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Assessment of biological remains from excavations at Bridge Street, Chester (site code: CHE/25BS'01)

by

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Summary

Plant, invertebrate and fish remains were examined from a series of sieved samples of various sizes from all phases of the sequence.

Plant remains were often limited to very small amounts of charcoal, but some medieval and post-medieval assemblages were quite rich in food remains (mainly fig, grape and other fruits), some contained charred and uncharred vegetative remains of gorse and a third group (from a post-Roman, pre-medieval feature) appeared to have originated in burnt peat. One unusual assemblage was a concentration of hop achenes, presumably from brewing. The presence of eggs of intestinal parasitic nematodes in two examined subsamples indicated a faecal component to these 16th century deposits. Insect remains were rather sparse but there were some post-medieval and early modern assemblages with typical urban taxa warranting further analysis. Hand-collected shell consisted mostly of rather abraded oyster shell with a small number of other marine taxa, presumably from food waste, whilst the fish assemblages included a reasonably diverse range of marine and migratory types, again primarily food waste.

Further examination of selected material should shed light on changing patterns of food use, fuel consumption and aspects of the urban environment at this site, as well as enhancing interpretation at the level of context and phase.

KEYWORDS: BRIDGE STREET; CHESTER; ASSESSMENT; ROMAN TO EARLY MODERN; PLANT REMAINS; CHARRED PLANT REMAINS; INTESTINAL PARASITIC NEMATODE EGGS; *TRICHURIS*; INVERTEBRATE REMAINS; SHELLFISH; OYSTER; FISH BONE

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Introduction

An archaeological excavation was carried out by Gifford and Partners Ltd at Bridge Street, Chester (NGR SJ 4060 6615), between October 2001 and March 2002.

Deposits excavated at this site were generously sampled for the purposes of finds recovery and for the retrieval of biological remains. A series of 120 samples from 115 contexts, varying in size from 5 to 100 litres (71 of which were of either 30 or 60 litres), was processed by 'bulk-sieving'(to 1 mm) on site; they yielded a heavy fraction ('residue') and lighter material ('washover' or 'flot'). A parallel series of unprocessed samples for many of these contexts was retained for subsequent examination of a 'GBA' subsample where deemed appropriate on the basis of the evidence from the BS samples (terminology follows Dobney *et al.* 1992).

An interim assessment of remains recovered from the on-site processing of the first twenty samples was undertaken at the end of 2001. These investigations suggested that processing of samples using paraffin flotation to extract invertebrate remains would not be appropriate but that laboratory washovers of subsamples for invertebrates using finer-meshed (300 microns) sieves would be profitable in some cases.

Provisional dating gave Roman to early modern dates for the encountered deposits and initial phasing has been assigned as follows:

Phase 1 – late 18th and 19th-20th century
Phase 2 – early to mid 18th century
Phase 3 – 17th century
Phase 4 – Tudor (1485 to 1603 AD)
Phase 5 – medieval (1066 to 1484 AD)
Phase 6 – post-Roman (410 to 1065 AD)
Phase 7 – Roman (including early Roman)

*(NB: Table 1, which presents summary information for major components of the washovers and distribution of some significant plant remains, and Table 2, which shows the more frequently recorded and/or interpretatively significant components of BS samples, were prepared before the above phasing information was available. For this reason the information in these tables follows a phasing scheme created by ARH. The equivalent excavator-assigned phases are also presented in Tables 1 and 2 in the column/row headed '***PhE'***. *In some cases, as can be seen by comparison of the two phasings in Table 1, particular contexts (e.g. Context 37) have been rephased but these changes have not been incorporated in Table 2.)*

A small amount of material sorted from the BS residues arrived too late to be fully included in this assessment. A brief summary of these remains is presented as Table 8.

Methods

Sediment samples

(i) BS samples

Small numbers of plant and invertebrate remains (mainly charcoal, and mineral-replaced seeds and fly puparia) were sorted by excavation staff from the residues during on-site work. These were inspected in the laboratory and the plant material recorded by ARH, who also checked 118 of the BS 'washovers' during the assessment, together with a small proportion of residues. It was not felt likely to be profitable to examine further plant material from the GBA samples at this stage, but subsamples from a group of these were subjected to processing (after Kenward *et al.* 1980; 1986) and the resulting 'washovers' examined for insect remains.

Lists of plant remains and other components of the samples examined were recorded semi-

quantitatively (using a simple, three-point scale from 1—one or a few remains, through 2—moderately frequent remains, or a component representing between about 1 and 10% by volume of the original sample, to 3—abundant remains or a component representing more than about 10% of the original sample volume), the data being entered, during inspection, to a computer database using *Paradox* software.

Very small quantities of marine shell, and occasionally of eggshell, were recovered from most of the sampled deposits; these were scanned and brief notes made of the remains.

The residues from the bulk-sieved samples also produced varying quantities of fish bone. Remains from 100 samples were examined and records were made concerning the state of preservation, colour of the fragments, and the appearance of broken surfaces ('angularity'). Where possible, fragments were identified to species or species group using the modern comparative reference collections of PRS and the Environmental Archaeology Unit, University of York. Additionally, fish remains recovered by hand-collection were also scanned and brief notes on identification recorded. Table 7 shows the species or family groups identified from the different phase groups (using information supplied by the excavators), whereby '+' indicates the presence of a species and '++' indicates that that species/family were predominant amongst the remains from that particular sample.

(ii) GBA samples

Washovers from the BS samples processed on-site in which at least traces of invertebrate remains were seen during botanical recording were subsequently re-examined via GBA subsamples processed in the laboratory.

Subsamples ('GBA'/'BS' *sensu* Dobney *et al*. 1992) from the selected deposits were inspected in the laboratory and their lithologies were recorded, using a standard *pro forma*, prior to processing, following the procedures of Kenward *et al*. (1980; 1986), for recovery of plant and invertebrate macrofossils.

In each case only part of the washover could be inspected closely for insect remains; to examine all of the material would have required a prohibitive amount of time. Where appropriate, preservation of insect remains was recorded using the scales of Kenward and Large (1998).

Small subsamples from two 16th century contexts (806–a ?garderobe fill, and 1697–the primary fill of a cess pit) were examined for the eggs of intestinal parasitic nematodes using the 'squash' technique of Dainton (1992). Where possible measurements were taken using a calibrated eyepiece graticule at 600x magnification.

Hand-collected shell

Nine boxes of hand-collected shell (representing material from 203 contexts) were submitted. All of the remains were identified as closely as possible within the constraints of the assessment. The weight (in grammes) of shell from each context was noted and its preservational condition recorded using two, subjective, four-point scales for erosion and fragmentation—scale points were: 0 – none apparent; 1 – slight; 2 – moderate; 3 – high.

For oyster (*Ostrea edulis*) shell, additional notes were made regarding: numbers of left and right valves; evidence of having being opened using a knife or similar implement; measurability of the valves; damage from other marine biota (polychaet worms and dog whelks); encrustation by barnacles.

The mollusc data were initially recorded on paper and later entered into a *Paradox* data table for subsequent interrogation.

Results

Sediment samples

(i) BS samples

The results for fish bone are presented separately as section (iii) below.

Tables 1 and 2 present some results from the assessment of plant remains from this series of samples. Most of the washovers contained at least a little charcoal, but sometimes this was the only plant material recorded. There were very great differences in the composition of the washovers, however. Thus, many of those from the latest (post-medieval/early modern) deposits were large and most were dominated by cinders, usually with some unburnt coal, whilst the medieval deposits yielded charcoal and rather little else. The few 'post-Roman/pre-medieval' contexts examined sometimes contained remains interpreted as burnt peat (they were mostly from a single feature), and the Roman layers yielded very few remains of any kind.

With regard to identifiable plant remains, a large proportion of the layers yielded at least a few seeds of elder (*Sambucus nigra* L.), perhaps growing in the vicinity, whilst many had at least a few (sometimes very many) fig (*Ficus carica* L.), blackberry (*Rubus fruticosus* agg.) and grape (*Vitis vinifera* L.) seeds. Preservation of the last of these was sometimes by mineral replacement, or partly so, and mineral-replaced seeds likely to have come from other fruits (but no longer closely identifiable) were present in several contexts, especially from 16th and 18th century levels. They are consistent with the presence in these deposits of very decayed faecal material, presumably human. There were small numbers of charred cereal grains in many samples, but only in a single 'post-Roman' sample were there more than one or a few grains per litre of sediment. Chaff was limited to a single record of part-charred rye (*Secale cereale* L.) rachis in the fill of a 19th century ash pit and some oat (*Avena*) chaff in a post-medieval deposit.

