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## **Plant and invertebrate remains from Anglo-Scandinavian deposits at 16-22 Coppergate, York: Technical Report**

### **Part 1: Period 3**

#### **Summary**

*This Technical Report provides a sample-by-sample account of the plant and macrofossil and invertebrate remains (apart from hand-collected shell) from deposits dated to the earliest part of the Anglo-Scandinavian sequence (Period 3: mid 9th-late 9th/early 10th century) at 16-22 Coppergate. Samples are arranged into groups according to the position of the context from which they were taken by feature type or location on the site.*

**Keywords:** YORK; ANGLO-SCANDINAVIAN (PERIOD 3);16-22 COPPERGATE; PLANT MACROFOSSILS; PARASITE EGGS; INSECTS; FLY PUPARIA

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# Plant and invertebrate remains from Anglo-Scandinavian deposits at 16-22 Coppergate, York: Technical Report

## Part 1: Period 3

### Introduction to this series of data archives and *Technical Reports*

The account of the non-vertebrate biological remains from Anglo-Scandinavian deposits at 16-22 Coppergate presented by Kenward and Hall (1995) was necessarily extremely condensed and it was impossible to publish, even in microfiche, the very large volume of data (there were at the time of writing, for example, nearly 19,000 records of identifiable plant remains from samples from 397 contexts, and about 25,000 records of adult beetles and bugs representing over 53,000 individuals). These archives and *Technical Reports*, published as *Reports from the EAU, York*, are intended as a means of placing on record the data behind the narrative of Kenward and Hall (1995).

In the data archives, information concerning timber identifications, records of other macrofossil plant remains, of insects, and of other invertebrate groups, is presented separately. The datasets for some of these groups are too extensive to produce under single covers and are thus presented as a series of separate parts. Unless stated otherwise, data have normally been sorted by context number to facilitate cross-reference with lists of contexts, samples and phasing information.

In the *Technical Reports*, accounts are structured by period, tenement and feature type, and include brief outlines of the implications of the recorded biota at the sample or subsample level.

(N.B. An account of the stratigraphic sequence and, in particular, the nature of the structures recorded, is in preparation at the time of compiling these archives and reports. The phasing used here follows that provided by York Archaeological Trust during 1997 and may be subject to slight modification when the sequences are eventually

published.)

Abbreviations used for type of sample (see Dobney *et al.* 1992):

BS	'bulk-sieved' sample
C14	sample for radiocarbon dating
GBA	'general biological analysis' sample
Spot	'spot' sample

For GBA subsamples, '/T' indicates a 'test' subsample (*sensu* Kenward *et al.* 1986; Kenward 1992) usually examined for both insect and plant remains; '/M' represents a subsample specifically processed for recovery of plant remains alone (usually of 0.5 kg, with '+' used to indicate subsamples larger than 0.5 kg and '\*' indicating those of smaller weight); '/1', '/2' etc. are subsamples for which insects have been studied, but plant remains usually have not. A set of additional subsamples—mostly from floors of Period 4B—examined during 1998 and intended in part to plug some gaps in the coverage of context type and tenement, is designated by '/T3'; most of these were of 2 or 3 kg.

For BS samples, 'V' indicates that remains extracted by 'rough sorting' from the residue have been recorded (i.e. they have only been examined during general sorting for all classes of remains and also for artefacts, by staff or volunteers with little archaeobotanical expertise). 'W' and 'R' indicate that material from the washover and from the residue, respectively, has been examined by means of a more thorough examination (by ARH).

### Methods

Practical and interpretative methods are summarised in the publication text. For insect

remains see also Kenward *et al.* (1986) and Kenward (1992).

## Results of the analyses

For each of the periods covered by the separate *Technical Reports* in this series, material is discussed under feature types in the following order:

- (i) contexts forming part of a structure, including post-pits, construction trenches, and so on, and alignments of posts and/or wattle;
- (ii) floors and other deposits within buildings—these include contexts identified by the excavators as ‘made’ floors *sensu stricto*, and the deposits that built up on them during use, other use-phase deposits (including hearths and the fills of cuts of all kinds inside buildings), and dumps and other backfills of building cuts;
- (iii) external deposits immediately around and between buildings, particularly in the strips between them (identified as ‘alleyways’ for Period 4B);
- (iv) external surface deposits in the area behind each building or set of buildings;
- (v) fills of cuts identified as ‘pits’;
- (vi) fills of other cuts (gullies, wells, etc.), and of features described by the excavators as ‘scoops’ and here given the purely descriptive term ‘depressions’.

*Naturally, not all context types are necessarily represented at all periods.*

Within each context, a brief description of the archaeological nature of the deposit (provided by the excavators) and a brief, mainly lithological, description, taken from the context card, are given. In the discussion of results, bulk-sieved (BS) samples (if any) are dealt with first (except where subsamples of GBAs have been bulk-sieved but no detailed record made of their content), followed by

general biological analysis (GBA) samples, and then spot and other types of samples (chemical, C14, wood, etc.). For GBA samples, there will usually be a series of sections as follows: (a) sample description (made in the laboratory); (b) results of analyses of plant macrofossils; (c) results of analyses of the eggs of parasitic worms; (d) results of analyses of insects and other arthropods (this section deals primarily with adult beetles and bugs, but includes an outline of other groups). For cuts, fill contexts are dealt with as far as possible in order from stratigraphically lowest to highest.

**The primary purpose of these *Technical Reports* is to reveal the reasoning leading to the very condensed form of presentation used in the publication text (Kenward and Hall 1995). The text of the *Technical Reports* was written prior to 1994 (some in the mid 1980s) and has not been more than very superficially revised. It has not been possible to take account of subsequent re-phasing or re-interpretation, or of recent developments in interpretative methods, so that there are some inconsistencies with the published report (in particular, revisions to the insect species lists will not be reflected in the statistics presented in the *Technical Report* texts, although the data archives give definitive statistics).**

**Bearing in mind the nature of these texts, they should not be used as a source for citation without consultation with the authors, though the species lists and statistics given in the data archives may be used safely.**

## Surface deposits of Period 3

The deposits dealt with in this section were apparently surface-lain but their exact nature was generally unclear during excavation. Deposits definitely forming part of a hearth or apparently associated with a hearth are considered in a separate section (below).

For convenience, and to determine whether there is any evidence for property divisions in Period 3, this material has been divided up as nearly as possible following the tenement boundaries established in

Period 4A. A group of samples toward the rear of the site has been designated ‘Tenement R’ in the records, as it would be dangerous to relate them to tenements at the front of the site.

The following co-ordinates have been used to define the five layer groups:

‘Tenement A’—to the geographical north-west of site grid 30N and south-west of grid 66E;

‘Tenement B’—to the geographical north-west of site grid 30N and north-east of grid 66E and south-west of grid 71.5E;

‘Tenement C’—to the geographical north-west of site grid 30N and north-east of grid 71.5E and south-west of grid 75.5E;

‘Tenement D’—to the geographical north-west of site grid 30N and north-east of grid 75.5;

‘Tenement R’—to the south-east of site grid 30N.

Some of the more extensive layers almost certainly spread beyond the ‘Tenement’ to which they have been assigned.

#### ‘Tenement A’

**Context 20893:** layer [in Tenement A] in similar position to **20523** (see below), with respect to Period 5B timbers. Possibly higher and even more likely to be contaminated. Dark to very dark grey clayey sandy silt with some flecks of brown clay.

*Sample 1643* (GBA): dark grey-brown, crumbly to brittle, humic, slightly sandy ?clayey silt with traces of small limestone and tile fragments.

**Insects (/T):** The small flot consisted of roughly equal proportions of plant fragments and seeds. Only a small insect assemblage was recovered, including 25 individuals of 21 beetle taxa. There were ‘several’ fly puparia, but other insects were rare. Diversity was estimated to be high, but with a large standard error ( $\alpha = 60$ , SE = 31) and the proportion of outdoor individuals was substantial

(in as much as reliance can be placed on statistics for such a small assemblage). Decomposers made up 60% of the individuals. No species were represented by more than two individuals. Subjectively this appears to be ‘background fauna’—the three species represented by two individuals were oxyteline staphylinids, believed to have been constant components of the background rain in Anglo-Scandinavian York (Kenward 1978).

In addition, a 12 kg subsample was bulk-sieved after the main period of processing. Its residue yielded abundant wood/twig fragments and moderate amounts of sand, charcoal and limestone fragments, together with traces of bone (some of it burnt), bark, nutshell and artefacts.

**Context 26020:** stratigraphical position as **26019** (see below); very dark grey peaty silt with a dry crumbly texture, the organic content being principally decayed wood.

*Sample 1675* (GBA): mid-dark grey-brown, crumbly, humic, slightly sandy clay silt, with traces of 2-20 mm stones, charcoal, charred twig fragments, and local concentrations of yellow, amorphous, powdery material.

**Insects (/T):** Mites were abundant and ‘several’ fly puparia were recorded. The assemblage of beetles (no bugs) was rather small—N = 50; S = 35. The main statistics were unremarkable in the context of Anglo-Scandinavian Coppergate. The most abundant taxa were *Carpelimus bilineatus* (5 individuals), *Anotylus complanatus* (4) and *Acritus nigricornis* (3). This may have been entirely background fauna, but there may have been a decomposer community attracted to, or breeding in or near, the deposit, for the diversity of the decomposer component was fairly low ( $\alpha$  RT = 24, SE = 8).

**Context 26019:** layer [at front of Tenement A]; very dark greyish-brown peaty loam; dry and flaky in texture, with flecks of wood. Below **20893**; under Structure 5/1 but unlikely to be contaminated. Probably dated to middle of Period 3.

*Sample 1662* (GBA): mid-dark grey-brown, crumbly, humic sandy silt with traces of 20-60 mm stones, tiny wood fragments and ?undecayed organic detritus.

Insects (/TP): The flot consisted largely of fine plant tissue, with small numbers of rather poorly preserved insects. In addition to 34 individuals of 26 beetle taxa there were 'several' fly puparia, but other arthropods were rare. About a quarter of the individuals were 'outdoor' taxa, all of which may have found habitats on the site. Only *Anotylus complanatus* was represented by more than two individuals: there were five. This assemblage may have been primarily background fauna or have represented the few fossils remaining when a deposit with a high rate of decay was sealed.

In addition, a 9 kg subsample was bulk-sieved after the main period of processing. The residue included modest amounts of bark and wood/twig fragments, and traces of bone, charcoal and shellfish.

**Context 20523:** layer [in Tenement A]; greyish-brown organic silt. Possible contamination from Period 5B since timbers of Structure 5/1 lay directly on it, but apparently reliably of Period 3 date.

*Sample 1304* (GBA): dark grey-brown, crumbly, silty sand with some patches of lighter brown ?sand and darker sandy clay silty.

Plants (/M): There was a large assemblage (54 taxa) from this subsample though, with the exception of *Eleocharis palustris*, all were recorded at an abundance of 1. The presence of *E. palustris* (at 2) partly accounts for the high AIVs for the grassland/reedswamp groups MOAR and PHRA (the highest for both groups for the series of small subsamples for Period 3). Though *E. palustris* is perhaps unlikely to have been deliberately cut from waterside vegetation, it may have been brought accidentally with other materials. The records of traces of *Phragmites australis* caryopses and *Typha* seeds is circumstantial evidence for the presence of cut wetland vegetation in this deposit, however.

Weed taxa are, unusually, poorly represented in this subsample, probably merely the 'background' that might be expected throughout an occupation site of this kind.

Traces of the dyeplants *Diphysium complanatum* (an imported clubmoss) and madder (*Rubia tinctorum*) were again recorded, together with stem fragments of dyer's greenweed (*Genista tinctoria*), making the AIV for the DYES group the highest value in the series (though very small compared with values for this parameter from many later deposits—see the relevant *Technical Reports*). The possibility exists, of course, that these were contaminants from Period 5 levels. Other useful plants included flax, *Linum usitatissimum* (both seeds and capsule fragments) and celery, *Apium graveolens* (fruits), but foodplants were in general rather scarce in this assemblage.

Parasitic worms: Two subsamples were examined; one gave a trace of *Trichuris* eggs, the other was barren.

Insects (/T): Recorded semi-quantitatively, with 's' converted to 6 in seven cases, and 'm' to 15 in four cases, so that the estimated number of individuals (170) may be rather inaccurate. Fifty-nine taxa were recorded. Diversity was estimated to be low ( $\alpha = 32$ , SE = 4). The outdoor component was small (%NOB = 5) and the decomposer component large (%NRT = 78). Taxa coded rd were rather abundant (%NRD = 26), but no rf taxa were recorded. The most abundant taxa were *Xylodromus concinnus*, *Carpelimus bilineatus*, *Lathridius minutus* group and *Enicmus* sp. (all 'many'), and *Cercyon analis*, *Ptenidium* sp., an aleocharine, a *Cryptophagus* species, an *Atomaria* species, *Mycetaea hirta* and *Aglenus brunneus*, all 'several'. Other notable decomposers were *Atomaria nigripennis* and *Typhaea stercorea*, both with three individuals. There was also a *Cryptophagus scutellatus* and two human fleas (*Pulex irritans*). This group was thus rather reminiscent of assemblages from within later buildings at the site, and a house floor or dumped material from such might be deduced. The possibility that the deposit was a rather peculiar midden cannot, however, be ruled out.

There were two human fleas, 'many' mites and 'several' Parasitica and fly puparia (mostly Sphaeroceridae).

**Context 24360:** layer [in Tenement A]; beneath Structure 5/1 but likely to be uncontaminated. Very dark grey silty loam.

*Sample 1622* (GBA): no action to date.

**Context 31120:** layer [in Tenement A]; very dark grey silty clay loam.

*Sample 2003* (GBA): no action to date.

**Context 36184:** layer [in Tenement A]; black clay loam mixed with dark grey-brown clay loam. Perhaps remains of pit fill.

*Sample 2467* (Spot): This sample contained several large sheets of tissue, probably of animal origin and perhaps remains of a hide, pelt or skin.

**Context 31023 (=31067):** layer [in Tenement A]; 50 cm-thick layer, dark grey, slightly sandy clay loam.

*Samples 1977-8* were part of a column taken from a section; the deposit above was a Period 3 layer (**27775**, *q.v.*); to the south of this deposit, the lateral equivalent was **28448** (*q.v.*).

