- Kenward, H. K., Engleman, C., Robertson, A. and Large, F. (1986). Rapid scanning of urban archaeological deposits for insect remains. *Circaea* **3**, 163-172.
- 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.

Table 1: Hand-collected vertebrate remains from further excavations at the Paragon BMW showroom, Citadel Way, Kingston-upon-Hull.

Context	No. frags	Preservation	Notes
1009 turfline (late 17 th C)	1	Well preserved bone; brown in colour	<i>Medium-sized mammal</i> : 1 shaft fragment <i>Total weight</i> : 1 g
1011 lower rampart deposit (late 17 th C)	1	Well preserved bone; brown in colour	<i>Sheep/goat</i> : complete scapula, measurable. <i>Total weight</i> : 22 g
1020 pre-citadel ground surface (mid 16 th -late 17 th C)	1	Fair preservation; rather rounded edges and damage to surface of bone	<i>Sheep/goat</i> : 1 radius, distal articulation unfused. <i>Total weight</i> : 24 g
2020 pre-citadel deposit	2	Fair preservation; brown in colour; rather battered appearance	<i>Large mammal</i> : 1 shaft fragment and 1 vertebra fragment. <i>Total weight</i> : 13 g
2033 build-up	2	Well preserved; brown in colour	<i>Sheep/goat</i> : 1 mandible (dP2-dP4). <i>Pig</i> : 1 femur shaft fragment. <i>Total weight</i> : 28 g