Other plant remains, especially seeds of weeds, were more sporadic; there were a few remains which may have come from ornamental plants grown in gardens in the vicinity, whilst one early 18th century deposit was unusual (for the site, and more generally in the context of British archaeological deposits) in being rich in uncharred and mineral-replaced fruits of hop (*Humulus lupulus* L.), presumably brewing waste.

Notable amongst the post-medieval deposits were the remains of gorse (*Ulex* sp.; the one Roman record was suspicious and subsequently the deposit (Context 37) proved to be of a much later date-Phase 4, Tudor). For the most part these were charred and consisted of leaves (in the form of spines) and twig fragments, with rare pods or pod fragments and even flower buds; sometimes uncharred or partly charred material was noted amongst the charred remains. Gorse has been employed in the past in an almost infinite number of uses (cf. Lucas 1979) of which perhaps the most likely in this setting would be as fuel in ovens (e.g. for bread) or perhaps other domestic fires. Perhaps not surprisingly at least two late (19th/20th century) deposits yielded seeds of what is almost certainly tomato (*Lycopersicon esculentum* Miller) but another taxon in the Solanaceae rarely if ever recorded from archaeological deposits was a tentatively identified specimen of thorn-apple (*Datura stramonium* L.) from a 19th/20th century feature fill. These seeds should be checked to confirm the identifications.

Small fragments of mostly marine shell were recovered from many of the BS samples which occasionally also gave a few fragments of eggshell (Contexts 37, 353, 671, 785, and 1513). Only four of the contexts gave more than the barest traces of highly fragmented shell and even these gave very few remains from large samples. The 19th century ash pit fill deposit (Context 208, Sample 5002) gave a small amount of cockle (*Cerastoderma edule* (L.)) representing perhaps as many as five individuals and a single fragment of mussel (*Mytilus edulis* L.) shell from a 60 litre sample. The 17th-18th century ?cultivation deposit (Context 237, Sample 5006) gave remains of two rather poorly preserved (the shell being heavily eroded and soft) oyster valves (one left and one ?right) and small shell fragments (including one fragment identifiable as cockle) from an 80 litre sample. The 17th century ?midden deposit (Context 1513, Sample 5148) gave the greatest quantity of shell (340 g of heavily eroded and fragmented oyster) from a 60 litre sample. Context 1607, Sample 5159 (early 18th century pit fill) yielded a single oyster valve (again heavily eroded and fragmented) from 30 litres.

A small assemblage of land snails was recovered from Sample 5027 (Context 424, a late 19th-early 20th century drain fill). Most of the shells were too poorly preserved to be identifiable but the better preserved remains were tentatively identified as *Oxychilus* sp. A few or single unidentified land snails were also recovered from Contexts 341, 353, and 464, and Context 375 gave a single *Vitrea* sp. shell.

Six contexts (441, 442, 545, 992, 1022, and 1513) gave coprolites which the presence of small bone fragments identified as most probably being of dog.

(ii) GBA samples

Subsamples of 5 kg of sediment (with the exception of Sample 5027, which was 4.25 kg) from 12 contexts were processed to recover invertebrate (primarily insect) remains. Results for the invertebrate remains are summarised in Table 3. Laboratory descriptions of the subsamples and the results of the examinations for the eggs of intestinal parasitic nematodes are given below (presented in context number order):

Context 206, Sample 5001: Dry, light to mid grey-brown, unconsolidated, ?ashy, silty sand. Stones (2 to 20 mm), cinder, rotted mortar/plaster, coal and a ?copper alloy pin were present.

Context 208, Sample 5002: Dry, light to mid brownish grey to mid grey-brown, unconsolidated, slightly silty sandy ash. Stones (2 to 6 mm), clay pipe fragments, pot, ?lead, wood (including ?worked chips) and cockle shell were present, coal was common, and cinder was abundant.

Context 245, Sample 5008: Moist, mid to dark grey-brown, crumbly to unconsolidated, ashy sandy silt with occasional lumps of light to mid brown clay (to 15 mm). Charcoal and ?burnt mortar and shale were present.

Context 424, Sample 5027: Moist, mid to dark grey-brown, unconsolidated, ?ashy, ?slightly clay sandy silt. Glass, mortar/plaster, brick/tile, pot, cinder, rotted wood, and cockle shell were present.

Context 429, Sample 5031: Moist, mid grey-brown, unconsolidated (working more or less soft), slightly clay sandy silt. Stones (2 to 60 mm), coal, cinder, and bone (including ?bird bone) were present.

Context 464, Sample 5046: Moist, mid to dark grey-brown, crumbly (working soft), slightly sandy clay silt. Stomes (6 to 60+ mm, including slate to 80 mm), mortar/plaster, brick/tile, cinder, rotted charcoal, and bone were present.

Context 670, Sample 5056: Moist, mid to dark brown to mid to dark grey-brown, stiff and sticky to crumbly (working soft), slightly gritty sandy clay silt.

Context 797, Sample 5077: Moist, mid to dark grey-brown, stiff and sticky (working soft and somewhat plastic), silty clay sand with some rotted charcoal present.

Context 806, Sample 5081: Moist, mid brown to mid grey-brown (lighter in places), crumbly and slightly sticky (working soft), sandy clay silt. Stones (2 to 20 mm), charcoal and some ?humic patches were present.

The 'squash' was mostly organic detritus with some inorganic material. Seven rather poorly preserved *Trichuris* eggs (all missing both polar plugs) were seen as were many pollen grains and some ?fungal spores. Maximum lengths (not including polar plugs) and widths were recorded for five of the eggs. A maximum length including polar plugs was calculated for these eggs, by using data from other archaeological records, and their size range determined to be 53-64 microns long by 24-27 microns wide.

Context 1632, Sample 5161: Moist, mid brown to mid grey (internally), crumbly to unconsolidated (working soft), sandy clay silt (more clay in places) with some coal present.

Context 1635, Sample 5166: Moist, mid to dark grey-brown to mid brown, crumbly to unconsolidated (working soft), sandy clay silt. Stones (2 to 60 mm), mortar/plaster, coal, cinder and bone were present.

Context 1697, Sample 5172: Moist, mid brown to mid grey-brown, crumbly (working soft), sandy clay silt. Cinder and charcoal were present.

The 'squash' was mostly organic detritus with some inorganic material. Twenty-one rather poorly preserved *Trichuris* eggs (all missing both polar plugs) were seen. Maximum lengths (not including polar plugs) and widths were recorded for 11 of the eggs. A maximum length including polar plugs was calculated for these eggs, by using data from other archaeological records, and their size range determined to be 50-59 microns long by 24-28 microns wide. A single ?*Ascaris* egg was also noted.

(iii) Fish bone

The extensive sampling programme employed at this site has resulted in the recovery of a moderate-sized assemblage of fish remains. A small number of fragments were retrieved by hand during excavation, but these were mainly restricted to large vertebrae or single large elements. A couple of deposits also produced groups of bones representing articulated remains, mostly fins. Only a limited suite of species were present within the hand-collected material. Details regarding the fish assemblages are, therefore, mostly concentrated on information provided by the sieved assemblage.

In total, material from 100 samples was examined, representing all seven phases. Fish bone from an additional ten samples representing Phases 4-7 were quickly scanned (Table 8). The largest concentrations of bones were recovered from Phases 1 to 4. In particular, a series of garderobe deposits (Contexts 785, 791, 798 and 806) and pit and midden fills (Contexts 1635 and 1697) from Phase 4 were especially rich in well-preserved fish bones. Additionally, several pit fills (Contexts 245, 352, 545, 1437 and 1607), including

those associated with the horncore-lined pit (Contexts 1699 and 1702), produced useful assemblages.

Material from the Roman, post-Roman and medieval deposits (Phases 5-7) was sparser, although an additional eight samples representing these phase groups (submitted a few days before the deadline of this assessment) produced some moderate-sized assemblages (Contexts 1138, 1148, 1175, 1179 and 120) of well-preserved fish bone.