*Sample 1996* (BS): no action to date.

*Sample 1977* (GBA): no action to date.

*Sample 1978* (GBA): no action to date.

**Context 27775:** layer in the front third of the site, up to 50 cm thick, of very dark grey silty loam with charcoal, limestone chippings and, in places, numerous woody fragments.

*Samples 1974-6* were part of a column taken from a section; the deposit above was a Period 4B layer (**31215**), that below another Period 3 layer (**31023**, *q.v.*).

*Sample 1916* (Spot): Puparia of *Musca domestica*

were abundant, and four puparia of *Teichomyza fusca* were noted.

*Sample 1974* (GBA): no action to date.

*Sample 1975* (GBA): no action to date.

*Sample 1976* (GBA): no action to date.

*Sample 1995* (BS): no record of processing.

**Context 28448:** layer above Roman wall, laterally abutting **31032** (*q.v.*); very dark grey slightly peaty loam. Below **27775** (*q.v.*).

*Sample 1918* (Spot): This sample comprised a cache of fly puparia with considerable numbers of *Leptocera* sp. and rather fewer *Muscina* sp.

*Sample 1997* (GBA): no action to date.

**Context 31065:** layer [in Tenement A]; dark grey, very silty clay.

*Sample 931065* (Spot): This was a small sample of twisted woody fragments identified as ?willow (*Salix*) by P. R. Tomlinson.

### 'Tenement B'

**Context 31527:** layer [in Tenement B/C]; black, slightly clay silt with much bone and shell; included a discontinuous lens of hard compacted amorphous peat. Below **31513** (*q.v.*). Possibly fill of a large pit.

*Sample 2350* (GBA): part of a sequence of samples (2342-52) from a column; no action to date. This sample was rejected because of the uncertainty of the archaeological record.

**Context 31513:** layer [in Tenement B]; black silty amorphous peaty material. Below **31383**, above **31527** (*q.v.*).

*Sample 2012* (GBA): no action to date.

*Sample 2348* (GBA): part of a sequence of samples

(2342-52) from a column. A subsample of this material was examined for vegetative plant remains by P. R. Tomlinson. She reports that, although it was described by the excavator as ‘?grassy material’, only one possible vegetative fragment of a grass was seen and that the numerous small wood fragments present may have given the impression of being short lengths of grass stems. The sediment is described as having few large organic fragments and a high mineral content’ and is evidently less ‘peaty’ than thought by the excavator.

*Sample 2349* (GBA): from Context **31513A**, behind **31513** in the section sampled, but behind it; no action to date.

**Context 31383**: layer [in Tenement B]; very dark grey silty clay loam with many flecks of clean, light brown clay; brick flecks and small charcoal fragments; some traces of vivianite. Above **31513**. Contained ash (*Fraxinus*) stake **31454**.

*Sample 2347* (GBA): part of a sequence of samples (2342-52) from a column; mid grey, crumbly, very heterogeneous clay silt with coarse woody detritus and traces of small limestone fragments, charcoal, small bone fragments and tile, and inclusions of pinkish-grey ‘natural’ clay and vivianite.

Plants: not recorded; ‘?bran’ was noted in the flot during insect recording.

Parasitic worms: A single *Trichuris* egg was recorded from the subsample examined.

Insects (/T): A small beetle assemblage and a single bug were recorded (N = 33, S = 29); other invertebrates were rather rare. The main statistics were undistinguished, bearing in mind the small size of the assemblage, apart from an unusually small decomposer component (slightly less than half of the individuals). Subjectively, the species composition was a little unusual, with specimens of *Pocadius ?ferrugineus* (associated with puffball fungi) and the ladybird *Coccidula rufa*.

**Context 31565**: layer [in Tenement B]; black silty clay loam with light brown clay flecking (some clasts up to 8 cm across); continues as **31548** (not

sampled) into a pit cut. Below **31230** (*q.v.*). The basal layer of a series sampled as a column, samples 2342-52, continuing through Period 3 into Period 4A.

*Sample 2352* (GBA): no action to date.

**Context 31230**: layer [in Tenement B]; very dark grey, slightly silty clay with some light brown clay mottling, brick fragments and charcoal flecking. Above **31565** (*q.v.*).

*Sample 2351* (GBA): part of a sequence of samples (2342-52) from a column; mid grey-brown, crumbly, slightly sandy clay silt with traces of 6-60 mm stones, small limestone fragments, charcoal, wood and large bone fragments.

Plants (/T): A smallish assemblage of 17 taxa was recorded from this 1 kg subsample. Most were weeds, including the only two taxa—stinging nettle, *Urtica dioica* and chickweed, *Stellaria media*—to achieve an abundance of 2.

Parasitic worms: Two subsamples were examined; one was barren, the other yielded a trace of *Trichuris* eggs.

Insects (/T): This subsample gave a small assemblage of beetles and bugs—45 individuals of 43 taxa. Other invertebrates were rare, but preservation was a little better than usual at the site. The estimate of diversity was thus very high ( $\alpha = 452$ , SE = 306), but of course suspect. Only *Anotylus complanatus* and *A. rugosus* were represented by more than one individual. The outdoor component was quite large, almost a third of the individuals, with several taxa common in places disturbed by human activity. Decomposers were proportionally less abundant than in the great majority of Anglo-Scandinavian assemblages, accounting for only half the individuals. These remains appear to have accumulated on an external surface in a disturbed area.

The flot also contained large numbers of seeds and seed fragments (including corncockle, *Agrostemma githago*, a taxon not observed during examination of the plant remains from the residue).



**Context 31359:** layer [in Tenement B]; very dark grey-brown, slightly organic silt with some patches of grey-brown, slightly sandy silt.

*Sample 2015* (GBA): no action to date.

**Context 36091:** layer [in Tenement B]; olive clayey peat.

*Sample 2457* (GBA): dark brown, crumbly, humic silt; no further analysis was undertaken.

**Context 34815:** layer [in Tenement B]; very dark grey charcoal deposit. Below **34816**, above **34814** (*q.v.*).

*Sample 2428* (BS—VWR): The long list of taxa (44) is perhaps partly of a function of the fact that both the residue and washover were examined in detail for this sample. Two plants associated with dyeing were present—*Diphysium complanatum* and *Rubia tinctorum*, together with some other ‘useful’ plant groups which were rather well represented within the Period 3 BS samples; thus possible oil-plants are represented by three taxa—hemp, *Cannabis sativa*, flax, *Linum usitatissimum* and rape, *Brassica rapa* (though the first two of these are also included with the fibre plants, and the third was probably present only as a weed). Two possible herbs are also present—hop, *Humulus lupulus* and ?cat-mint, cf. *Nepeta cataria*—the first of these also being counted with the food flavourings (FOOF) and with DYES. Traces of four of the larger hypnoid mosses were recorded here; all, and especially *Antitrichia curtispindula*, may have arrived incidentally with bark, rather than being collected deliberately.

*Sample 2427* (GBA): dark (black), crumbly, humic sandy silt/amorphous organic material, with abundant charcoal and traces of wood fragments.

Plants (/T1, /T2): Both subsamples were scanned for plant remains and both gave small assemblages (14 and six taxa, respectively), and were very rich (abundance score 3) in charcoal. The /T1 subsample is also recorded as having moderate amounts (score 2) of wood fragments. The

assemblages are too small to discuss in detail, but there was a mixture of useful plants and weeds—the former group including *Cannabis*, *Linum usitatissimum* (both seeds and capsule fragments), and *Diphysium complanatum*.

Parasitic worms: Two subsamples were examined, of which one was barren, the other yielding a single *Trichuris* egg.

Insects (/T1, T2): The first subsample produced 116 individuals of 44 beetle and bug taxa; there were also ‘many’ mites and ‘several’ puparia. Diversity was quite low ( $\alpha = 26$ , SE = 4). The decomposer component (RT) was about normal (%NRT = 62), but there were three ‘u’-coded probable decomposer taxa in the first ten ranks of abundance. The diversity of this component was low ( $\alpha$  RT = 12, SE = 2), and some taxa were rather numerous: *Carpelimus bilineatus* (19); *Neobisnius* sp. (12); *Anotylus complanatus* (11); *Acrotichis* sp. (7); *Carpelimus pusillus* group (6); *Cercyon analis* and a pselaphid (5). It thus appears that there was a breeding or at least attracted decomposer community, perhaps of moist but not too foul plant remains. Alternatively, pit fill material had been redeposited.

The /T2 subsample included 82 individuals of 32 taxa. Diversity was again low ( $\alpha = 19$ , SE = 3), and the outdoor component small (only four individuals). The proportion of RD individuals was small (5%) and the diversity of the RT component very low ( $\alpha$  RT = 10, SE = 2), but other statistics were unremarkable. The more abundant taxa were *Carpelimus bilineatus* (17), *Neobisnius* sp. (15), *Anotylus complanatus* (8) and *Cercyon analis* (4), so that there was a general similarity to the fauna of subsample /T1. The same conclusion may be drawn concerning its origin. Several mites and two *Pulex irritans* were recorded from this subsample.

**Context 34814:** layer [in Tenement B]; very dark grey, slightly clay loam with occasional wood and charcoal flecking.

*Sample 2426* (BS—V): A very small assemblage of only nine taxa was recorded from the residue by rough sorting; the washover was not seen or had

been returned to the residue after disaggregation. Three large hypnoid mosses were present, along with *Diphysium*, *Cannabis*, hazelnut (*Corylus*), wheat (*Triticum aestivo-compactum*) and barley (*Hordeum*), and a single weed taxon. They are of little value in interpretation other than as further records of taxa already identified from these deposits.

*Sample 2425* (GBA): dark grey-brown, crumbly, rather heterogeneous, humic sandy silt or amorphous organic material with traces of 20-60 mm stones, twig, wood and large bone fragments.

Parasitic worms: Two subsamples were examined; one was barren, the other yielded a trace of *Trichuris* eggs.

Insects (/T1, /T2): A modest assemblage of 94 beetles and a single bug was recorded from the /T1 subsample: these included 56 taxa. Diversity was quite high ( $\alpha = 57$ , SE = 11), and other statistics not far from normal for the period. The assemblage was dominated by Oxytelinae, as follows: *Carpelimus bilineatus* (9 individuals); *Anotylus complanatus* (7); *Platystethus arenarius*, *A. nitidulus* and *A. rugosus* (all 3). There were also seven *Neobisnius* sp. Apart from these, only an aleocharine and *Lathridius minutus* group were represented by more than two individuals, there being three of each. This may have been background fauna with a modest attracted/breeding decomposer component, although the dominant community was one which has been recorded from a number of pits at the site, suggesting the possibility that the layer incorporated redeposited pit fill. Several Sphaeroceridae sp. and a few other puparia and one *Melophagus* adult, a human flea and an *Athous ?haemorrhoidalis* larval abdominal apex were noted.

The /T2 subsample was not subjected to general insect analysis but several puparia, mostly of Sphaeroceridae were noted.

In addition, a 25 kg subsample was bulk-sieved after the main period of processing. It yielded large quantities of wood, with charcoal, burnt and unburnt bone (including fish bone and scales),

pottery and other artefactual material, shellfish, bird eggshell and concretions (which were not analysed further).

*Sample 25175* (formerly part of 2517) (GBA): mid-dark grey-brown, crumbly to brittle, very humic silt with traces of wood and twig fragments, leather and tile.

Insects (/T): The degree of chemical degradation of the fossils appeared to vary, although it is possible that the paler remains were of newly-emerged individuals. Seventy individuals of 36 beetle taxa were recorded. Diversity was moderately low ( $\alpha = 30$ , SE = 6). Main statistics were unexceptional apart from the low value of  $\alpha$  for the RT component (14, SE = 3). The more abundant species were mainly fairly eurytopic decomposers typical of Anglo-Scandinavian deposits at 16-22 Coppergate; they may have bred in (or have been attracted to) the deposit, in which case it may have been a little foul, at least in places. There were 'several' puparia and scale insects, many mites of several kinds, two adult sheep keds (*Melophagus ovinus*) and a single human flea head.

[**Context 34832**: archaeology uncertain.

*Sample 25176* (formerly part of 2517): mid-dark grey-brown, crumbly to brittle humic silt with some wood fragments, small bone, shellfish, brick/tile and including clasts of mid-brown clay on <10 mm scale; no further analyses undertaken.]

**Context 32265**: layer [in Tenement B]; very dark grey silty clay loam or peat with large amounts of varying sizes of wood fragments.

*Sample 2385* (BS/GBA): (not described in the laboratory; a large part of the sample was bulk-sieved but a series of four 1 kg subsamples was examined for insects.)

Plants (BS—VR): Plant remains were only recorded from the residue for this 35 kg subsample; it is likely that the washover had been misplaced. The list of eight taxa includes three large woodland mosses of the kind recorded regularly from many

later contexts at this site (in cess-pits and the more richly organic floor layers), together with birch (*Betula*) bark, hazel nutshell, sloe (*Prunus spinosa*) fruitstones and two probable arable weed taxa. The remains of *Corallina*, a marine red alga with a calcareous exoskeleton, was probably brought to the site incidentally with shellfish.

Insects (/1-/4): The first subsample gave a large flot, mostly consisting of plant fragments. The beetle assemblage was small—41 individuals of 32 taxa. This group was too small for interpretation, but the ‘outdoor’ component was quite large and decomposers relatively rare. Only two species, *Anotylus complanatus* and *A. nitidulus* were represented by more than two individuals, there being three of each. There were several mites and puparia

The flot from the second subsample had dried out during storage between processing and recording to form an intractable lump and could not be recorded.

Subsample /3 gave another large flot and a small assemblage, which was recorded semi-quantitatively. There were 25 taxa, and an estimated 30 individuals; main statistics, so far as they may be trusted, were unremarkable. The species recorded were ecologically varied but typical of Anglo-Scandinavian Coppergate. Only *Lathridius minutus* group was represented by more than one individual: there were ‘several’. Several puparia, a flea, a *Melophagus* adult and several mites were also noted.

Subsample /4 was not recorded.