Generally, the fish remains were well preserved throughout the periods represented. Most assemblages were scored as excellent or good, although some fragments were a little eroded, and some showed damaged edges. Very little material was poorly preserved, but those fragments which were tended to be from the earliest deposits, i.e. Roman or post-Roman. Not surprisingly, several of the fills described as ash pit deposits (Contexts 208 and 279) also produced eroded fragments, but some of the bones from these contexts were burnt and were rather friable as a consequence. Many of the identifiable fragments were vertebrae, but other elements were represented. Unidentified fin rays, spines and ribs made up a substantial proportion of some of the larger assemblages. In some contexts, preservational conditions may have affected the survival of less robust elements, but a more detailed analysis of the representation of different elements would need to be undertaken to provide a clearer picture.

Evidence of butchery was not extensive. Some of the larger gadid vertebrae, particularly those recovered by hand, had quite clearly been chopped and a single vertebra (Context 1702) from a cartilaginous fish (shark/ray family), tentatively identified as tope (cf. *Galeorhinus galeus* (L.)), had been deliberately split in half.

Roman (Phase 7)

On the basis of the initial material submitted to PRS, this phase produced very little fish bone. However, material from three samples (Contexts 1148, 1219 and 1220) belatedly sent for assessment (See Table 8) increased the assemblage from this phase from 40 fragments to over 200. These fragments were only very quickly scanned, but appeared to include the remains of eel (*Anguilla anguilla* (L.)), flatfish (Pleuronectidae), salmonid, smelt (*Osmerus eperlanus* (L.)), small gadid and ?mullet (Mugilidae).

A number of vertebrae, as yet unidentified, from Context 1242 may be worthy of note. These fragments resemble mackerel (Scombridae) vertebrae, but a final identification could not be made as further reference material is required. However, they could perhaps be the remains of Spanish mackerel (also known as chub mackerel – *Scomber colias* Gmelin), a known delicacy in the Roman world and imported into this country in amphorae. Confirmation of the importation of such fish comes from an inscription on the side of an amphora recovered from Chester. This stated that the content was a sauce from Baetica [Southern Spain] made from mackerel tails (Alcock 2001). These few fragments, therefore, could potentially provide further evidence of trading links and the status of the inhabitants of this area of Chester in the early Roman period.

Post-Roman deposits (Phase 6)

Of the 14 deposits assigned to this phase, few produced more than ten fragments; however, a moderate-sized assemblage of approximately 100-150 fragments was recovered from a 'cess-like' deposit, Context 272. Species or species groups identified from this phase included herring (*Clupea harengus* L.), eel (*Anguilla anguilla* (L.)) and flatfish (Pleuronectidae), with remains of ?smelt (cf. *Osmerus eperlanus* (L.), ?gadid (cod family) and ?conger eel (cf. *Conger conger* (L.) also present. Additional samples (see Table 8) from this phase produced over 100 extra fragments. Material from Context 1175 was extremely fragmented; it included a number of battered vertebrae fragments which were possibly the remains of a cartilaginous fish, such as thornback ray (*Raja clavata* L.).

Medieval – 1066 to 1484 AD (Phase 5)

A similar range of species (to those from the post-Roman deposits), herring, eel and flatfish, were recorded within the assemblages from the four deposits of medieval date. A midden deposit, Context 261, produced the bulk of the material. Additionally, Gadidae remains, including haddock (*Melanogrammus aeglefinus* (L.) and ?whiting (cf. *Merlangius merlangus* (L.), were identified from this deposit, whilst salmonid (trout/salmon) vertebrae were recovered from Context 490.

Tudor – 1485 to 1603 (Phase 4)

A number of large assemblages of fish bone were recovered from a series of deposits dated to this period. Contexts 785, 791, 797, 798 and 806 produced considerable quantities of bone, most of which was well preserved. Flat fish, including ?flounder (cf. *Platichthys flesus* (L.), ?flounder/plaice cf. *Platichthys flesus* (L.)/cf. *Pleuronectes platessa* L. and ?sole (cf. *Solea vulgaris* Quensel), appeared to be the dominant species represented, particularly within the material from Context 785. Herring and eel were also fairly numerous, whilst Gadidae (including ?rockling (cf. Lotinae), cf. smelt, Salmonidae and cf. conger eel were also recorded. Thornback ray (*Raja clavata* L.) was

identified by the presence of a number of characteristic fragments called dermal denticles. Similar species were identified from other Phase 4 deposits, but within cesspit fill, Context 1697, eel remains were predominant. The material from this deposit also included vertebrae, which had been crushed; this type of damage suggests that these vertebrae had been eaten. The inclusion in this deposit of faecal material is highly likely.

17th Century (Phase 3)

Ten deposits, mainly representing cess/garderobe pit fills or midden spreads produced fish bones. Only four of the deposits contained more than 15 fragments. Herring and flatfish remains provided the bulk of the assemblage from this phase. Gadidae and thornback ray remains were also identified. A single ?gadid vertebra recovered from garderobe fill Context 1558, showed distinctive (crushing) damage, probably the result of having been eaten.

Early to mid 18th century (Phase 2)

Fish bones were examined from twenty-three pit fills and midden deposits of Phase 2 date and from 2 additional samples dated to Phase 2/3 (17th/18th century). Overall, the remains showed a greater diversity of species than most of the earlier phases (Table 7). Whilst herring, flatfish and eel were still the most significant species (by fragment count), the remains of Gadidae were more widespread and included not only the larger gadids, such as cod, ?pollack/saithe (cf. *Pollachius pollachius* (L.)/cf. *Pollachius virens* (L.) and haddock but also the smaller species, whiting and ?rockling. Eel was noted to be more common within some pit fills (Contexts 489, 1486 and 1607). Thornback ray dermal denticles were present in eight of the samples, and some very battered vertebrae from Context 1607 were also possibly remains of this species. The exploitation of freshwater fish was evident by the presence of remains identified as cyprinid, ?perch (cf. *Perca fluviatilis* L.) and salmonid. Hand-collected material from Context 1602 included the cleithrum from a large cyprinid.

Late 18th and 19/20th century (Phase 1)

Fish remains recovered from the early modern deposits were mostly very well-preserved. Many of the bones were unidentifiable spine, finray and rib fragments, however, those bones which could be identified included the remains of herring, eel, flat fish and ray (probably thornback – cf. *Raja clavata* L.). Gadidae remains were less well represented, but included ling, ?whiting and cf. rockling. Additional species, tentatively identified as ?perch, ?anchovy (cf. *Engraulis encrasicolus* (L.) and ?trout (cf. *Salmo trutta* L.) were also recorded.

Hand-collected shell

Hand-collected shell was recovered from 203 contexts (40 of which were unstratified (5) or unphased (35) at the time of writing of this assessment). Preservation was generally poor with erosion and fragmentation scores for most contexts being recorded as either 2 or 3. Much of the shell was notably 'soft' and that the remains had continued to degrade post-excavation was evidenced by the many fragments and flakes of shell (mostly of oyster) present in almost all of the contexts. All of the material was assessed and the taxa identified as closely as possible.

Table 4 shows the total numbers of contexts assessed by phase. Table 5 gives a summary of the recorded shell by phase. The molluscs from almost all of the contexts included oyster shell and summary information (again by phase) for this material is presented as Table 6.

Most of the recovered shell was of edible shellfish from deposits of 18th to 20th century date (Phases 1 and 2) but remains were recovered from all phases of the site. Oyster was, by far, the most commonly represented taxon with other edible marine taxa (e.g. cockle, mussel, and periwinkle) present in small numbers, again mostly concentrated in the later phases of the site.

Oyster shell was, on the whole, sufficiently well preserved for valves to be identified as either left or right valves. Only 15% of the valves for which 'side' could be determined were measurable, however—though measurements were not taken as part of this assessment. Evidence of the oysters having been opened using a knife or similar implement (as shown by 'V'- or 'W'-shaped notches on the shell margins) was noted on 28% of the valves. There was some evidence of damage to the valves from polychaet worm burrowing but no dog whelk holes, and only occasional encrustation by barnacles.

The other marine invertebrates represented were, with a few exceptions, other edible species commonly occurring off the coasts of Britain.