*Sample 2384* (GBA): A small subsample was examined by P. R. Tomlinson for vegetative plant remains. There were many woody fragments, some large, with mammal and fish bone, avian eggshell and other occupation debris. Some fairly large fragments of *Diphasium complanatum* stem were present, along with straw fragments, small amounts of *Genista tinctoria* stem and small fragments of legume pod, perhaps also from *Genista*.

### ‘Tenement C’

**Context 33077:** sandstone block, roughly cubic in shape, 30 x 32 x 28 cm.

*Sample 2332* (Spot): This was a fine-grained pinkish sandstone, rather unlike the more usual coarser-grained and weakly-cemented gritstone recorded elsewhere at this site.

**Context 30709:** layer [in Tenement C]; small patches of olive-yellow iron-pan or ash.

*Sample 2094* (Spot): dark grey silty clay with patches of light brownish yellow fine-grained mineral material (probably ash, though initially thought to be something like fullers’ earth).

### ‘Tenement D’

**Context 30735:** layer [in Tenement D]; dark grey silty clay loam; below **30693**, **30747** (*q.v.*).

*Sample 2146* (BS—VW): There was rather a small assemblage (16 taxa) from this sample, almost all of weeds, though with a few charred cereal grains.

*Sample 2145* (GBA): mid grey, plastic, somewhat heterogeneous, slightly clayey sandy humic silt, with discrete inclusions of amorphous organic material, mottles at 10 mm scale and traces of 2-6 mm stones, small limestone fragments, charcoal, small bone fragments and shellfish.

Plants (/T1, /T2): Two subsamples of 1 kg were examined, giving 19 and 9 taxa, respectively, most of them weeds. The /T1 subsample did also yield *Linum usitatissimum* and some charred cereal grains, however. The plant remains are of little interpretative value.

In addition, a 7 kg subsample was bulk-sieved after the main period of processing. Its residue gave a range of animal and plant remains and artefactual materials but these have not been examined in detail.

Parasitic worms: Two subsamples were examined;

one was barren, the other yielded a single *Trichuris* egg.

Insects (/T1, /T2): Only single individuals of five beetle taxa were found in the flot from the /T1 subsample, no other invertebrates being recorded. The flot from the second subsample has not been examined.

*Sample 2144* (Chemical): sent to Dr J. Hunter (then at Bradford University).

**Context 30575:** layer [in Tenement D]; grey clay loam with 5% flecks of tile, mortar, shell, and other materials, and 5% sporadic blobs of brown/dark brown clay approximately 40 mm diameter (and less). A very hard, compact surface. Below **30547** (*q.v.*).

*Sample 2055* (GBA): no action to date.

**Context 30699:** layer [in Tenement C/D]; very dark grey-brown loam; very slightly sandy, with a few charcoal flecks.

*Sample 2098* (BS—VW): With 27 taxa, this assemblage was of average size for the Period 3 BS samples. No vegetation or use group was especially well represented; the list of potentially useful plants includes *Corylus*, *Humulus*, *Cannabis*, field bean (*Vicia faba*, charred seed), *Apium graveolens* and charred cereals—bread/club wheat, rye and barley (the last of these at an abundance of 2).

**Context 30620:** layer [in Tenement D]; black silty clay loam with 5% flecks of tile, wood, charcoal and limestone.

*Sample 2068* (GBA): mid grey, plastic, rather heterogeneous, slightly sandy clay with traces of small limestone fragments and charcoal, and inclusions of pinkish 'natural' clay.

Parasitic worms: There was a single *Trichuris* egg in the subsample examined.

Insects (/T): A small assemblage of single individuals of 12 species of beetles, a group of no interpretative significance, was recorded by rapid

scanning. The flot also included a fragment of plastic sponge.

**Context 25990:** thick layer (=31562) [in Tenement D] of smelly silty clay loam with wood chips, spread all over west of Area IV.I; contained areas of charred matted grass.

*Sample 1899* (BS—VW): This sample gave one of the larger assemblages for the Period 3 BS samples—45 taxa—though most of the AIVs were modest compared with values for the period as a whole. The score of 2 for *Cannabis* largely accounts for the highest period AIVs achieved for both fibre (FIBR) and oil plants (FOOO) here. Otherwise weeds in groups BIDE (fourth highest period AIV) and CHEN (third highest) were proportionately well represented. *Rubia* was again present as a trace; *Humulus* may also be counted as a dyeplant or as a food (drink) flavouring. There were also traces of charred bread/club wheat, oats (including cultivated oats) and barley grains.

**Context 33028:** layer [in Tenement D]; black charcoal.

*Sample 2321* (C14): no action to date.

**Context 30755:** layer [in Tenement D]; black, gritty, slightly clayey silt, mottled slightly by grey silty clay. Above **30750**, below **30749** (*q.v.*).

*Sample 2109* (Chemical): very dark grey, crumbly, humic, slightly sandy silt; no further analysis undertaken.

**Context 30839:** layer [in Tenement D]; very dark grey clay loam with large limestone fragments sitting on it and small blobs of grey-brown clay. Below **30735** and above **30842**; adjacent to **30841** and **30843** (*q.v.*).

*Sample 2147* (GBA): mid-dark grey-brown, plastic, slightly sandy silty clay with traces of 2-6 mm stones and inclusions of pinkish 'natural' clay.

Plants (/T): The very small assemblage (10 taxa) from this deposit yielded a single seed of fig, *Ficus carica*, from a residue that was essentially lacking

in organic matter, apart from charcoal and mammal bone. This is one of a very few records for *Ficus* from the Anglo-Scandinavian deposits at this site and seems—from the present context—unlikely to be a contaminant from either earlier (Roman) or later (post-Conquest) layers, although the presence of reworked natural clay suggests earlier material had become incorporated.

**Parasitic worms:** A single entire *Trichuris* egg was recorded from the subsample examined.

**Insects (/T):** Preservation was a little worse than normal for Anglo-Scandinavian Coppergate. Only single individuals of 12 taxa of beetles and ‘several’ mites were noted.

**Context 30727:** layer [in Tenement D]; dark grey silty clay loam below **30693**, **30699**, **30752**, above **30711**, **30749**, **30750** (*q.v.*).

**Sample 2104** (BS—VW): The assemblage (27 taxa) was of average size and the AIVs mostly low or moderate. Charred wheat and barley were present, together with hazel nut, seeds or stones of some fruits, and a range of weed taxa.

**Context 30693:** layer [in Tenement D]; very dark grey to very dark greyish-brown, rather greasy, slightly organic silty clay loam. Above **30727**, below **30699** (*q.v.*).

**Sample 2101** (BS—VW): The assemblage of macrofossil plant taxa (46) was well above the mean for this series of samples. Several taxa scored an abundance of 2; all of them were likely to have been denizens of the local weed flora. Some of the AIVs for weed taxa were therefore proportionately very high—those for ARTE, CHEN and PLAN were the second highest for the period, that for BIDE the equal highest. The last of these was inflated by the score of 2 for *Ranunculus sceleratus*—a species often present in huge concentrations in Anglo-Scandinavian deposits at 6-8 Pavement, but usually rather scarce at Coppergate, barely 75 m to the north-west.

There was very little trace of ‘useful’ plants in this sample—only *Cannabis* and *Prunus spinosa* and

some charred wheat and barley grains were recorded.

**Sample 2102** (BS—VW): With only half the number of taxa of the previous sample, the assemblage from 2102 gave much more modest AIVs, though weeds were still the best-represented groups. The AIV for FOOS was proportionately higher than for 2101, but inspection of the species list does not suggest that foodplants were especially important—most could be ‘casuals’ from bird-droppings or even reworked (as in the case of the charred cereals). The single nut of beech, *Fagus sylvatica* is of interest. Beech is thought to have arrived late in Britain during the Flandrian and to be native only in south-east England. It is recorded in some quantity from Viking Age Haithabu, N. Germany (Behre 1983), though this is in an area where beech is certainly native and likely to have been common in the ‘wildwood’ in the past. The specimen concerned is very well preserved and it is possible that it is a modern contaminant. No beech trees were observed near to the site (by contrast, *Acer pseudoplatanus* fruits were observed in some bulk-sieved samples, a sycamore tree having overhung one corner of the area in which the excavation took place). If this is a genuine record, it is perhaps an indication of a rare importation from southern Scandinavia or perhaps from southern England.

**Sample 2535** (Spot): The sample consisted of rounded, light brown concretions (up to about 30 mm diameter) with a rather low density and vesicular nature, their surface sometimes glossy. No further analysis was undertaken.

**Context 30710:** layer [in Tenement C/D]; slightly silty and gritty clay with some charcoal flecking and clean clay blotching. Above **30864** (*q.v.*).

**Sample 2112** (BS—VW): An assemblage of somewhat below mean size for this series, there was nothing remarkable about it. *Diphysium complanatum* and *Cannabis sativa* were almost the only ‘useful’ plants present; weeds were predominant.

**Context 30711:** layer [in Tenement D]; gritty silty

clay with traces of ?mortar, charcoal flecks and pieces. Below **30699** (*q.v.*).

*Sample 2106* (Spot): no action to date.

**Context 30819**: layer [in Tenement D]; very dark grey silty clay loam with fragments of tile and charcoal and clay flecks. Below **30801**; above **30751** (*q.v.*).

*Sample 2174* (Chemical): varicoloured (but essentially light grey), crumbly to indurated, sandy silty clay with traces of 6-20 mm stones; no further analysis was undertaken.

**Context 30547**: layer [in Tenement D]; crumbly, sandy amorphous peat with 10% wood fragments and 20% bone, tile and limestone fragments.

*Sample 2052* (GBA): no action to date.

**Context 30802**: layer [in Tenement D]; reddish-grey clay; 50% inclusions of very dark grey clay loam and a few charcoal flecks.

*Sample 2163* (Chemical): light pink/yellow mottled, indurated silty clay; no further analysis was undertaken.

**Context 30824**: layer [in Tenement D]; very dark grey sandy clay with a large charcoal component; burnt clay and small patches of brown clay; above **30802** (*q.v.*).

*Sample 2176* (GBA): dark grey, crumbly, slightly sandy, silty clay, with traces of wood fragments and yellow iron staining and inclusions of lighter grey silt.

Plants (/T): Though the assemblage of 37 taxa was well above the mean for this series of samples, the AIVs were mostly rather unremarkable. Only *Chenopodium album* reached an abundance of 2. That there was perhaps some faecal material present in this layer is suggested by the traces of apple (*Malus sylvestris*) seeds and endocarp ('core') and by the wheat/rye (*Triticum/Secale*) 'bran'; the several large hypnoid mosses present include several associated with cess-pit fills at this

site.

Parasitic worms: Three subsamples were examined; two yielded traces of eggs of both *Trichuris* and *Ascaris*, one only a trace of *Trichuris*.

Insects (/T): Preservation of insect remains was quite good. There were 34 beetle and bug taxa, with 49 individuals; statistics therefore require cautious use. Diversity was close to the mode for Period 3 ( $\alpha = 50$ , SE = 15); outdoor forms were fairly well represented (%NOB = 16). Other statistics were mostly quite unremarkable, bearing in mind the size of the assemblage, although the diversity of the decomposer component was rather low ( $\alpha$  RT = 16, SE = 5). The assemblage was dominated by Oxytelinae: *Anotylus nitidulus* (7), *A. complanatus* (5), *Platystethus arenarius* (3), and two individuals of *Carpelimus pusillus* group and *Oxytelus sculptus*. These together suggest somewhat foul conditions. Only one other taxon was represented by more than one individual. This may have been background fauna, but more probably was attracted to foul matter (which—always a possibility—might have been a redeposited pit fill). This subsample gave a record of *Loricula pselaphiformis*, possibly overlooked in other cases, but certainly rare at the site.

Fragments of fly puparium were abundant, but only two individuals of Sepsidae sp. were identified. There was also a human flea.

**Context 30801**: layer [in Tenement D]; dark to very dark grey silty clay loam with occasional flecks of charcoal and small limestone fragments. Above **30751** (*q.v.*).

*Sample 2123* (GBA): mid grey, plastic, silty sandy humic clay, with traces of 2-6 mm and 60-200 mm stones, small limestone fragments, large burnt bone fragments and tile.

Parasitic worms: Two subsamples were examined; both were barren.

Insects (/T1, /T2): The first subsample gave only single individuals of four beetle taxa (all among the more commonly occurring taxa at Coppergate), an

adult fly and two mites. Preservation was poor. The second also produced single individuals of four adult beetles, together with a single adult fly and a larval abdominal apex of the click beetle *Melanotus rufipes*.

**Context 33143:** build-up at the front of Area IV.I: 'cessy organic flecked hard-pan-topped material.'

*Sample 2438* (BS): no action to date.

'Tenement R'

**Context 27272:** layer towards rear of site; compact peaty deposit, consisting almost entirely of matted small twigs.

*Sample 1816* (BS—VW): This was somewhat unusual amongst the Period 3 samples in having rather a high score for dyeplants (the highest AIV, 13, equalled only by a similar figure for 1844 from 28033 [cut fill]). *Diphasium complanatum*, *Genista tinctoria* (stem fragments) and *Rubia tinctorum* were all present, the last of these with an abundance score of 2. The AIVs for the other groups represented by the 23 taxa recorded were mostly unremarkable and the only other taxon to score an abundance of 2 was elder, *Sambucus nigra*. At least part of the organic component of this deposit appears to have been dyebath waste; other taxa included probable foodplant, including walnut (*Juglans regia*), *Corylus*, *Humulus lupulus*, *Malus* and *Apium graveolens*.

*Sample 1817* (GBA): no action to date.

**Context 19743:** layer of up to 50 cm in thickness of very dark grey silty peat with a light scatter of bone, oyster shells and some limestone fragments.

*Sample 2392* (Spot): a single snail (*Cepea nemoralis*) shell.

**Context 19763:** clay loam with animal skull and post.

*Sample 2407:* (Spot): a single modern snail (*Helix aspersa*) shell.

**Context 19739:** layer at the rear of the site, comprising a very dark grey silty peaty clay loam with patches of dark grey clay with bone and limestone and cobbles covering the surface. Above 19743 (q.v.).