Context 488 (unphased) gave a rather unusual assemblage of a limpet (*Patella* sp.), a scallop (Pectinidae sp. indet.) valve, seven top shells (one at least of which was probably grey top shell, *Gibbula cineraria* (L.)), ten flat winkles, two ?Baltic Tellin valves (?*Macoma balthica* (L.)), and four small ?dog whelks (cf. *Nucella lapillus* (L.)).

One context (1440, Phase 2) gave a single *Helix aspersa* Müller (the 'garden snail'), a highly eurytopic species of no value in interpreting ecological conditions on the site.

Discussion and recommendations

Plant remains

Though plant remains were rather sparse and the survey undertaken for this assessment has been unusually comprehensive (with almost all the processed BS sample being examined) there is a need to make proper record of at least a few narrowly- and securely-dated assemblages with good preservation of plant remains. These should include some representative assemblages from contexts rich in food remains from presumed cess pit fills and one or two of the gorse-dominated assemblages from ash deposits, as well as the unusual hop-rich deposit. Further examination of the peat-containing contexts from the 'post-Roman' levels is also worthwhile since these are so distinctive and it would be of value to establish what other taxa are present in an essentially rather pure, unmixed assemblage, which might be used elsewhere as an indicator of burnt peat. Contexts for which further work on plant remains is recommended are indicated in Table 1.

Parasites

The *Trichuris* eggs seen in the 'squash' samples examined from Contexts 806 and 1697 were all rather poorly preserved (all were lacking both polar plugs). Comparison of the calculated size ranges for these eggs with data for modern trichurids indicated that the eggs seen were almost certainly of either *Trichuris trichiura* (Linnaeus) or *T. suis* (Schrank), the whipworms of humans and pigs respectively, or perhaps of both. It is particularly difficult to distinguish these two species purely by examination of their eggs as the normal size range for the eggs of *T. trichiura* is a wholly contained subset of that for *T. suis*.

Only a single ?ascarid egg was seen in the 'squash' from Context 1697. A low ration of ascarid to trichurid eggs has been interpreted as indicative of human rather than pig faeces (Taylor 1955), but this is not conclusive. Context 806 was interpreted as a ?garderobe fill and, as such, rather more likely to contain eggs of human parasites than those of pigs. The cess pit fill (Context 1697) could perhaps contain faecal material of mixed origins.

The presence of the parasite eggs clearly indicates that faecal material formed a component of these deposits. Their fairly poor state of preservation, together with the difficulties of identification outlined above, suggest that any further study of these remains would be of limited value, however.

Insect remains

A few of the washovers appeared to contain sufficient insects to form the basis of an interpretation of ecological conditions, and the material as a whole is certainly significant in relation to emerging patterns of change through time in urban fauna.

Further investigation of some of the well-dated insect assemblages is desirable, both in order to reconstruct conditions at the site and for use in future synthesis. Identifications will often be difficult as a result of the degree of decay, but should not be impossible given time.

Shell

The bias of the recovered shell towards edible taxa (particularly oyster), together with the evidence of shells having been opened using tools, strongly suggests that these assemblages derive almost exclusively from human food waste.

The most likely sources for the oysters are perhaps beds in Swansea Bay (the oyster beds

of Mumbles were among the most prolific in Britain by the late 17th century) or Cornwall, though they have been traded widely from the Roman period so sources further afield (e.g. the Kent, Essex or Sussex coasts) are not necessarily ruled out. Most of the remains are from Phases 1 and 2 (18th to 20th century) and certainly by the mid 19th century oysters were being dredged in huge numbers all along the Sussex coast (to the point of exhausting the beds).

It seems likely that all of the remains of other edible marine taxa were also derived from human food waste—the extremely small number of non-edible species having been collected accidentally. All of these taxa are common off the coast of Britain today.

The very few land snail remains were of no interpretative value.

Some limited further study of the oyster remains may be of use in site interpretation but the generally poor preservational condition of the shell severely restricts their value. For example, certain organisms (e.g. *Polydora* spp.) which infest oysters have known preferred habitats, and this might help to identify the source of the oysters, but surface erosion of the valves may prevent a determination of the particular species responsible for the burrowing damage on the present material. Only a few measurements of oyster valves could be taken, almost all from Phase 1 and 2 material, so that little study of changes in size through time (to explore patterns of exploitation or trade) would be possible.

Fish bone

A very biased picture of fish exploitation at this site in Chester would have been formed if the hand-collected material had been the only fish bone recovered from this site. The extensive programme of sieving has produced a well preserved assemblage, from which it is clear that fish, from the medieval period onwards, were a significant component of the diet.

Mostly marine or migratory fish are represented, with flatfish, eel and herring remains forming the bulk of the bones from most periods. Gadidae, both large (e.g. ling and cod), and small (e.g. whiting and cf. rockling) also provided components of the later medieval and post-medieval assemblages. A gradual increase in diversity was noted, with the later assemblages from the Tudor period onwards (Phases 1-4) showing the greatest variety of species; only Phase 2 deposits showed much evidence of the use of freshwater resources. The wider range of species present in the later periods is probably a reflection of the growth of coastal fisheries and the expansion of trading networks. This gradual increase in the importance of gadids and other offshore marine species (e.g. thornback ray and conger eel) has been noted at other urban sites in the medieval and post-medieval period (Enghoff 2000; Locker 2001).

Remains of large fish are mainly restricted to the hand-collected material and are not particularly numerous. If larger fish were being consumed in this area of Chester, as has been found at other urban sites (e.g. Scott 1991; Bond and O'Connor 1999), then the waste from such consumption must mostly have been deposited elsewhere. Generally, the remains from the samples seem to represent small individuals, and, whilst some (e.g. herring and eel) are probably food debris, others, such as the very small Gadidae, might be considered too small to eat. These species could perhaps represent the gut contents of larger fish. Preliminary observations also suggest that some of the material is derived from faecal matter and mostly this coincides with the excavators' interpretations of cess pit fills and garderobe deposits. Some slight variations in the occurrence of different species in different context types were apparent. Further analysis of species and body part representation would produce more

detailed information regarding the type of waste recovered and aid the interpretation of the different features found on the site.

The importance of the fish remains recovered from the excavations at Bridge Street is that they have the potential to provide information from a sequence of deposits covering a broad chronological period. Using data from these remains, it may be possible to address a number of questions regarding the dietary preferences and status of the inhabitants in this particular part of Chester, the supply of marine and freshwater fish through time, and general aspects of fish exploitation in the region.

It is recommended that all well-dated fish assemblages from the samples should be recorded in detail (including the collection of biometrical data), with the objective of providing basic information regarding species and body part representation, size range of species, and some interpretation concerning the exploitation of past fish stocks. A basic archive should be made of the hand-collected material.

Retention and disposal

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

Archive

All relevant 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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Table 1. Bulk-sieved samples from Bridge Street, Chester: major components of washovers and distribution of some significant plant remains. Order of contexts is numerical within phases erected by ARH on the basis of information available from the excavator at the time this report was compiled. The excavator assigned phases are given in the column headed **PhE**. *Contexts marked with an asterisk are considered worthy of further examination and more detailed recording for plant remains.*

Phases (Ph) into which contexts have been grouped for this table: 1—Roman (incl. early Roman); 2—Roman/post-Roman; 3—post-Roman; 4—early medieval; 5—14th c. and late medieval; 6 —16th c.; 7—16th/17th c.; 8—17th c.; 9—17th/18th c.; 10—18th c.; 11—19th c.; 12—19th/20th c.; 13—20th c.; 14—phase currently unknown. Scores in the form of '+'s are abundance scores on a three-point scale (from rare to abundant, cf. text) *—for cereals, pulses, *Ulex*, and for *Ficus/Vitis*, sums of amounts for each separate part or taxon recorded in a sample are given. Abbreviations: charc—charcoal; cindr—cinders; ch—charred. Residue weight shown where provided by excavator.

Context	Sample	Context type	Ph	PhE	Sample volume (l.)	Residue weight (kg)	charc	coal	cindr	ch peat	ch cereal *	ch pulses	*Ulex**	*Ficus +Vitis* *	Other taxa/ remains
37	5102	fill of stone-capped drain [evaluation]	1	4	9	1.6	+		+		1		2		
276	5015	clay layer	1	7	10	1.4	+				1				
1026	5126	floor ?+foundation layer	1	7	15	8.6	+								
1040	5117	fill of small pit cut into Roman ?layer	1	6	15	1.3	+	+			1				
1148	5132	lower (?primary) fill of culvert	1	7	60	36.2	+								
1219	5130	upper fill of stone culvert	1	7	60	11.6	+		+		1				
1220	5131	lower fill of stone culvert	1	7	60	14.9	+								
1221	5127	post hole fill	1	6	20	2.7	+								
1242	5135	bone-rich layer cut by Rom stone-lined culvert	1	7	60	12.1	+	+			1				
1243	5133	'cessy' fill of roadside ditch	1	6	30	6.0	+				1				
1250	5134	charcoal rich layer under	1	7	40	3.6	+								

Context	Sample	Context type	Ph	PhE	Sample volume (l.)	Residue weight (kg)	charc	coal	cindr	ch peat	ch cereal *	ch pulses	*Ulex**	*Ficus +Vitis* *	Other taxa/ remains
		early Roman deposit													
1388	5136	?occupation deposit over surface 1394	1	7	60	7.2	+		+		1				
1392	5139	fill of drain feature	1	7	20	0.9	+								
121	5107	occupation deposit just above an Op-Sig floor	2	6	8	1.7	+		+		1				
1138	5129	base to possible pit/?top fill of culvert	2	6	60	16.6	+				2				
272	5014	green-brown 'cess' layer	3	6	30	2.6	+	+			3				
278*	5016	outer of concentric fills of ?ash pit 277	3	6	10	0.5	+			++	6	3			
279*	5017	middle of concentric fills of ?ash pit 277	3	6	10	0.5	+			+	2	2			
280*	5018	inner of concentric fills of ?ash pit 277	3	6	10	3.2	+				4				
281*	5019	primary fill of ?ash pit 277 - under 278-280	3	6	10	2.6	+	+	+	+	2				
973	5094	layer on Roman floor: ?occupation layer sealed by destruction debris	3	6	30	5.5	+	+			1				
1022	5098	layer containing residual Roman pottery	3	6	60	14.9	+		+		2				
1030	5114	pit/negative feature with sandy/'cessy' fill	3	6	60	15.7	+				2				

Context	Sample	Context type	Ph	PhE	Sample volume (l.)	Residue weight (kg)	charc	coal	cindr	ch peat	ch cereal *	ch pulses	*Ulex**	*Ficus +Vitis* *	Other taxa/ remains
1033	5099	pit fill sealed by clay surface	3	6	30	5.4	+		+		2				
1034	5116	post hole sealed by clay surface	3	6	20	1.8	+	+			2				
1041	5115	charcoal/ashy layer - ?primary pit fill	3	6	9	0.8	+								
490	5058	?	4	5	60	12.5	+		+		3			1	
1175	5124	dark 'cessy' fill of shallow pit cut into Roman	4	6	50	9.6	+				3			1	
261*	5010	rubbish/midden spread or ?cultivation deposit	5	5	60	10.8	++	+			4	2			
264	5012	charcoal rich layer	5	5	20	0.7	++								
266	5013	silty clay layer	5	5	30	5.7	+		+		1				
1021	5095	pit fill (lower or primary)	5	5	50	5.6	+	+	+		2				
1130	5123	fill of culvert with bdy ditch	5	4	30	2.5	+				1				
1162	5122	charcoal rich fill of pit 1163	5	5	50	9.6	++								
1387	5144	?occupation deposit over sandstone floor	5	1	30	5.8	+				2				
1579 /1516*	5152	layer within stone structure; excavation revealed a flue and stoke hole	5	4/5	30		+	+	++		6				charred oat awns +

Context	Sample	Context type	Ph	PhE	Sample volume (l.)	Residue weight (kg)	charc	coal	cindr	ch peat	ch cereal *	ch pulses	*Ulex**	*Ficus +Vitis* *	Other taxa/ remains
1585	5153	?rake out debris from oven feature	5	4/5	20		+	+	+		1				
1632*	5161	green-brown sandy 'cessy' pit fill	5	4	30	242.7			++		3			3	?faecal concretions ++; some oat grains sprouted
768	5084	fill of ?oven	6	4	30	4.6	+		+						
770	5120	sealed fill within oven flue	6	4	30	5.4	+	+	+						
785*	5073	deposit within cellar backfill	6	4	60	13.0	++	+	+++		2		10	2	some barley grains sprouted
791	5075	pit/cellar fill	6	4	60	9.9	+	+	+		2			2	
797	5077	layer towards base of cellar	6	4	60	10.9	+	+	+		1			2	
798	5079	dark fill of small negative feature in cellar fill	6	4	100	12.5	+		+++		1		2		
806*	5081	contained within cellar - possible garderobe 487	6	4	60	5.5	+		+					4	?faecal concretions +
888	5088	charcoal rich spread in oven flue	6	4	15	1.9	+		+			2			
992	5097	fill of drain - ?cessy	6	4	30	9.0	+	+						1	
1697	5171	soft 'cessy' material cut by two pits	6	4	60		+		++					3	charcoal from oak

Context	Sample	Context type	Ph	PhE	Sample volume (l.)	Residue weight (kg)	charc	coal	cindr	ch peat	ch cereal *	ch pulses	*Ulex**	*Ficus +Vitis* *	Other taxa/ remains
															roundwood
1699	5167	fill of horncore lined pit	6	2	30		+	++	++				2	2	
1702*	5169	bone rich ?primary fill of pit	6	4	60		+	+	+					3	faecal concretions ++
442	5038	primary pit fill - greenish 'cessy' clay	7	3	60	9.4	+	+	+		2			4	
	5080	primary pit fill - greenish 'cessy' clay	7	3	6	0.9	+	+	+						
467	5044	fill of negative feature 468	7	2	60	22.2	+		+		1			1	
608	5043	pit fill	7	2	15	5.6		+	+						
670	5056	?	7	2	60	4.9	+	+	+		1		2	2	
671	5071	fill of ?cellar	7	4	60	11.1	+	+					2	1	
60	5103	cess pit fill [evaluation]	8	1	9	1.6			+		1			1	
245	5008	fill of rectangular pit 244	8	2	30	5.9	+	++	++				1	1	
489	5060	cess pit fill	8	2	20	0.9	+	+	+				1	2	
777	5061	fill of brick structure - ?oven	8	3	16	1.4	+						2		
1505	5146	?cessy upper fill of ?garderobe	8	2/3	20	2.1	+	+	+		3		2	1	
1513	5148	?midden deposit	8	2/3	60	13.7	+	+	+++		2			1	

Context	Sample	Context type	Ph	PhE	Sample volume (l.)	Residue weight (kg)	charc	coal	cindr	ch peat	ch cereal *	ch pulses	*Ulex**	*Ficus +Vitis* *	Other taxa/ remains
1515*	5150	lower fill of pit - ?garderobe/cess pit	8	3	30	3.5	+	+	++		1		7	4	box leaf fgts +
237	5006	?cultivation deposit (48cm thick)	9	2	80	9.5	+	+++	+++		5			1	
237	5007	?cultivation deposit (48cm thick)	9	2	5		+	+	+					1	
1437	5151	lower pit fill	9	2	60	8.3	+	++	+++					3	
206	5001	fill of shallow feature	10	1	9	1.8	+	++	++					2	
223	5005	?pit fill	10	1	30	4.3	+	+++	++		1			1	
341	5026	layer	10	1	100	19.6	+	+	++		3			1	some barley grains sprouted
431	5041	pit fill	10	3	60	16.3	+		+		2		1	1	
455	5142	dark garden soil	10	2	60	9.8	+	+	++						
463	5045	pit fill - negative feature 465	10	2	60	10.6			+++		2			3	
464	5046	fill of pit 465	10	2	60	18.4	+	+	+					3	
520	5035	fill of pit 519	10	2	60	9.9	+	+	++		3			1	some barley grains sprouted
545	5032	fill of small pit 544	10	1	20	4.2			+		1			1	
546	5033	fill of small pit 544	10	1	8	2.2			+			1		1	
547	5034	primary fill of small pit	10	1	10	2.3	+	+	+						