*Sample 2496* (BS—VW): The assemblage from this sample was by far the largest for the Period 3 BS samples (74 taxa). Several taxa scored an abundance of more than 1: *Urtica urens*, *Chenopodium album*, *Stellaria media*, *Ranunculus sceleratus*, *Marrubium vulgare*, *Galeopsis* Subgenus *Galeopsis*, *Hyoscyamus niger*, *Sambucus nigra* and *Carex* sp(p). all stood at 2, and *Urtica dioica* at 3. In addition, charcoal and wood fragments both scored 2. Perhaps not surprisingly, therefore, the highest AIVs for this series of samples were achieved for the 'weed' groups ARTE, BIDE, CHEN, PLAN and SECA. In particular, annual nitrophiles in the family Chenopodiaceae were strongly represented (with the otherwise rather rarely recorded *Chenopodium murale* and *C. ficifolium* both present). They perhaps indicate a 'midden' deposit, formed where foul waste stood, and becoming colonised by annual weeds

Grassland taxa were also well represented—the highest AIV for FEBR and the second highest for MOAR were recorded for this sample, though inspection of the lists does not suggest any very strong indicators of this kind of habitat—rather, there are taxa like self-heal (*Prunella vulgaris*), which are as likely to have originated in disturbed grassland near to habitation as from pasture or meadow further off. On the other hand, the highest AIV for the reedswamp group PHRA was recorded here—perhaps evidence for such a community in the vicinity (this was a layer at the very rear of the site and therefore nearest the river), although an origin in cut vegetation cannot be ruled out. The high AIVs for ISNA and SCCA may also point to local wetland vegetation, though they are based on rather small numbers of taxa.

Albeit with only five taxa, the heathland/moorland group NACA also achieved its highest period AIV here and it is perhaps of significance that the most characteristic representatives of that community at

Coppergate—heather (*Calluna vulgaris*) and cross-leaved heath (*Erica tetralix*)—were not present. Perhaps this group reflects the presence of turf from such habitats, rather than coarser shrubby vegetation?

Food and other useful plants are, as might be expected in a surface layer of this kind, rather rare. *Cannabis* and *Linum usitatissimum* were both recorded at 1, and there were traces of *Rubia tinctorum* and a tentatively identified trace of *Diphysium* sp. The latter are perhaps unlikely to have been reworked from later deposits and suggest that dyeplants were, indeed, in use in Period 3 (though they were recorded in huge quantities in later Anglo-Scandinavian deposits).

*Sample 2362* (Spot): a single common periwinkle (*Littorina littorea*) shell.

**Context 19701**: a small spread of stony deposit—a very dark grey-brown silty sandy clay loam covered with cobbles, limestone, tile, wood fragments. About 35 x 20 cm in extent. Located at very rear of site.

*Sample 2329* (GBA): no action to date; rejected in view of archaeological information.

**Context 28195**: extensive spread to rear of site. Very dark grey, slightly clay, very silty loam, with many patches of grey-brown silty clay. It was cut through by **28794**, the construction cut for the barrel well containing a poplar (*Populus*) barrel **27231**.

*Sample 1902* (Spot): mid grey, crumbly to indurated, somewhat heterogeneous, sandy clay silt with traces of charcoal and iron staining; no further analysis was undertaken.

#### *Layers not located*

(no site co-ordinates available, but all described by excavator as ‘back of site’ except **28444**, which is ‘layer B/C’; some are not dated more closely than Period 1/3).

#### **Context 28196**

*Sample 1954* (GBA): /T and TC processed but not yet examined. *Sample 1956* (GBA): no action to date.

#### **Context 28444**

*Sample 2271* (Spot): Recorded by the excavator as ‘coprolite’, this sample consisted of a faecal concretion with moss (*Neckera complanata*), corncockle seeds, and cereal (wheat/rye) ‘bran’.

#### **Context 28558**

*Sample 1933* (Soil): examined in the laboratory; no further action. *Sample 1955* (Soil): examined in the laboratory; no further action.

#### *Hearths, and other deposits showing evidence of burning*

This section mainly deals with contexts sampled for ‘chemical’ analysis (usually pairs of samples from a context, of which one was for analysis by Dr J. Hunter, formerly of the University of Bradford), designed to identify the nature of industrial or craft processes which created areas of burning.

*This group of samples is of very little relevance to environmental interpretation in the sense adopted for this report. A sample from most of the contexts has, however, been examined in the laboratory and its lithology recorded so that no samples with obvious potential for biological analysis were overlooked. Unless stated otherwise, no further analysis was undertaken.*

#### **Context 30675 (?hearth cut )**

**Context 30657**: *Sample 2085* (Chemical): light grey to bright orange-brown, but mainly mid buff, crumbly, silty fine sand with traces of charcoal and abundant large and small burnt bone fragments.

**Context 30658**: *Sample 2086* (Chemical: light grey-brown, crumbly, silty ash with the texture of sand.



**Context 30663:** *Sample 2087* (Chemical): light-mid reddish grey-brown, crumbly, silty ash.

**Context 30664:** *Sample 2088* (Chemical): mid-dark grey, crumbly, slightly sandy silt.

**Context 30757 (?hearth cut)**

**Context 30749:** *Sample 2107* (Chemical): light grey, crumbly, somewhat heterogeneous, slightly sandy silt with lenses of black carbonaceous material and modest amounts of grey ash.

**Context 30760, 30760A, 30760B and 30760C:** *Sample 2157* (Chemical): mid red-brown, crumbly ?ash. *Sample 2158* (Chemical): sent to Dr J. Hunter. *Sample 2205* (Chemical): mid brown, crumbly, silty fine sand. *Sample 2206* (Chemical): sent to Dr J. Hunter. *Sample 2241* (Chemical): mid red-brown, crumbly sandy silty clay. *Sample 2242* (Chemical): sent to Dr J. Hunter. *Sample 2246* (Chemical): light yellow-brown, crumbly, sandy silt. *Sample 2247* (Chemical): sent to Dr J. Hunter.

**Context 30799:** *Sample 2221* (Chemical): light yellow grey-brown, crumbly to brittle to layered, sandy silty ash. *Sample 2222* (Chemical): sent to Dr J. Hunter.

**Context 30876:** *Sample 2165* (Chemical): light-mid grey-brown, crumbly, slightly silty sand with traces of 2-20 mm stones. *Sample 2166* (Chemical): sent to Dr J. Hunter.

**Context 30877:** *Sample 2167* (Chemical): mid grey-brown, crumbly, slightly clayey silty sand with traces of ?chalk. *Sample 2168* (Chemical): sent to Dr J. Hunter.

**Context 30884:** *Sample 2185* (Chemical): mid grey-brown, crumbly, rather heterogeneous, slightly clayey sandy silt. *Sample 2186* (Chemical): sent to Dr J. Hunter.

**Context 30886:** *Sample 2181* (Chemical): mid yellow-brown, crumbly, slightly silty sand with traces of 20-60 mm stones. *Sample 2182* (Chemical): sent to Dr J. Hunter.

**Context 33017:** Archaeological information not obtained. *Sample 2308* (GBA): light yellow-brown, crumbly, somewhat heterogeneous, slightly clayey sandy silt.

Parasitic worms: The subsample examined was barren.

Insects (/T): The only arthropods recorded were two beetles (not identifiable further) and an ant.

**Context 30787 (hearth cut)**

Archaeological information not obtained.

**Context 30768:** *Sample 2114* (C14): A bag of charcoal from the washover from this sample was available but not examined further, and not used for radiocarbon dating.

**Context 30910 (?hearth cut):** This was a small squarish cut—probably a hearth—the very heterogeneous fills apparently of ashy material. It was about 70 cm across and 30 cm deep, the fills being very heavily sampled. None were thought worthy of biological analysis, however.

**Context 30748:** *Sample 2193* (Chemical): sent to Dr J. Hunter. *Sample 2194* (Chemical): mid-dark grey, stiff, slightly sandy, silty clay with small amounts of glass, and inclusions of mid red-brown silty clay and ?iron fragments. The whole of this sample (5 kg) was bulk-sieved, leaving a residue rich in gravel, sand and brick/tile fragments, with some glass and ?glassy slag.

**Context 30888:** *Sample 2183* (Chemical): mid grey-brown, crumbly to indurated, very heterogeneous silty clayey sand, with abundant charcoal and ?burnt soil. *Sample 2184* (Chemical): sent to Dr J. Hunter.

**Context 30907:** *Sample 2201* (Chemical): light to mid yellow-grey, crumbly, sandy silty clay. *Sample 2202* (Chemical): for Dr J. Hunter.

**Context 30908:** *Sample 2200* (Chemical):

varicoloured on 2-10 mm scale but essentially a mid grey-brown, crumbly, slightly clayey sandy silt, with patches of red-brown burnt soil, charcoal and ?ash.

**Context 30909:** *Sample 2203* (Chemical): light yellow-grey, crumbly, silty sand. *Sample 2204* (Chemical): sent to Dr J. Hunter.

**Context 30918:** *Sample 2210* (Chemical): mid red-brown to dark grey, crumbly, slightly sandy clay silt. *Sample 2212* (Chemical): sent to Dr J. Hunter.

**Context 30919:** *Sample 2213* (Chemical): mid-dark grey-brown, slightly crumbly, slightly clayey silt with traces of charcoal. *Sample 2214* (Chemical): sent to Dr J. Hunter.

**Context 30920:** *Sample 2218* (Chemical): mid grey-brown, crumbly, silty sand. *Sample 2219* (Chemical): for Dr J. Hunter.

**Context 30921:** *Sample 2216* (Chemical): light yellow to mid red-brown to light grey-brown crumbly to brittle to indurated, very heterogeneous sandy, silty clay. *Sample 2217* (Chemical): for Dr J. Hunter.

**Context 30923:** *Sample 2215* (Chemical): varicoloured (mid grey with patches of yellow, black, and other colours), crumbly, slightly clayey, sandy silt with traces of charcoal and ?ash.

#### *Other related contexts*

**Context 30443:** layer [in Tenement D]; mixed compact layer of 30% each of ash, charcoal, and burnt clay. Above **30497** (*q.v.*). *Sample 2027* (Chemical): mid, slightly yellowish, grey, crumbly ash, with abundant charcoal.

**Context 30479:** layer [in Tenement D]; compact layer of charcoal and ash with a few patches of unburnt clay. Above **30497** (*q.v.*). *Sample 2028* (Chemical): dark grey, crumbly, ash, with abundant charcoal.

**Context 30480:** layer [in Tenement D]; loose to compact mixture of 60% burnt clay, 35% amorphous peat with charcoal fragments and 5% unburnt clay blobs. Below **30575** (*q.v.*). *Sample 2032* (Chemical): dark yellow-grey, crumbly, humic silty ash. *Sample 2038* (Chemical): light grey-brown, crumbly, silty sand—?ashy—with moderate amounts of charcoal.

**Context 30497:** layer [in Tenement D] consisting of clean ash and burnt clay; below **30479** and **30443** (*q.v.*). *Sample 2031* (Chemical): light yellow-grey, crumbly ash with abundant charcoal.

**Context 30513:** layer [in Tenement D]; amorphous silty peat with 5% wood flecks. Above **30547**, below **30479**, **30443** (*q.v.*). *Sample 2037* (Chemical): mid-dark grey-brown, plastic to crumbly to brittle, slightly clayey sandy silty with wood fragments.

**Context 30740:** layer [in Tenement C]; very dark sticky, slightly loamy clay with 15% pinkish clay flecks, charcoal and ash flecks. An extensive area. Abuts **30864** (*q.v.*). *Sample 2154* (GBA): no action to date.

**Context 30747:** layer [in Tenement D]; very dark grey silty clay with scattered small patches of charcoal and ash and small lumps of brown clay, tile and limestone flecks, and small limestone fragments. Above **30735**, **30750**, **30760**, **30802**; below **30693**, **30727** (*q.v.*).

*Sample 2110* (BS—VW): a smallish assemblage of 17 taxa was recovered, the majority weeds, and all in trace amounts.

*Sample 2111* (BS): sample disaggregated, but there is no record of sorting.

**Context 30750:** layer [in Tenement D]; light brown burnt clay containing some burnt daub and tile fragments and some patches of pale grey ash. Below **30711**, **30747**, **30749**, **30859**; above hearth **30876**.

*Sample 2159* (BS—V): Only the rough-sorted plant remains were available for this sample (there

was probably no washover); they comprised wood and charcoal fragments, alone. Amongst the other components there were, however, several puparia of Sepsidae sp. and a few *Leptocera* sp.

*Sample 2150* (Chemical): sent to Dr J. Hunter.

*Sample 2151* (Chemical): mid grey-brown, indurated, sandy silty clay.

**Context 30751:** layer [in Tenement D]; dark grey, slightly gritty silty clay loam with flecks of brown clay, charcoal and burnt daub. Below **30801** and **30747**; above **30819** (*q.v.*). Cut by scoop **30781** (*q.v.*).

*Sample 2128* (BS—VW): A smallish assemblage of 21 taxa was recovered, mostly of weeds; it has the appearance of many lists from these and many other urban archaeological deposits and in isolation is of little interpretative significance.

*Sample 2129* (Spot): a piece of orpiment, a bright yellow trisulphide of arsenic. *Sample 2130* (Chemical): light-mid grey, crumbly, sandy clay silt.

**Context 30752:** layer [in Tenement D]; spread of burnt material; dark brown crumbly burnt clay and tile fragments. Below **30711** (*q.v.*). *Sample 2235* (Chemical): light-mid grey, crumbly, sandy clay silt.

**Context 30841:** layer [in Tenement D]; rubbly layer of very dark grey clay loam with a high content of charcoal flecks. Large concentration of animal bone. Below **30735**; above **30843** (*q.v.*).

*Sample 2152* (BS—V): Only rough-sorted plant remains were available from this sample (probably there was no washover). The four taxa recovered cannot be interpreted in isolation, but it appears that there was, indeed, very little organic matter in this deposit.