Context	Sample	Context type	Ph	PhE	Sample volume (l.)	Residue weight (kg)	charc	coal	cindr	ch peat	ch cereal *	ch pulses	*Ulex**	*Ficus +Vitis* *	Other taxa/ remains
		544													
559	5036	fill of pit 519	10	2	30	4.9	+	+	+		2			1	some oat grains sprouted
583	5042	fill of negative feature 345	10	1	10	3.1		+	+					1	
1486	5143	green-grey 'cessy' deposit	10	2	30	3.4	+	+	+					2	
1556	5155	bone and charcoal rich pit fill	10	2	30		+	+	+						
1558	5149	dark grey-green layer in ?garderobe	10	3	25	2.2	+		+		1		3	1	
1599	5158	fill of stone lined pit	10	2	30		+	+	++		1		1	2	
1607	5159	bone rich pit fill	10	2	30		+	+	++					3	
1608*	5162	?	10	2	60			+	++		1			1	hop fruits ++ (some mineralised)
1695	5168	pit fill	10	2	30		+	+	++		3			3	
1881	5170	primary fill of horn core pit	10	2	60		++		++		1			1	
207	5004	compact ?surface	11	1	60	11.6	+	+	+++					2	
208*	5002	fill of ash pit	11	1	60	9.8	+	+++	+++		4				?box leaf fgts +; part-charred rye rachis

Context	Sample	Context type	Ph	PhE	Sample volume (l.)	Residue weight (kg)	charc	coal	cindr	ch peat	ch cereal *	ch pulses	*Ulex**	*Ficus +Vitis* *	Other taxa/ remains
															fragments +
217	5003	rubble ?assocd with fireplace	11	1	30	8.8	+	++	++		1			1	
515	5030	fill of cut 514	11	2	30	7.5	+		++	?	1				
325	5020	fill of pit	12	1	30	3.5	+	++	++		1			2	
352	5021	fill of linear feature 336	12	1	60	13.2	+		+++		3	1	1		
353	5022	fill of negative feature	12	1	5	1.3			+						
353	5023	fill of negative feature	12	1	6	1.7	+		+						
375	5024	fill of negative feature	12	1	50	21.1	+		+		3				
424	5027	discrete layer in drain fill	12	1	10	3.9	+		+					3	tomato seeds +
1635	5166	?	13	4	30		+		++		1		3	2	
26	5100	cess pit fill [evaluation]	14	3	10	1.5	+		++		1		1		
31	5101	[evaluation]	14	4	5	0.8	+		+						
75	5104	? [evaluation]	14	7	18	1.3	+								
98	5105	? [evaluation]	14	7	8	1.5	+								
113	5106	? [evaluation]	14	3	8	2.6	+	+	+						
126	5108	? [evaluation]	14	7	8	1.4	+								
131	5109	? [evaluation]	14	7	9	2.7	+		+		1				
142	5110	? (evaluation)	14	7	16	2.6	+								

Context	Sample	Context type	Ph	PhE	Sample volume (l.)	Residue weight (kg)	charc	coal	cindr	ch peat	ch cereal *	ch pulses	*Ulex**	*Ficus +Vitis* *	Other taxa/ remains
143	5111	? (evaluation)	14	7	8	0.5	+								
157	5112	? [evaluation]	14	7	6	0.8	+								
161	5113	? [evaluation]	14	7	8	1.4									
384	5025	fill of linear feature (gully) 345	14	1	40	13.3	+	+	++		1			1	
429	5031	upper fill of pit	14	3	60	13.7	+	+	++		2			1	
451	5040	fill of negative feature	14	1	20	5.3		+	+					3	tomato seeds ++
493	5057	post hole fill	14	5	5	1.6	+				2			1	
507	5028	fill of negative feature	14	1	60	8.5	+	+	+		2			1	
566	5039	burrow fill (incorporates some distd mtl from 565)	14	2	5	0.8	+		+		2		2	1	
1015	5096	very moist clay-rich pit fill	14	6	35	6.5	+				1				
1174	5125	post-hole fill	14	5	100	21.4	+		+		4				

Table 2. The more frequently recorded and/or interpretatively significant components of BS samples (mainly from washovers; excludes mainly 'one-off' records). For each component and phase (see caption to Table 1), the number of contexts in which it was recorded is given.

Key and explanation: 'ash beads' are whitish vesicular structures usually a few millimetres in diameter which seem to be associated with the burning of herbaceous plant material and perhaps also materials like peat. 'Seed base cups' are small limpet-like structures found at the distal end of apple pips. ch—charred; cot—cotyledon(s); endo—endocarp; —; fgts—fragments; fl—flower(s); inc—including; lef—leaf epidermis fragments; lf, lfy, lvs—leaf, leafy, leaves; min—mineral-replaced; rt-tw—root/basal twig; s—seed(s); sht—shoot; sil—silicified; spklts—spikelets; spr—sprouting; unch—uncharred; w/l—waterlogged (i.e. preserved by anoxic 'waterlogging'). 1+?1 indicates presence of item plus a further record from another context of a tentatively identified specimen (or specimens). Plant remains identified to genus or species are assumed to be uncharred and unmineralised unless otherwise indicated, except for cereals, where the default is that they are charred unless otherwise indicated.

PhE	**7**	**6**		**5**		**4**		**3**	**2/3**	**1/2**	**1**			**-**
ARH Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
No. contexts examined	13	2	11	2	10	13	5	7	2	21	4	5	1	19
'ash beads'	2	1	6	1	3	1	1		1	4				2
Concretions and other mineralised material														
concretions								1						
faecal concretions					1	1+?1								
mineralised seeds/embryos		1				2		1	1	5				2
Peat														
peat fgts (ch)			3								?1			
?peat ash			1											
Charcoal and other fuel														
charcoal	13	2	11	2	10	12	4	6	2	14	4	5		18
Fraxinus excelsior (charcoal)			1		3					1				2
Quercus (ch roundwood)								1						
Quercus sp(p). (charcoal)		1	4		3	5				4	2	2		2

PhE	**7**	**6**		**5**		**4**		**3**	**2/3**	**1/2**	**1**			**-**
ARH Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
twig fgts (ch)	1		1	1		4	2	4	1	3	1	1	1	3
cinders	3	1	3	1	5	12	4	6	2	21	4	5	1	10
coal	2		4		4	7	4	5	2	15	3	1		5
Cultivated, ?cultivated and collected plants														
Aquilegia cf. *vulgaris*												1		
Avena sativa (spklts/fgts)			2								1			1+?1
Avena sp(p).	1	1	4	2	3	2	2	2	1	8	1	3		4
Avena sp(p). (part-ch)			1											
Buxus sempervirens (lvs/fgts)								1			?1			
Calluna vulgaris (ch sht fgts)											1			
Calluna vulgaris (sht fgts and tips)											1			
cf. *Calluna vulgaris* (ch rt-tw fgts)			2						1					
cf. *Calluna vulgaris* (ch sht fgts)										1				
cf. *Calluna vulgaris* (rt-tw fgts)										1				
Cannabis sativa										1				
Cerealia indet.	1	1			1	1					2	1 min		
Corylus avellana (ch)	3		2	1	2	4		1		1	2+1 unch			
Ficus carica				2	1	8	4	6	2	18	2	2	1	6
Fragaria cf. *vesca*										1				1
Hordeum sp(p).	1		5	2	3+1h	1spr		3	1	4		1+1h	1	4

PhE	**7**	**6**		**5**		**4**		**3**	**2/3**	**1/2**	**1**			**-**
ARH Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
										(2 spr)				
Humulus lupulus										1				
Linum usitatissimum (sf)													1	
cf. *Lycopersicon esculentum*												1		1
Malus sylvestris							1	1		1				
Malus sylvestris (endo)								1						
Malus sylvestris (min)		1				1		1	1	2				
Malus sylvestris ('seed base cups')								1						
Pisum sativum			?2		?1	1				?1				
Rubus cf. *idaeus*	1													
Rubus fruticosus agg.			1	1	1	4	4	4	2	12	2	4+?1		5
Rubus idaeus						3	2	2		8	1	2		2
Secale cereale			2+?3		1				1					
Secale cereale (part-ch rachis fgts)											1			
Triticum aestivo-compactum	1+1		2+?1		2+?1	?1	1	1+?1	1	4		1		3+?1
Triticum sp(p).	2	1	7	2+?1	5	1	1		1	2		1		2
Ulex sp(p). (ch fl buds)						1		1		1				
Ulex sp(p). (ch lf/lvs)	1					3	2	4		2		1	1	2
Ulex sp(p). (ch pods/fgts)						1								
Ulex sp(p). (ch tw fgts)						3		3		2			1	