**Context 30842:** layer [in Tenement D]; very dark grey clay loam (like **30841**, but much less gritty and rubbly). Large charcoal content in southernmost area of spread collected for a C14 date. Stratigraphically equivalent to **30841**. Below

**30735**, **30839** and **30841**; above **30843** (*q.v.*).

*Sample 2149* (BS—VW): There was a small assemblage (16 taxa) from this sample, including *Cannabis* and *Rubia* and a modest component of charred grain, especially *Hordeum* (at an abundance of 2). No particular discussion of this group is warranted, however.

**Context 30843:** layer [in Tenement D]; very dark grey gritty clay loam with very small amount of charcoal flecking. High concentration of animal bone. Below **30735**, **30841**, and **30842** (*q.v.*).

*Sample 2162* (BS—VW): This deposit was evidently more richly organic than the stratigraphically related contexts **30841** or **30842**; its assemblage comprised 31 taxa, though with only fat-hen (*Chenopodium album*) and elder seeds reaching an abundance of 2. Indeed, only weed taxa were reasonably well represented, with one of only five records for ?scotch thistle (cf. *Onopordum acanthium*) for the site as a whole amongst them. This biennial is likely to have required at least one season's lack of disturbance to reach flowering and seed-set.

**Context 30845:** layer [in Tenement D]; thin band of black charcoal apparently separating **30846** from **30844**. Below **30735** (*q.v.*). *Sample 2148* (C14): no action to date.

**Context 30859:** layer [in Tenement D]; brown ash mixed with 10% very dark grey silty clay loam. Below **30749**; above **30750** (*q.v.*). *Sample 2155* (Chemical). Light yellow-grey, crumbly, silty sand with patches of ?slag residue. *Sample 2156* (Chemical): for Dr J. Hunter.

**Context 30864:** layer [in Tenement C]; a largish area 3 m across of very dark grey sticky clay loam with 10% mottling of clean brown clay and 10% charcoal flecking. Above scoop **30818**; abuts **30740** (*q.v.*).

*Sample 2211* (BS—VW): Only trace amounts of *Corylus* nutshell and charred *Hordeum* grains, together with modest numbers of earthworm egg capsules, were recorded during the archaeo-

botanical analysis of this sample.

**Context 30879:** layer [in Tenement D]; mixed material—70% matrix of tile fragments and burnt sandy clay, 30% very dark grey clay loam. Above **30760** (*q.v.*). *Sample 2169* (Chemical): varicoloured—mid-dark grey-brown to light brown and reddish-brown, crumbly, sandy clay silt. *Sample 2170* (Chemical): for Dr J. Hunter.

**Context 30880:** layer [in Tenement D]; sticky light red-brown unburnt clay—10% blobs less than 20 mm diameter of red burnt clay, 10% very dark grey clay loam. Equivalent to **30992**; below **30879**; above **33017** (*q.v.*). *Sample 2248* (Chemical): light yellow-brown, crumbly, sandy silt. *Sample 2249* (Chemical): for Dr J. Hunter.

**Context 30889:** layer [in Tenement D]; light yellow-brown ash with 10% very dark grey clay loam. Below **30894**, above **30886** (*q.v.*). *Sample 2187* (Chemical): light-mid yellow-brown, crumbly, slightly silty sand. *Sample 2188* (Chemical): for Dr J. Hunter.

**Context 30890:** layer [in Tenement D]; very dark grey silty clay loam with 20% charcoal fragments, light brown clay flecking, ash and tile. Below **30799**; above **30983** and **30957** (*q.v.*). *Sample 2223* (Chemical): light-mid grey-brown, indurated, somewhat heterogeneous, sandy silty clay with traces of charcoal and tile fragments. *Sample 2224* (Chemical): for Dr J. Hunter.

**Context 30894:** layer [in Tenement D]; red burnt sandy clay with 5% very dark grey clay loam. Below **30884**, above **30889** (*q.v.*). *Sample 2189* (Chemical): light-mid red-brown, crumbly, silty sand. *Sample 2190* (Chemical): for Dr J. Hunter.

**Context 30939:** layer [in Tenement D]; very dark grey clay loam lens; very rubbly in texture, with inclusions of small tile flecks and some limestone fragments; some glass-coated ceramic material. Below **30890**, above **30760** and **30983** (*q.v.*). *Sample 2243* (Chemical): mid grey (with light yellow brown flecks), crumbly, slightly sandy clay silt.

**Context 30941:** layer [in Tenement D]; red-grey clay, decayed sandstone and 25% dark grey loamy clay. Below **30890** (*q.v.*). *Sample 2260* (Spot): iron-stained mortar.

**Context 30946:** layer [in Tenement D]; dark reddish-brown coarse clinkerish material, consisting principally of some slag-like fragments, coarse ash and fine rubble. Within **30760** (*q.v.*). *Sample 2256* (Chemical): light yellow-brown, crumbly, sandy clay with abundant ?slag.

**Context 30947:** layer [in Tenement D]; dark brown sandy clay, lightly burnt, with flecks and pockets of finer ash, charcoal flecks and tiny tile fragments. Below **30799** and **30884**; above **30760** (*q.v.*). *Sample 2255* (Chemical): mid grey-brown to light reddish-brown (with pale yellow-brown), crumbly, somewhat heterogeneous silty clay: burnt soil.

**Context 30957:** layer [in Tenement D]; very dark grey clay loam; 20% ash and charcoal fragments, several large patches of clean pink clay. Below **30890** (*q.v.*). *Sample 2294* (Chemical): mid-dark grey-brown, crumbly, slightly humic sandy clay silt.

**Context 30962:** layer [in Tenement D]; very dark grey clay loam with 20% charcoal fragments; tile and ash fragments and a few clay lumps. Above **30983** (*q.v.*). *Sample 2269* (GBA): no action to date.

**Context 30966:** layer [in Tenement D]; very dark grey ash and burnt brick; below **30760** (*q.v.*). *Sample 2267* (Chemical): mid grey (to slightly varicoloured), crumbly, sandy clay silt with traces of ?slag. *Sample 2268* (Chemical): for Dr J. Hunter.

**Context 30971:** layer [in Tenement D]; dark brown clay with tile fragments; in tile spread **30933**. Below **30941** (*q.v.*). *Sample 2262* (Chemical): light grey, crumbly, sandy silty clay with traces of 2-20 mm stones.

**Context 30983:** layer [in Tenement D]; mixed dark grey clay loam with ashy patches (increasing in intensity towards hearth); charcoal and tile flecks,

and patches of clay. Below **30890** and **30962** (*q.v.*). *Sample 2276* (Chemical): for Dr J. Hunter (described in the EAU as mid grey-brown, to slightly varicoloured, crumbly, slightly clayey sandy silt with traces of charcoal).

**Context 31000**: layer [in Tenement B]; black sticky clay silt with no obvious inclusions. *Sample 2298* (Chemical): for Dr J. Hunter. *Sample 2299* (Chemical): light yellowish-grey to mid grey sandy silt (mixture of ash and soil) with abundant charcoal.

**Context 34816**: layer [in Tenement B]; light olive-grey ash deposit with dark grey friable loam; occasional charcoal flecking. Above **34815** (*q.v.*). *Sample 2433* (Chemical): light yellow-grey, crumbly, sandy silt.

### The pits of Period 3

Pits were numerous in the excavated area (which was mainly on the south-west side of the site, in the parts which were later occupied by Tenements A and B). They ranged in size from small (of the order of only 0.5 m in diameter and depth), to large (over 2 m in diameter and 1.5-2 m in depth), the majority being not far from one metre in diameter and depth. The shapes in plan were usually roughly circular, the section generally showed near-vertical sides, sometimes with the mouth widening, perhaps as a result of slumping.

The fills of these pits were generally richly organic and clearly stratified, and some had very complex fill stratigraphy. Fill layers were typically of the order of 10-20 cm thick, although there were many exceptions. Few pits of this period appear to have been lined with wickerwork (as seen in many of the later pits). An extensive study has been made of the Period 3 pits; unfortunately, however, the distribution of fills examined is not ideal and the central and rear groups (see below) were particularly poorly worked. This resulted from the necessity to carry out analyses of Period 3 deposits long before it was practicable to obtain adequate archaeological information.

### Pits in the area of later Tenements A and B

Seven cuts were placed in this group; it included four large pits which were used in investigations of variability between contexts in the fills of single cuts, and from which there are thus rather large numbers of samples. These pits lay towards the putative street frontage.

**Context 27288**: [Pit A] This large pit was situated in the north-west corner of the site and cut by the shoring. It was extensively sampled with a GBA sample collected from each of the eight contexts in the main vertical sequence and a BS sample from six of them. A further spot sample (*1744*) was taken from Context **26721**. The samples are described in sequence from lowermost to uppermost. This pit was used in a study of inter-contextual variation in pit fills; this piece of work was important in the development of test/scan recording methods.

### Context 26732

*Sample 1739* (BS—VW): With an assemblage of 48 taxa, this was one of the largest (sixth in rank order) for the series of BS subsamples from Period 3 deposits. It gave the fourth highest AIV within this series for the annual nitrophile weed group CHEN (made the all the larger by abundance scores of 2 for *Atriplex* sp(p), *Chenopodium album*, and *Urtica urens*, all of which have indicator values of 3 and which together contribute a total of 18 to the AIV of 45).

Alongside this weed component (and the perennial nitrophile weeds of group ARTE were also rather well represented in this assemblage), there was evidently some food waste—probably faecal in origin. Thus, together with small amounts of wheat/rye ‘bran’, there were traces of coriander (*Coriandrum sativum*), celery-seed (*Apium graveolens*), and dill (*Anethum graveolens*) (all presumably used as food flavourings), apple (*Malus*), hazel nut (*Corylus*) and sloe (*Prunus spinosa*) (fruits and nuts) and the charred cereals oats (*Avena*), barley (*Hordeum*), rye (*Secale*), and bread/club wheat (*Triticum aestivo-compactum*).

This component of foodplants was not especially large in comparison with other layers from this pitfill, however, and it seems likely that this layer mainly formed by gradual accretion of mineral material through natural infilling, or by deliberate backfilling with ‘soil’; is it, perhaps, slump during the early phase of use of the pit? The score of 2 for earthworm egg capsules probably accords with this interpretation. The presence of reed (*Phragmites*) culm-nodes may indicate that roofing or flooring material was present in the fill, but these remains were only present in small numbers.

*Sample 1738* (GBA): black, slightly clay silt with some organic detritus and small stones.

Plants (/M): The large plant macrofossil assemblage of 66 taxa from this small (0.5 kg) subsample was the second largest of any from Period 3. Like the BS subsample, it was dominated by weed taxa, the high AIV of 61 (the highest for any Period 3 sample) being accounted for by 26 taxa, some—*Chenopodium album*, *Stellaria media* and *Urtica urens*—scoring 2 on the three-point scale of abundance. Other weed groups were well represented, too: ARTE achieved its highest AIV (24, based on 11 taxa) for Period 3 assemblages, SECA its second highest (33, from 14 taxa). In ARTE, only *Urtica dioica* had an abundance of 2; in SECA all taxa scored 1 except *Stellaria media*. (As noted elsewhere, the proportionately high AIV for EPIL (nitrophile plants of woodland margins and clearings) is probably meaningless, the five taxa contributing to it not forming a very coherent group.)

Possible grassland/reedswamp taxa were quite well represented here, with the second highest AIV for MOAR (20 from 10 taxa, more than double the period mean value) and the third highest for PHRA (7 from 4, nearly three times the mean value); two taxa (*Ranunculus* Section *Ranunculus* and *Eleocharis palustris*) are shared by these groups. Such plants might be growing on meadowland and water-marginal vegetation near to the site, or have been imported with cut vegetation such as reed for thatch. It may be significant that one of the few identifications of *Phragmites* from Period 3 deposits was from this context (*Sample 1739*, see

above).

The small range of probable foodplants echoes those from the BS subsample; only *Linum usitatissimum* is added to the list for this context. The residue after processing was noted as having rather a lot of charcoal (abundance score 2); perhaps ashes formed part of the fill at this stage.

Parasitic worms: A single damaged *Trichuris* egg was recorded.

Insects (/1, /M): A very small assemblage of beetles was recovered from subsample /1 by ‘detail’ recording (N = 34, S = 26). Some of the outdoor species were preserved in a different condition from the bulk of the fossils in the pit and it is possible that they were redeposited. A single specimen from the /M subsample was provisionally identified as *Oryzaephilus* sp. and is significant in that it *may* indicate redeposition from Roman levels (which, together with the natural, were penetrated by the bottom of the pit). *O. surinamensis*, the only species of the genus so far found in British archaeological deposits, is consistently abundant in Roman deposits in York and elsewhere but there are no definite records from the Anglo-Scandinavian period. Apart from this specimen, the assemblage resembles a random sample of the fauna of the overlying contexts.

Insects from the /M subsample were recorded non-quantitatively; there were few remains.

### Context 26721

*Sample 1736* (BS—VW): The assemblage of 42 taxa was quite large for the Period 3 series, nearly 40% being annual nitrophile weeds. The foodplant component was rather larger than in previous samples from this sequence of pitfills, however, with the AIV for FOOS of 46 (from 14 taxa) being fifth highest for the Period 3 BS subsamples, and FOOF (12 from 4) being third highest for that group. There were small amounts of faecal concretions, and *Triticum/Secale* ‘bran’ was recorded at an abundance score of 2, indicating that some of the material was faecal in origin. In addition to the food flavourings also noted from

lower subsamples, summer savory (*Satureja hortensis*) was recorded from this subsample, and there was a range of fruits including apple, sloe (abundance 2) and ‘plum’ (*Prunus domestica*). Besides the cereal ‘bran’, there were charred grains of the four major cereals. The moderately abundant fragmentary corncockle (*Agrostemma githago*) seeds are likely to have been a crop contaminant ingested with flour-based foods.

The trace of *Dipsacus sativus* fruits—giving a proportionately high AIV for the ‘other useful plants’ group USEF—will be discussed under *Sample 1732* (below).

Fly puparia were present in modest numbers; there were some *Musca domestica* and Sepsidae, and small numbers of *Fannia* sp. and *Paregle radicum*.

Parasitic worms: A sample of concretion gave modest numbers of *Trichuris* eggs, mostly entire, from two subsamples. Measurements of these eggs were made.

*Sample 1732* (GBA): mottled brown to black (?oxidation effect) organic silt with large stones, wood in ca. 10 mm chunks, clods of matted moss and some light brown silt.

Plants (/M): Of the large assemblage of 57 taxa recorded, the dominant components were arable and disturbed ground weeds and foodplants, though woodland taxa, including several mosses, were also well represented. Probable food taxa not recorded in *Sample 1736* from this context were flax/linseed (*Linum usitatissimum*) and ‘bilberry’ (*Vaccinium* s(p)). Wheat/rye ‘bran’ was very abundant (scoring 3 on the three-point scale) but faecal concretions were not a major component of the subsample. Microscopic examination of fragment of undisaggregated matrix showed the eggs of *Ascaris* and *Trichuris* to be common and there is little doubt that the bulk of the deposit was faecal in origin, but with an admixture of weed taxa and probably some other materials.

The woodland taxa indicate exploitation of an environment that can probably be assumed to have been at some distance from the site. Whilst the taxa

contributing to the relatively high AIV for QUFA (second highest for this series of samples) were in the main foodplants, the mosses might have been accidental or deliberate imports. Thus mosses such as *Antitrichia curtispindula*, *Homalia trichomanoides*, and *Neckera complanata*, might all have originated on bark stripped from wood, though only the first of these is primarily associated with bark. It is perhaps more likely that these large branching mosses were used as anal wipes. Though recorded during description of the raw sediment as being present as ‘clods’, they were not recorded in the particular subsamples examined in the quantities seen in some other cess pit deposits from this site.

Both fruits and receptacular bracts of fullers’ teasel (*Dipsacus sativus*) were recorded from this subsample, the latter at a score of 2 (fruits were also present in the BS sample). The teasel heads that these remains represent are of course likely to have been used in textile working for teasing wool. These, and some other records for *D. sativus* from the fills of this pit, were the only ones for the entire Anglo-Scandinavian period at Coppergate. Other possible evidence from this sequence for textile working is limited to records of flax seeds (which could equally well represent food remains) from five of the fill contexts (with capsule fragments from one of these, **26715**), hemp ‘seed’ (another potential foodplant or oilseed) from four, and traces of plants used in dyeing or mordanting—woad (*Isatis tinctoria*) and clubmoss (*Diphysium complanatum*) from **26715**, and weld (*Reseda luteola*) from two contexts (though these are the upper- and lowermost fills and it is possible that weld is simply present as a weed. Two further possible dyeplants are agrimony, *Agrimonia eupatoria* (from one context) and hop, from four contexts.

Equally curious were the salt-marsh taxa sea arrow-grass (*Triglochin maritima*) and *Juncus* cf. *maritimus*. The former is widely recorded from Roman deposits in York (cf. Hall and Kenward 1990) but there are several possible ways it might have arrived and for none of these is there substantial supporting evidence at the present site.

Parasitic worms: Modest numbers of *Trichuris* eggs were recorded from the single subsample examined.

Insects (/1, /2, /M): The 2 kg /2 subsample provided a modest assemblage of beetles (detail recording: N = 158, S = 74). Diversity was moderately high ( $\alpha = 54$ , SE = 7), and the outdoor component rather large (%NOB = 22). Over half the specimens were of species associated with rotting matter of some kind (%NRT = 57), while forms preferring rather dry decaying matter comprised 17% of the assemblage and those associated with foul rotting matter made up 6%. The more abundant species included some associated with dryish mouldering matter, others preferring rather foul rotting matter and some perhaps originating in background fauna. The assemblage did not give an unequivocal indication of conditions in the pit as Context **26721** was deposited but fitted into the pattern of the overlying few contexts. It is possible that there was variation in the kind of decaying matter exposed at the surface either in space or in time, but the presence of *Cryptophagus*, *Atomaria* and *Lathridius minutus* group gives a hint that house sweepings might be present, a possibility reinforced by the presence of six human lice, *Pediculus humanus*.

Phytophages were rather numerous, and this was the only sample from Cut **27288** with a phytophagous species in the higher ranks: eight individuals of *Ceutorhynchus contractus*, whose host may thus have grown nearby. This small weevil mines in plants of the family Cruciferae, which includes some common weeds as well as vegetables like cabbage and turnip. A likely origin is from weeds such as shepherd's purse (*Capsella bursa-pastoris*), growing round the pit. This plant is highly tolerant of disturbance and was present in small amounts in three other contexts from this pit (although not in the present one).

Fly puparia were abundant but not all were identified; several respiratory processes of larvae of syrphid flies were recorded. There were many mites and quite large numbers of beetle larvae.

The 1 kg /1 subsample gave an assemblage of 82

beetles (no bugs), 47 taxa being recorded. Main statistics were very close to those for the second, larger, subsample described above. The species lists were also fairly similar, with much the same range of abundant taxa. Phytophages were rather abundant here too, with *Longitarsus* sp., *Ceutorhynchus contractus* and a second *Ceutorhynchus* species all represented by three individuals, and two specimens of a black *Phyllotreta* species. There were 'several' beetle and syrphid larvae, and many puparia; bee (*Apis mellifera*) wings representing at least two individuals were noted.

The /M subsample was also examined for insects; 17 individuals were recorded, a random extract of the fauna from the main insect subsamples. A record of *Otiorhynchus ligneus* is worthy of note since this species is very rarely recorded from urban deposits.

*Sample 1744* (Spot): Though sampled as the fill of a pot in this pit, a small subsample (100 g) was examined for plant remains. It was found to be rich in wheat/rye 'bran' (with *Agrostemma githago* seed fragments) and parasite eggs. *Dipsacus* fruits were again present at trace amounts, and cat-mint (*Nepeta cataria*) was recorded amongst the probable flavouring/herbal plants. This record was one of only three secure determinations for Period 3, one of the others coming from *Sample 1734* from a higher layer within the same pit as *1744*, the third from a pit near the centre of the site (**36158**).

Parasitic worms: Modest numbers of *Trichuris* eggs were recorded from the single subsample examined.

### Context 26718

*Sample 1733* (BS—VW): The rather large assemblage from this subsample was dominated by weeds of groups CHEN and SECA (the latter yielding its third largest AIV for the BS subsamples for Period 3), with a strong component of foodplants, especially 'flavourings' (*Humulus lupulus*, *Apium graveolens*, and *Satureja hortensis*). Faecal concretions were recorded as abundant during rough-sorting but were not available when the plant lists were compiled;



eggshell membrane fragments were also present, and the fragments of wool from this sample might, along with the rather large variety of mosses, represent anal wipes. Mosses of bark (group LIGN) achieved their highest AIV (of 11) for the Period 3 BS samples, though all the six taxa were present only in small amounts.

Parasitic worms: A sample of concretion yielded modest numbers of *Trichuris* eggs from one subsample and a trace from the other. Measurements of the eggs were made for the richer subsample.

*Sample 1731* (GBA): heterogeneous very dark clay silt with moss, stones and monocotyledonous stems/leaves.

Plants (/M): Only a preliminary examination was made of a 0.25 kg subsample of this sample, so the total of 17 taxa is, not surprisingly, well below the Period 3 mean of 29 (the mean for samples excluding those less than 0.5 kg is 30). Along with traces of receptacular bracts of *Dipsacus sativus* (cf. *Sample 1732*, above), there were large concentrations of wheat/rye 'bran' and *Agrostemma githago* seed fragments and foodplants dominated the statistics.

Parasitic worms: There were quite large numbers of *Trichuris* eggs and a single crumpled *Ascaris* egg from the subsample examined. Measurements of *Trichuris* eggs were made.

Insects (/1): A small assemblage was recovered and detail recorded (N = 45, S = 31);  $\alpha$  was estimated at 45 (SE = 14). Outdoor forms accounted for 20% of the individuals with a third of the outdoor component being damp ground/waterside taxa and the remainder phytophages. Just over half the assemblage was made up by decomposers (%NRT = 53) and this component was of low diversity ( $\alpha$  RT = 21, SE = 9), suggesting breeding, although a background origin for the assemblage cannot be ruled out. Two individuals of *Kateretes rufilabris*, a species repeatedly recorded in Roman deposits at the General Accident site, 24-30 Tanner Row, York, were present.

There were a few fly puparia, mostly Sepsidae sp. and 'several' mites, but rather few other invertebrate remains.

### Context 26716

*Sample 1730* (GBA): dark brown to black friable clay silt.

Plants (/M): A subsample of 0.1 kg was examined; it gave a small assemblage (16 taxa), with 'bran' scoring 3 and *Agrostemma githago* seed fragments scoring 2. There is little doubt that this material was more or less pure faeces, to judge from this and from the nature of the sediment, though foodplants were restricted to 'bran', charred *Triticum* sp(p)., and waterlogged *Corylus avellana* and *Sambucus nigra*. A larger subsample would no doubt have yielded a greater range.

Parasitic worms: There were small numbers of *Trichuris* eggs and a single *Ascaris* in the subsample examined.

Insects (/1+2, 3 kg): The minimum number of individuals of beetles and bugs was estimated as 198, including 84 taxa (detail recorded). Diversity was moderately high ( $\alpha$  = 55, SE = 6), and the outdoor component modest (%NOB = 13, although %SOB = 25;  $\alpha$  OB high at 50, but error large, SE = 24). The rotting matter component was a little large for Anglo-Scandinavian samples from York (%NRT = 70) and of low diversity ( $\alpha$  RT = 22, SE = 3), suggesting that there was a breeding community. The dry decomposer component was not large (%NRD = 12) but foul matter taxa were quite abundant (%NRF = 11). The species in the higher ranks include the following typical of foul rotting matter: *Cercyon haemorrhoidalis* (with five individuals); *Platystethus arenarius* (5); and *C. unipunctatus* (4). Some other species which would be at home with these were abundant or quite abundant: *Anotylus complanatus* (11); *Gyrophypnus fracticornis* (6); *Cercyon analis* (5); and several taxa of which four individuals were recorded. As in other assemblages from this pit, however, a mixture of decomposer habitats is indicated; *Falagria ?caesa* (9) and *Sericoderus lateralis* (5), for example, would have required relatively dry

conditions.

If most of the abundant species bred in the pit, then the surface of its fills can hardly have been more than intermittently water-covered. In view of this, the presence of four individuals of *Cercyon convexiusculus* is worthy of remark. This beetle is normally found amongst litter at the edge of water. It has only rarely been recorded from urban archaeological deposits, and then as single specimens. Four individuals is thus a rather large number to be dismissed as of casual occurrence and the species may have been attracted to the pit during a wetter phase. There were also three *Helophorus* water beetles of two species.

The flots contained abundant fly puparia, the majority being Sepsidae sp. and *Leptocera* sp. There were also many mites, Hymenoptera Parasitica and ?psocids.

### Context 26715

*Sample 1735* (BS—VW): The assemblage of 56 taxa was the third largest for the Period 3 BS subsamples, though most taxa were scored with an abundance of 1. Abundance scores of 2 for *Triticum/Secale* ‘bran’, *Apium graveolens* and *Prunus spinosa*, however, accounted in large part for the high AIVs for FOOS (second highest for this series of subsamples) and the high *Apium graveolens* abundance inflated the AIV for FOOF (the highest for the series). Also counted in the latter group were *Humulus lupulus*, *Satureja hortensis*, *Coriandrum sativum* and *Anethum graveolens*. Other taxa in FOOS included fruits (*Malus*, *Prunus domestica*, *Rubus fruticosus*), nuts (*Corylus*), cereals (charred barley, wheat and oats) and pulses (charred *Vicia faba*).

Together with the cereals and ‘bran’ was a large proportion of cornfield weeds—group SECA reaching its second highest period AIV of 30, with 12 taxa; the AIV for CHEN, by contrast, was not much more than the period mean value for this series. Woodland mosses were quite well represented, but the high AIV for the woodland margin group RHPR (18—the highest for the series, based on nine taxa) is misleading, since the

taxa involved do not make a neat ecological group, all perhaps being equally likely to be brought to the town for some purpose—for bedding (*Pteridium aquilinum* rachis and pinnule fragments), food (*Sambucus nigra*, *Crataegus monogyna*, *Prunus spinosa*, *Rubus fruticosus* and *Humulus lupulus*) or even dyeing or medicinal use (*Agrimonia eupatoria*). The high score for this group thus indicates exploitation of a particular habitat—probably from different places—rather than the presence of such vegetation in the vicinity. (Taxa in RHPR, almost by definition, are likely also to grow in other places, so the high score may be very much an artefact.)

Two potential fibre/oilseed plants were also present in this subsample of 1735—hemp and flax (the latter represented by both seeds and capsule fragments).

Puparia of *Musca domestica* were moderately abundant; three other species were present.

Parasitic worms: two subsamples from concretions in the BS residue were examined. Modest numbers of *Trichuris* eggs were recorded from both. Measurements of the eggs were made.

*Sample 1729*: black organic silt, almost a mud, *sensu stricto*, with grey silt patches (?lenses); some parts primarily greyish silt.

Plants (/M): The subsample from 1729 was a 0.1 kg ‘pilot’; it gave a modest assemblage (for its size) of 18 taxa, most of them weeds or foodplants. Wheat/rye ‘bran’ scored 3 and *Agrostemma githago* seed fragments 2, and there were scores of 3 for both *Ascaris* and *Trichuris* eggs—indicating the material to be largely faecal in origin.

Parasitic worms: Rather large numbers of *Trichuris* eggs (some measured), were recorded, together with traces of *Ascaris*.

Insects (/1+2, 3 kg): Detail recorded; the recovered assemblage was quite large: 198 individuals and 70 taxa. Diversity was not very high ( $\alpha = 39$ , SE = 4); outdoor taxa accounted for 12% of the total assemblage but 24% of the taxa. The only outdoor

taxa with more than two individuals, however, were *Aphodius granarius* and *A. ?prodromus*, doubtless attracted to the pit (they are dung beetles). These species were probably responsible for the low value of  $\alpha$  OB (27, SE = 12) and the remaining outdoor fauna were probably true background fauna.