PhE	**7**	**6**		**5**		**4**		**3**	**2/3**	**1/2**	**1**			**-**
ARH Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
cf. *Ulex* sp(p). (ch tw fgts)	1									1				
Ulex sp(p). (lf/lvs)	1						2	1					1	
Ulex sp(p). (lfy sht fgts)								1						
Ulex sp(p). (min lf/lvs)						1								
Ulex sp(p). (min tw fgts)						1								
Ulex sp(p). (part-ch fl buds)						1								
Ulex sp(p). (pods/fgts)								1						
Vicia faba (ch seeds, cot and testa)			2		1	2						1		
Vitis vinifera						2	1	1		2	1	2	1	1
Vitis vinifera (min)					1	3	2	1	1	4				
Weeds and other wild plants														
Aethusa cynapium								1		6	1	3		2
Atropa bella-donna						1		1		1				1
Carex sp(p).			4 ch 2 sil	1	3	4	4+1 ch	2	1	1+1 ch	3	1		
Eleocharis palustris sl (sil)			3											
Euphorbia helioscopia			1		1	2	2	1	1	2	2	2		2
Gramineae (ch)			1	1		1	1			1		1		
Hyoscyamus niger						1	1	1				1		
Sambucus nigra	6	2	6	2	7	6+1ch	4	4	1	16	3	3		12
Viola sp(p).						3	1	1	1	3	3	2		

PhE	**7**	**6**		**5**		**4**		**3**	**2/3**	**1/2**	**1**			**-**
ARH Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Animal remains and materials														
beetles				1	1	3	2	2		5	2	2		2
bone fgts	6	1	3	1	4	8	2	6	2	16	3	5		9
burnt bone fgts			1		1	1				3	1	1	1	3
burnt fish bone						1							1	
eggshell fgts						2		1		1	1			
eggshell membrane fgts						1		1			1			
fish bone	2	1	3	2	2	2	2	4	1	9	2	1	1	3
fish scale	1	1	1			2	1	3	1	8	3	4		2
fly puparia			2ch		1	1	1	1		2	2	1		
fly puparia (min)								3	1	3				1
leather fgts									1	1	3			
small mammal bone						1			1		1	1		
snails										2		3		

Table 3. Bridge Street, Chester. Notes on invertebrate remains from the GBA samples. Preservation notes follow Kenward and Large (1998).

Context	Sample	Phase	notes	preservation (where appropriate)
206	5001	1	Some insects, though well-decayed and yellow. *Aphodius,* ?*Quedius, Tipnus unicolor* (Piller and Mitterpacher), ?*Typhaea stercorea* (Linnaeus), *Cryptophagus scutellatus* Newman, ?*Mycetaea hirta* (Marsham). Many fragments of cuticle, some characteristic. Not a very large fauna but deserves careful investigation.	E4 F4 change to yellow 4
208	5002	1	Some charred ?insect fragments. No identifiable invertebrates seen.	
245	5008	2	Traces of decayed cuticle.	
424	5027	1	Small numbers of pale insect fragments including *Anobium punctatum* (Degeer) and several fly puparia; one landsnail.	
429	5031	3	earthworm egg capsule and fragments. No other invertebrates seen.	
464	4046	2	A few, very decayed, insect remains; *Omalium* sp., ?*Coprophilus striatulus* (Fabricius).	
670	5056	2	Traces of cuticle including a dermestid beetle and some other beetle scraps, often unidentifiable. One *Coprophilus striatulus*, less pale and perhaps intrusive.	E4 F4 change to yellow 4
797	5077	4	Traces of cuticle, including some earthworm egg capsules.	
806	5081	4	Appreciable numbers of insects, characteristic 'restricted urban' fauna. Several *Tipnus unicolor*, *Blaps* sp., *Catops* sp., *Trox scaber* (Linnaeus), *Aglenus brunneus* (Gyllenhal), *Ptinus* sp. Certainly deserves further work, to gather data for ecological reconstruction and for future synthesis.	E 4.0-5.0 mode 4 distinct; F 2.5-5.0 mode 3.0 weak, pale yellow 3-4
1632	5161	4	Moderate numbers of insect remains; some puparia, beetles including *Hister* sp. (s.. lat.), *Philonthus* sp., ?*Tipnus unicolor*, Omaliinae sp., *Cercyon* sp., ?*Omalium* sp. Probably enough remains for an interpretation, although identification difficult.	E4 F4 Yellow 3
1635	5166	4	Moderate numbers of beetles and traces of unidentified cuticle. *Tipnus unicolor*, *Aglenus brunneus*, *Cercyon* sp., *Ptinus* sp., Aleocharinae sp. Probably enough remains for an interpretation.	E4 F4 Yellow 3
1697	5172	4	Abundant cuticle fragments. *Cryptophagus* sp., many puparia, *Omalium* sp., several *Tipnus unicolor*, *Cercyon* sp. Certainly enough remains for a reconstruction and valuable in synthesis.	E 4.0-4.5, mode 4.0 weak; F 2.5-4.0, mode 3.0 weak; pale yellow 3-4, mode 4 strong

Table 4. Bridge Street, Chester. Number of contexts containing hand-collected shell by phase.

Phase	**Number of contexts**
unphased	35
1	74
1/2	1
2	39
2/3	1
3	17
3?	1
3/4	2
3/4?	1
4	15
4/5	2
5	5
6	3
7	2
Total	198

Table 5. Bridge Street, Chester. Hand-collected shell counts by phase. Counts for bivalve taxa are minimum numbers of whole valves. Counts for other taxa are minimum numbers of individuals.

	Phase													
Taxon	**1**	**1/2**	**2**	**2/3**	**3**	**?3**	**3/4**	**?3/4**	**4**	**4/5**	**5**	**6**	**7**	**Total**
Limpet (*Patella vulgata* L.)	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Top shell (Trochidae sp. indet.)	-	-	1	-	-	-	-	-	-	-	-	-	-	1
Periwinkle (*Littorina littorea* (L.))	-	-	5	-	1	-	-	-	-	-	-	-	-	6
Flat periwinkle (*Littorina ?obtusata* (L.))	2	-	2	-	-	-	-	-	-	-	-	-	-	4
?Auger shell (?*Turritella communis* Risso)	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Red whelk (*Neptunea antiqua* (L.))	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Mussel (*Mytilus edulis* L.)	20	-	2	-	2	-	-	-	11	-	-	-	-	35
Oyster (*Ostrea edulis* L.)	307	1	195	3	10	7	1	2	32	4	6	1	3	572
Cockle (*Cerastoderma edule* (L.))	31	-	27	-	1	-	-	1	-	-	1	-	-	61
?Tellin (?Tellinidae sp. indet.)	-	-	4	-	-	-	-	-	-	-	-	-	-	4
Total (marine taxa)	363	1	236	3	14	7	1	3	43	4	7	1	3	686
Helix sp.	-	-	1	-	-	-	-	-	-	-	-	-	-	1

Table 6. Bridge Street, Chester. Additional notes on oyster valves summarised by phase. ***Key:*** *'Right valves' = number of right (or upper) valves; 'Left valves' = number of left (or lower) valves; 'Indet. valves' = number of valves of indeterminate side; 'Knife marks' = number of valves showing damage characteristic of the oyster having been opened using a knife or similar implement; 'Measurable?' = estimated number of valves intact enough to be measured; 'Worm burrows' = number of valves showing damage by polychaet worms; 'Barnacles' = number of valves with barnacles; 'Dog whelk' = number of valves showing damage from dog whelk boring.*

Phase	Right valves	Left valves	Indet. valves	Knife marks	Measurable?	Worm burrows	Barnacles	Dog whelk
1	130	143	34	80	33	11	3	0
1/2	0	1	0	0	0	0	0	0
2	99	79	17	57	35	25	6	0
2/3	1	2	0	0	0	0	0	0
3	3	6	1	5	2	0	0	0
?3	2	3	2	2	0	0	0	0
3/4	1	0	0	0	0	0	0	0
?3/4	1	1	0	0	0	0	0	0
4	8	20	4	10	4	0	0	0
4/5	3	1	0	2	0	0	0	0
5	4	2	0	3	2	0	1	0
6	0	1	0	0	0	0	0	0
7	1	2	0	0	0	0	0	0
Total	**253**	**261**	**58**	**159**	**76**	**36**	**10**	**0**

Table 7. Bulk-sieved samples from Bridge Street, Chester: Fish remains from different phase groups (using information supplied by the excavators), whereby '+' indicates the presence of a species and '++' indicates that that species/family were predominant amongst the remains from that particular sample. Key: Ph = phase group; Size = approximate number of fish bones recovered from sample; incl. = including; unid = unidentified.