The rotting matter component was about normal for the present site (%NRT = 68), but with the foul matter component rather large (%NRF = 13). The low diversity of the decomposer component strongly indicates breeding ( $\alpha$  RT = 18, SE = 2). The principal foul matter species were *Platystethus arenarius*, *Cercyon atricapillus*, *Aphodius prodromus*, *C. haemorrhoidalis*, *C. terminatus* and *A. granarius*, all with six or more individuals. *Acritus nigricornis* (11), *Cercyon analis* (10), *Oxytelus sculptus* (8), *Anotylus rugosus* (5), *Leptacinus* sp. (4) and *Gyrophypnus fracticornis* (3) would all have been at home with the foul matter component. The deposit was clearly exposed to background fauna as it formed and was colonised by a variety of species found in decaying matter. This was at least in part foetid, faeces probably being exposed so as to attract foul matter insects.

(Note that *Cercyon atricapillus* is common in urban archaeological deposits, having been confused by the author in the past with *C. pygmaeus* as a result of comparison with incorrectly-named reference material. No *C. pygmaeus* have been recognised in recently-examined material or in that which has been re-examined. A striking thorax character separates the two species, but the elytra may be distinguished by the fine prostrate hairs in *C. atricapillus*, absent in the examined material of *C. pygmaeus*. There are other, more subtle, differences in sculpturation, and the sternal keels are characteristic.)

There were abundant fly puparia, the majority being Sepsidae sp. and *Muscina* sp.; mites and beetle larvae were also abundant.

### Context 26631

*Sample 1721* (BS—VW): With 38 taxa, this subsample was somewhat smaller than that from *1735* yet, in terms of some of the statistics

describing the kinds of plants present, it was very similar to it. Groups that were less well represented were DYES, FIBR, FOOF, FOOS, SECA and mosses. It is likely, however, that the main component of the fill was human faecal material.

*Sample 1714* (GBA): crumbly dark organic silt.

Plants (/M, /T): The assemblage of 40 taxa from the smaller (0.5 kg), /M, subsample was rather above the average for the Period 3 subsamples in this series. The best represented groups were weeds in groups CHEN and SECA, and foodplants in FOOS. The last of these included wheat/rye ‘bran’ at an abundance of 2, the remaining food taxa being present in small amounts (and including *Malus*, *Rubus*, *Corylus* and *Triticum aestivo-compactum*). Both celery and dill were present in the ‘flavourings’ group. Faecal material is again probably indicated.

The larger (1 kg), /T, subsample gave a somewhat smaller assemblage of plants in terms of numbers of taxa—33 were recorded. This probably reflects the ‘scanning’ approach adopted to the /T subsamples compared with the more rigorous, but much more time-consuming examination of the /M series. Overall, the derived statistics for the two subsamples were rather similar, though the /T subsample gave a greater diversity of mosses, with the second highest AIVs for this series of samples for groups LIGN, SLIT and WOOF (based on the presence of seven taxa, some of which are scored in two or all three of these groups). In terms of the lists of taxa, there was only a modest overlap (Jaccard coefficient of community = 21%, increased by an insignificant amount if tentative identifications were taken as secure).

Parasitic worms: Three subsamples were examined; rather small numbers of *Trichuris* eggs were recorded from each of them and a few *Ascaris* in one. Measurements of *Trichuris* eggs were made.

Insects (/1+2+M (3.5 kg), /T): The results from the /1, /2 and /M subsamples were combined for analysis of beetles and bugs. A large assemblage resulted (detail recording), the minimum number of individuals being 369, with 93 taxa present. The

concentration of insects was quite high at 105/kg. Alpha ( $\alpha$ ) was estimated at 40, with an SE of 3. The proportion of outdoor individuals was low (%NOB = 7), perhaps depressed by an abundant breeding community. The percentage of outdoor taxa was quite large (PSOB = 24), evidence of deposition in the open—the outdoor component was rather diverse,  $\alpha$  OB = 54 (although with an SE of 26).

The assemblage was dominated by three taxa: *Carpelimus bilineatus* (54 individuals, 15% of the assemblage); *Neobisnius* sp. (54, 15%), and *Clambus pubescens* (34, 9%). Some other species were quite abundant and it appears that the assemblage included a rich breeding community and a large number of infrequent ‘background’ species. The decomposer component was of very low diversity ( $\alpha$  RT = 15, SE = 2). The proportion of rotting matter forms (56%) was quite low for an assemblage from a Period 3 deposit, but if some uncoded taxa are included—as they probably should be—the value rises to a typically high level of 83%. The species associated with rather dry mouldering matter made up a quite small proportion of the specimens (%NRD = 7), and the foul matter component was modest in percentage terms (%NRF = 5), but numerous in absolute terms and probably included taxa breeding in the pit fill.

Ecologically, the commoner species were rather mixed. As with so many Anglo-Scandinavian assemblages, interpretation revolves around the question of the habitat of *Carpelimus bilineatus* in the past (Hall *et al.* 1983, AY 14/4, 212-14). In this case, the equally vexed question of the habitats of *Neobisnius* sp. in ancient towns is also raised. (It has not yet been possible to confirm the identification for the present sample but all the *Neobisnius* material so far examined is believed to be *N. villosulus*.) Some light is cast on the problem, however. Both species are abundant, in good condition, and represented by some pale, or congenitally-distorted specimens. These characteristics are seen as evidence of autochthony (Kenward 1976, 14). If the evidence for the modern habitats of these species is taken as a whole, they seem to indicate the presence of masses of wet but rather open-textured rotting plant litter, like reed

(in the broadest sense) debris in texture. Such conditions may have been provided by moss or other plant material thrown into the pit, or just by drying, crumbling and bioturbation of faecal material. *C. bilineatus* and *Neobisnius* sp. may have been trapped and killed in large numbers when soil was thrown into the pit, or less probably (as they adapted to waterside habitats) when the surface of the fills flooded. Reading the literature uncritically, the first 10 ranks of abundance include five taxa which could be found in rotting vegetation by water, wet but not too oxygen-deficient. Alternatively, a substratum resembling organic waterside mud may have been presented by a mixture of faeces and litter.

While *C. bilineatus* and *Neobisnius* sp. indicate fairly wet conditions, *Clambus pubescens*, and probably the abundant *Atomaria* sp. (15 individuals) would have occupied drier habitats. The abundant *Cercyon* spp. would have preferred fouler conditions. A vertical or time succession of habitats may be indicated. Three human fleas (*Pulex irritans*) were recorded, but the ‘house fauna’ community was not strongly represented.

The assemblage includes representatives of a group of beetles regarded as post-depositional invaders of buried organic matter—*Coprophilus striatulus* (8), *Trechus micros* (7) and *Rhizophagus parallelo-collis* (6). *Euplectus* species are often recorded with these; there were 12 in the present case.

Three further taxa must be mentioned, for they have rarely been recorded from archaeological deposits in York. *Deporaus betulae* is a leaf-rolling weevil found mostly on birch but able to utilise other deciduous trees. The record of *Ischnodemus quadratus* or *sabuleti* almost certainly refers to the latter, as *I. quadratus* is restricted to Folkestone Warren, Kent in the British Isles. *I. sabuleti* is of particular interest because it has spread from southern England only during the past 100 years or so (Southwood and Leston 1959). There are two records from Anglo-Scandinavian Coppergate, so it seems rather likely that the bug was established in Yorkshire at that time. It is well known in Yorkshire at the present day. The bug is associated with grasses, usually in damp places. *Platypus*

*cylindrus* is associated primarily with oak, but is also known from other deciduous trees. It is a wood-borer, and can cause considerable damage.

Fly puparia were extremely abundant in the flots, with many Sphaeroceridae sp. and some *Muscina* sp., *Paregle radicum*, Sepsidae spp., *Tephrochlamys* sp. and *Leptocera* sp. Mites were abundant.

The 1 kg /T subsample gave 92 beetles and bugs of 45 taxa. The main statistics of the assemblage were, for practical purposes, identical to those for the 1+2+M group. The species list showed some differences, however: there was only a single *Clambus pubescens*, and there were slightly different proportions of the other more abundant species. These were probably related to deposition at slightly different times; overall, conditions were probably much the same. There were two human fleas, but few other remains were noted, apart from fly puparia, of which there were 'many'.

### Context 26630

*Sample 1734* (BS—VW): The assemblage of 47 taxa was well above average. It was dominated by weeds in groups CHEN (the sixth highest AIV for this series), SECA (fourth highest), foodplants in FOOS (sixth highest) and FOOO (second highest, though based on three taxa, one of which, *Brassica rapa*, is perhaps more likely to have been a weed of cultivated land). The four major cereals were all represented by trace amounts of charred caryopses. Perennial weeds in ARTE were quite strongly represented, and included *Nepeta cataria* (also perhaps used as a herb) and *Pastinaca sativa* (one of only two secure determinations for this plant from Period 3—perhaps as likely to have arrived with cut calcareous grassland vegetation as to indicate the use of parsnip as a vegetable—the plant is certainly unlikely to be used as a root by the time it is producing ripe fruits!). The relatively high AIV for the woodland group QUFA includes a record for *Ilex aquifolium* leaf epidermis fragments. These, common in later Anglo-Scandinavian deposits at Coppergate, were recorded from one other Period 3 context, with seeds of holly from a third.

*Sample 1728* (GBA): dark brown to black silt; friable, earthy.

Plants (/M): This subsample gave an assemblage of 31 taxa, with just over half of them nitrophile annual weeds of cultivated soils (group CHEN). No taxon scored more than 1 on the three-point scale used. Foodplants were restricted to *Corylus*, *Prunus spinosa* and *Sambucus nigra*. It appears that this deposit included very little organic refuse and may represent post-use infilling.

Parasitic worms: The single subsample gave traces of *Trichuris* eggs.

Insects (/1, /M): A modest assemblage (N = 57, S = 36) was recovered from the 1 kg subsample and it would have been impractical to provide a larger (and therefore interpretable) one. (The relationship between MNI and sample weight is not a simple arithmetical one. Doubling sample weight may only increase MNI by a small percentage when the concentration of remains is low, since most of the parts recovered in the additional subsample could have belonged to previously recorded individuals.) The material was detail recorded. The estimate of diversity,  $\alpha$ , was 42 (SE = 11) and the proportion of outdoor individuals was modest (%NOB = 12; %SOB = 19). The material could represent a random extract from other assemblages from the pit, but with the addition of *Carpelimus pusillus* group, of which there were 8, so that it clearly formed under slightly different circumstances.

Puparia of Sepsidae sp. were present in large numbers but there were few other arthropod remains.

The /M subsample produced 'many' fly puparia, but no other remains were noted.

### Context 26476

*Sample 1707* (GBA): dark brown to black silt with stones; rather homogeneous; friable and earthy.

Plants (/M): This subsample of the uppermost fill of pit Cut 27288 gave a somewhat above average assemblage of 34 taxa. Nearly half were annual

weeds in group CHEN (at 42, the fourth highest AIV for the group); nitrophile weeds of wetter habitats were also quite well represented (the AIV of 13 for group BIDE was the fifth highest for this series of samples). Somewhat surprisingly for a sample so poor in foodplants, the list included *Coriandrum* and *Apium graveolens*—perhaps reworked. As remarked earlier, the record of the possible dyeplant, *Reseda luteola*, in the absence of supporting evidence, may merely indicate that it was growing as a weed.

Insects (/1, /M): The 1 kg /1 subsample, detail recorded, gave a small assemblage (N = 37, S = 26); diversity was not very high ( $\alpha = 39$ , although SE = 14) and the proportion of outdoor individuals was small. The proportion of decomposers was about normal. Only two species were represented by three or more individuals—*Neobisnius* sp. and *Coprophilus striatulus*. The entire assemblage could be background fauna, have arisen by admixture of material from lower in the pit, or have been introduced with backfill. There were few non-beetles, although ‘several’ earthworm egg capsules were present. The /M material provided no useful additions to the record.

The evidence from the plant remains and parasite eggs suggests that this pit functioned as a cesspit while most of the fills were deposited. The insect remains indicate that the surfaces of the fills were at least in places moist and foul, and some seem to have been exposed to the open air for a long time. It appears that the pit was not within a closed structure. A few elements of the fauna may have been imported with moss or other material thrown into the pit (cf. medieval pits from Oslo, Norway, Kenward 1988). Sample 1714 included three taxa probably imported in this way which were otherwise rare or unrecorded at Coppergate.

The fauna does not offer much positive evidence about the surroundings of the pit. There were a few ground beetles and some phytophages associated with weeds, but not enough to suggest that a rich flora grew round the mouth of the pit or that it acted as a pitfall trap for crawling insects. Thus, on largely negative evidence, the surroundings seem to have been subjected to heavy disturbance. It is

notable that the only phytophage present in the fills in more than small numbers—*Ceutorhynchus contractus*—might find its cruciferous host plants even under highly disturbed conditions.

There was marked variation in the fauna through the succession of fills, although the differences were mainly in concentration of remains and in which species were most abundant. The lithology of the samples would not have given sufficient evidence as to which layers were likely to provide large (and thus readily interpretable) insect assemblages, or which might give especially significant archaeological information. It appears that single layers from complex pitfills are likely to be unreliable as a guide to the function and history of the pit. Clearly it is desirable to sample all layers and test process a subsample from each. Further work can then be carried out where it appears from a preliminary examination that useful archaeological information may be obtained.

Insects from the bulk samples: this pit was used to evaluate the potential of bulk samples in recording insect remains. It was supposed that bulk samples provided an opportunity to examine larger insects, especially predatory forms like Carabidae and Staphylinidae, which are generally present in relatively small numbers in the small subsamples of GBA samples conventionally examined, and to obtain more representative assemblages of fly puparia than are generally recovered from GBA samples. Rapid examination of the flots and residues from bulk samples from this pit indicated a low concentration of insects retainable on 2 mm mesh—other than puparia, which were abundant in some contexts, especially 26631 (Sample 1721). There is thus no evidence that the pit acted as a pitfall trap, which is perhaps surprising since the larger Carabidae (for example) usually fall into holes in the ground in considerable numbers. Two explanations are possible: firstly that the local population of such insects was small—implying a very high level of human disturbance indeed; or secondly that the pit was not normally water-filled and had sloping sides or material piled against the sides to form a ramp, facilitating escape. The rarity of these forms did not result from the pit having been rapidly backfilled, since decomposer species

had time to build up large populations in a series of layers, and there was apparently time for the deposition of 'background fauna. The same observations militate against the fills having formed in winter when ground beetle activity was minimal.