Ph	Context	Sample	Size	ray/shark family	herring	eel	smelt	gadid	small gadid	flat fish	cyprinid	salmonid	other taxa
?	1579	5152	s (c. 10)							+			
1	60	5103	s (5)		+					?flat fish			
1	207	5004	s-m (c. 100)	+	+	+							?perch
1	208	5002	s (c. 15)		+								
1	217	5003	s-m (c. 75-100)		+	+				+			
1	223	5005	s (c. 50)	+	+				+	+			
1	325	5020	s (c. 30)	+	+				+	+			
1	341	5026	s-m (c. 75)		+	+		incl. ling	?whiting				
1	352	5021	m (c. 100-150)	+	+			+	?whiting	+			
1	353	5022	s (c. 20)										?perch
1	353	5023	s (c. 15)						+				?anchovy
1	375	5024	s (c. 50)		+	+				incl. sole			
1	384	5025	s (c. 5)										all unid
1	424	5027	s (c.15)							+			
1	507	5028	m (c. 100-150)	+	+	+				+		?trout	
1	545	5032	m (c. 100-150)		+	+				++			
1	546	5033	s (c. 5)										all unid
1	547	5034	s (c. 5)		+								
1	583	5042	s (1)		+								
1	1387	5144	s (c 25.)		+	+			?rockling	+			
2	206	5001	s (c. 10)										all unid
2	237	5006	m (c. 100-150)		+	+		incl. ?cod		+			?stickleback
2	237	5007	s (5)										all unid
2	245	5008	m (c. 100-150)		+	+		incl. ?haddock		+			
2	455	5142	s-m (c. 75)	+	+			+		+			
2	463	5045	s (c. 10)		+	+							
2	464	5046	s (c. 50)		+	+			+	incl. sole			

Ph	Context	Sample	Size	ray/shark family	herring	eel	smelt	gadid	small gadid	flat fish	cyprinid	salmonid	other taxa
2	467	5044	s (2)										
2	489	5060	s-m (c. 75-100)		+	++	+		+	+			
2	515	5030	s-m (c. 75-100)		+	?eel		incl. haddock		+			
2	520	5035	s-m (c. 75-100)		+			+		+	?cyprinid		
2	559	5036	s-m (c. 75)		+	+			?whiting	+			
2	566	5039	s (c. 10)										all unid
2	670	5056	s (c. 10)										all unid
2	1437	5151	m (c. 100-150)	+	+	+	?smelt		+	+			
2	1486	5143	s-m (c. 75-100)			++				+	+	+	?perch
2	1556	5155	s (fb)	+									
2	1599	5158	s (c. 50)	+	+					+			
2	1607	5159	l (c. 200+)	?thornback	+	++	+		+	+			
2	1608	5162	s (c. 50)	+	+	+	+						
2	1695	5168	s (c. 50)		+	+				+			
2	1699	5167	s-m (c. 75-100)	+	+	+					?cyprinid		
2	1881	5170	s (c. 15)							+		?salmonid	
2/3	1505	5146	s (c. 25)		+				+	+			
2/3	1513	5148	l (c. 200+)	+	+	+	?smelt	incl. ?pollack/ saithe	+	+	+	?trout	?conger eel
3	26	5100	s (14)							+			
3	431	5041	s (c. 25)		+			?gadid		++			
3	442	5038	s (3)										all unid
3	442	5080	s (5)										all unid
3	442	5089	s (c. 25)		+					+			
3	725	5076	s (2)										
3	804	5086	s (8)		+								
3	805	5090	s (4)							+			
3	1515	5150	s (c. 30)	+	+	+				+			
3	1558	5149	s. (c. 30)		+								
4	31	5101	s (c. 50)		+	+			+	+		+	
4	37	5102	s (c. 20)			+		+		+			

Ph	Context	Sample	Size	ray/shark family	herring	eel	smelt	gadid	small gadid	flat fish	cyprinid	salmonid	other taxa
4	671	5071	s (c. 30)		+					+			
4	765	5078	s (c. 50)							+			
4	768	5084	s (c. 50)			+				+			
4	785	5073	l (c. 200+)		+	+				++			
4	791	5075	l (c. 200+)	+	+			+		+			
4	797	5077	s-m (c. 75)	+	+	+			?rockling	+			?conger eel
4	798	5079	l (c. 200+)		+	+	?smelt	+		+			
4	806	5081	l (c. 200-250)	+	+	+	+	+		incl. sole		+	?conger eel
4	888	5088	s (c. 50)		+					+			
4	1632	5161	s (c. 30)	+				+		+			
4	1635	5166	l (c. 200+)	+		+			+	++			
4	1697	5171	l (c. 200+)	+	+	++		incl. ling	+	+		+	
4	1702	5169	m (c. 100-150)	incl. ?tope	+	+	+		+	++			
4/5	1585	5153	s (c. 20)		+	+			+				
5	261	5010	m (c. 150-200)		+	+	?smelt	incl. haddock	?whiting	+			
5	264	5012	s (c. 30)		+	+			+				
5	266	5013	s (c. 20)		+	+							
5	490	5058	s (c. 40)		+	+			+	+		+	
5	493	5057	s (10)		+	+							
5	1021	5095	s (c. 5)		+								
6	121	5107	s (2)		+								
6	272	5014	m (c. 100-150)		+	+				+			
6	279	5017	s (2)							+			
6	280	5018	s (2)		?herring								
6	973	5094	s (10)										
6	1015	5096	s (c. 10)							+			
6	1022	5098	s (c. 35)		+	+				+			
6	1030	5114	s (c. 25)		+	+				+			
6	1033	5099	s (c. 20)		+					+			
6	1034	5116	s (c. 10)		+					+			
6	1040	5117	s (c. 10)							+			
6	1041	5115	s (c. 10)										?conger eel

Ph	Context	Sample	Size	ray/shark family	herring	eel	smelt	gadid	small gadid	flat fish	cyprinid	salmonid	other taxa
6	1138	5129	s-m (c. 75)		+	+	?smelt		+			+	
6	1243	5133	s (c. 15)			+		?gadid					
7	98	5105	s (5)										all unid
7	126	5108	s (2)							+			
7	131	5109	s (1)					?gadid					
7	142	5110	s (1)										
7	276	5015	s (5)										all unid
7	1242	5135	s (c. 10)										?mackerel
7	1250	5134	s (c. 10)							+			
7	1388	5136	s (2)										
7	1392	5139	s (5)							+			

Table 8. Bridge Street, Chester. A brief summary of material sorted from the BS residues which arrived too late to be fully included in this assessment. The fish bone column gives the approximate number of recovered fragments.

Phase	Context	Sample	charcoal	other plant	shell	?coprolite	fish bone
4	770	5120	approx. 100 ml	-	-	-	25
4	1130	5123	approx. 10 ml	2 wood fragments to 10 mm	-	1	6
5	1162	5122	approx. 400 ml	a few charred ?seed fragments	-	-	35
6	1138	5129	approx. 100 ml	-	some fragments and ?shell fragments to 20 mm	-	75
6	1175	5124	approx. 100 ml	a few charred ?hazelnut fragments; a charred grain; a few charred ?seed	a few fragments to 7 mm	1	50
6	1179	5125	approx. 10 ml	a few charred grains and seeds	-	fragments	50
6	1221	5127	approx. 75 ml	-	-	-	8
7	1148	5132	approx. 10 ml	-	38 g of very rotted shell fragments – mostly oyster with some mussel	-	100+
7	1219	5130	approx. 15 ml	-	-	-	20
7	1220	5131	approx. 50 ml	-	-	-	50