Insects from residues of a large number of other bulk samples have been very rapidly examined and only very rarely were more than one or two large beetles present. Recovery at the sorting stage may have been low, as most sorting was undertaken by unskilled workers, and it is also possible that most insects were carried off into the flots.

**Cut 27410** (Sections 2381 and 2283): A proportionately deep and narrow pit (varying in diameter between about 0.5 and 2 m, and in depth between 1.5 and 2 m). The sequence of fills was comparatively regular and all the major layers were sampled.

**Context 27874:** the basal context.

**Sample 1913** (GBA): black (oxidizing to brown) fine organic clay silt; sulphurous smell.

**Plants (M):** A smaller than usual subsample of 100 g was examined for plant remains. It gave an assemblage of 24 taxa, dominated by wheat/rye (*Triticum/Secale*) 'bran', the only plant food. Otherwise, the subsample yielded a range of weed taxa, mostly from group CHEN. *Trichuris* eggs were also present in modest amounts in a smear produced from some of the sediment matrix. The deposit was clearly faecal in nature, though it is surprising that, even from a 100 g subsample, no other foodplant evidence was forthcoming.

**Parasitic worms:** A subsample gave 26 unbroken *Trichuris* eggs, the majority lacking polar plugs; there were also a number of crumpled and fragmentary eggs. No *Ascaris* were observed.

**Insects (I):** The 1 kg subsample gave a rather small assemblage of 66 individuals, including 45 taxa, of Coleoptera and Hemiptera. The fauna consisted mostly of small numbers of individuals of taxa typical of the pits at 16-22 Coppergate. Diversity was quite high ( $\alpha = 62$ ; SE = 15).

Decomposers made up 68% of the individuals; this component may have included species breeding in, or more probably just attracted to, the fill. Fairly foul conditions were indicated by species such as *Cercyon haemorrhoidalis*, *Carpelimus fuliginosus*, *Platystethus arenarius*, and *Oxytelus sculptus* (three of each), and the foul decomposer component was relatively large (%NRF = 18, 27% of the decomposers). The most abundant taxon was *Carpelimus bilineatus*, with four individuals.

Puparia of *Leptocera* sp. were rather abundant and there was at least one other species of fly puparium; there was also a single bee (*Apis mellifera*) wing.

**Context 27873:** this overlay 27874.

**Sample 1912** (GBA): very moist, smooth, heterogenous, very organic 'mud' with abundant straw-like debris.

**Plants (M):** Again, a 100 g subsample was examined for plant remains. Of the 21 taxa recorded, 'bran' was predominant (and *Trichuris* eggs were noted as being present in quite large concentrations). This time, faecal concretions were also recorded (at an abundance of 2 on the three-point scale). In addition to 'bran', apple (*Malus sylvestris*) and ?dill (cf. *Anethum graveolens*) offered evidence for plant-based foods but both were present in only small amounts. A notable feature of this subsample was the record at an abundance of 2 of grass or cereal (Gramineae/Cerealialia) culm fragments. These might be stems from hay or straw from thatch, or floor litter, for example.

**Parasitic worms:** Several counts were made for parasite eggs; there were quite large numbers of both *Trichuris* and *Ascaris*, the proportion varying from about 2:1 to about 5:4—unusually large proportions of *Ascaris*. Measurements of *Trichuris* eggs suggested that the human whipworm, *T. trichiura* was the species concerned. Large proportions of *Ascaris* are said to be characteristic of infestations in pigs, but in the present case there is no other evidence to suggest that this was anything but human faeces. Measurements of

*Trichuris* eggs were made.

Insects (/1+2): Insects from the two subsamples (total weight 3 kg) were combined for 'detailed' analysis. A moderately large assemblage was thus obtained (N = 199; S = 92); diversity was quite high ( $\alpha = 66$ ; SE = 8) and the outdoor component substantial (%NOB = 20, with 23 'outdoor' taxa). This component was of quite low diversity ( $\alpha_{OB} = 24$ ; SE = 7). The more abundant members were: *Aphodius prodromus*, with 7 individuals; *Phyllotreta nemorum* group, 4; *Apion ?subulatum*, 3; and *Ceutorhynchus contractus*, 3. Possibly some or all of these bred near the pit. *A. prodromus* may have been attracted to its fills. Some of the less abundant taxa may, like *P. nemorum* group, *A. ?subulatum* and *C. contractus*, have been associated with weedy vegetation nearby.

The decomposer component was large (%NRT = 69) and ecologically mixed. Taxa coded 'rd' made up 32% of the decomposers, the most numerous being *Lathridius minutus* group (10), *Atomaria* sp. (6), *Ptinus fur*, a second *Atomaria*, *Ephistemus globulus* and *Typhaea stercorea* (all 4 individuals). Overall the impression was of 'compost heap'-like conditions, with variations in moisture content and texture in time and/or space. Dumping of relatively dry litter (perhaps already containing a fauna), which became fouler in the damp conditions of the pit is another possibility, but a typical 'house fauna' was not well developed and there were no fleas so this may not have been floor litter like that observed repeatedly elsewhere at Coppergate.

Puparia, especially of *Leptocera* sp., were fairly abundant, and there were many fly adults of a kind that was large with a slightly metallic cuticle. There were also 'many' mites.

**Context 27872:** overlay **27873**.

*Sample 1911* (GBA): very moist, dark clay silt with straw-like debris; 'black slimy cess'.

Plants (/M): A 100 g subsample of *1911* gave a much larger assemblage (44 taxa) than the subsamples from *1912* or *1913*, though only

'bran', with 3, scored more than 1 on the three-point scale. There is little doubt, again, that this deposit is faecal in nature, the list of foodplants comprising *Malus sylvestris* (only recorded as endocarp from the apple core), flax/linseed (*Linum usitatissimum*), and *Anethum graveolens*. Most other plant taxa recorded were weeds of some kind, with a component associated with trampled places (group PLAN) being well-represented within the assemblages from Period 3 as a whole (five taxa giving an AIV of 11, the second highest for this group). It is perhaps surprising that such plants were comparatively poorly represented in most deposits at a time when there was clearly much human traffic on or around the site.

Parasitic worms: Three subsamples gave quite large counts for *Trichuris* eggs, retention of polar plugs varying from about 20% to 75%. *Ascaris* was rare in two of the subsamples and absent from the third.

Insects (/1, /2): The /2 subsample, of 1 kg, gave an assemblage of 180 beetles and bugs, with 79 taxa; it was detail recorded. There were also abundant fly puparia (mostly *Leptocera* sp.) and 'several' beetle larvae. Diversity was moderate and the outdoor component modest ( $\alpha = 50$ ; SE = 7; %NOB = 12). Decomposers were abundant (%NRT = 67), with 'rf' taxa well represented (17 individuals, %NRF = 9). The assemblage was somewhat unusual at Coppergate, especially in Period 3, in its more abundant taxa: *Ptenidium* sp. (20); *Cercyon analis* (13); *Anobium punctatum* (7); *Carpelimus ?bilineatus* (6) and a large *Philonthus*, perhaps *politus* (6). There was probably a breeding community of decomposers in this layer (diversity was quite low,  $\alpha_{RT} = 27$ ; SE = 4), and the fill may have consisted of rather foul matter, perhaps fairly open-textured. There was a single human flea head.

The /1 subsample fauna was not recorded, but rapid examination showed that the flot contained remains of at least 14 *Trox scaber* (there were also three in subsample 2). This large species is usually recovered in ones and twos. It is generally found in dry animal remains and in wood mould and nests in hollow trees at the present day. These beetles may



have originated from a nest, but the range of habitats which *T. scaber* can exploit may be wider than suggested by the standard works (see Hall *et al.* 1983, 183). It has been recorded in large numbers by HK from a pitfall trap baited with rotting cat food. There is also a record from the Chaucer House site, Southwark, London, where one sample (unfortunately of uncertain size) gave several tens of individuals (Kenward 1990). *T. scaber* may be an indicator of rather dry animal remains, but this is uncertain.

Fly puparia were abundant in the /1 subsample; most were *Leptocera* sp., but there were modest numbers of Sepsidae and a single *Tephrochlamys tarsalis*.

**Context 27868:** overlay **27872.**

*Sample 1908* (BS—VW): The combined species lists for rough-sorting of the residue and detailed examination of the washover from this subsample gave a modest assemblage of 36 taxa (rather above the average for Period 3 BS samples). Faecal concretions were abundant, together with modest amounts of hazel nut (*Corylus avellana*), sloe (*Prunus spinosa*), Gramineae/Cerealia culm fragments and *Triticum/Secale* ‘bran’ (and fly puparia also scored 2). These point to the major component of this layer of the pit fill being faecal, though with some other materials. The presence of bracken (*Pteridium aquilinum*) stalk fragments together with the grass/cereal culm fragments perhaps points to the inclusion of bedding or litter. The list of probable food taxa includes hawthorn (*Crataegus monogyna*) and rose (*Rosa* sp(p.)) (presumably wild-collected), and *Anethum graveolens* and summer savory (*Satureja hortensis*) (presumably cultivated or even imported).

There were also traces of dyeplants in this subsample, albeit in small amounts: stem fragments of dyer’s greenweed (*Genista tinctoria*) and root fragments of madder (*Rubia tinctorum*). (Although there was possible later intrusion into the upper fills of this pit, it appears from the excavators’ section that this layer was probably uncontaminated.) Capsule fragments of *Linum*

*usitatissimum* may indicate further evidence of textile working, though they would also be present if extraction of linseed for oil or for food had occurred nearby. Though not scored as dyeplants, the heather (*Calluna vulgaris*) flowers from this subsample might also have arrived with plants brought to the site for dyeing.

*Sample 1907* (GBA): dark brown organic silt with coarse plant detritus.

Plants: The 0.5 kg subsample washed as a trial for plant remains was not examined in detail and has been treated as a ‘spot’ find for analytical purposes. It was found to have a large coarse (greater than 2 mm) fraction, including material thought to be straw fragments, and bracken pinnule (frond) fragments, together with ‘bran’ and faecal concretions. There were *Ascaris* and *Trichuris* eggs, too. The record of knapweed (*Centaurea nigra*) involucre and *Centaurea* sp. capitula probably points to the presence of hay. As well as bran, *Prunus spinosa* stones were recorded, but other foods were lacking. The corncockle (*Agrostemma githago*) seeds were probably a grain contaminant.

Parasitic worms: Very large numbers of *Trichuris* eggs were recorded from two subsamples and substantial numbers from another two; less than half retained both polar plugs in three of the subsamples, but the fourth, treated with sodium pyrophosphate, yielded eggs most of which had both plugs present. There were a few *Ascaris* in two of the subsamples. Some *Trichuris* eggs were measured.

Insects (/1+2): 4 kg of sample was processed and gave a large and distinctive insect assemblage which was ‘detail’ recorded (N = 389, S = 109). Decomposer insects were abundant (%NRT = 67), with species primarily associated with dryish and with foul rotting remains both quite well represented (%NRD = 17; %NRF = 11). The most abundant species was *Philonthus politus* (identification confirmed from male genitalia), with 51 individuals making up 13% of the assemblage. This large rove beetle is recorded from a wide range of habitats, including moss, nests, carrion,

dung, rotting fungi and compost (standard works and references given by Kenward 1988). It was, however, very abundant in the clearly identified cess pits at a medieval site in Oslo (Kenward 1988), and certainly bred in them. In one assemblage from the Oslo site, Sample 72, it was accompanied by abundant remains of a group of species which were also numerous in the present assemblage, particularly *Ptenidium pusillum* (confirmed by spermathecae from entire abdomens in both cases), *Cercyon analis*, *Philonthus cephalotes* (confirmed from male genitalia in both cases) and *Cercyon unipunctatus*. Sample 1907 had, in addition, a group of taxa characteristic of rather less foul conditions (although in some cases most are occasionally found in quite foul matter): *Lathridius minutus* group (16), *Atomaria* sp. (10), *Cryptophagus* sp. (9), *Xylodromus concinnus* (8), *Corticaria* sp. (8), *Dienerella* sp. (7), *Acritus nigricornis* (6) and *Typhaea stercorea* (6). The presence of seven *Anobium punctatum* and seven human fleas (*Pulex irritans*), and also three *Atomaria ?nigripennis*, together with these decomposers from relatively dry habitats, combine to hint that material from house floors contributed to this layer.

The outdoor component was modest (%NOB = 9, %SOB = 22), but included three *Phyllotreta nemorum*, a flea-beetle which may have lived on low-growing crucifers by the pit, and also two *Kateretes rufilabris* and two *Apion (Exapion)* sp.

Among the fly puparia, which were extremely abundant and varied, *Leptocera* sp. were predominant. There were also many mites and beetle larvae.

#### **Context 27813: overlay 27868.**

*Sample 1900 (BS):* A somewhat smaller assemblage (32 taxa) than that from the BS sample 1908, though most of the same elements were again recorded. Faecal concretions made up a modest proportion of the deposit, with fly puparia quite abundant. The only other 'taxon' scoring more than 1 was *Corylus avellana*. The remaining foodplants included *Malus sylvestris* and *Anethum graveolens*. Of note were the culm-nodes of

common reed (*Phragmites australis*), identified by P. R. Tomlinson, one of the few positive identifications of this plant from the Anglo-Scandinavian deposits at Coppergate.

An assemblage of 32 *Muscina* sp. puparia was also recorded from this sample.

Appreciable numbers of *Trichuris* and a few *Ascaris* eggs were obtained from a concretion; preservation was poor, however.

*Sample 1893* (GBA): crumbly to soft, dark brown organic clay silt with much fine organic detritus; abundant fly puparia.

Plants (/M): The assemblage of 45 taxa was well above the mean for this kind of sample for the Period 3 deposits, though all taxa scored 1 with the exception of *Triticum/Secale* 'bran'. Amongst the components excluded from the numerical analyses, faecal concretions and mineralised fly puparia both scored 2; with them, were traces of eggshell membrane and feathers. Certain or probable foodplants, in addition to 'bran', included *Malus sylvestris* (seed and endocarp), *Prunus spinosa*, cf. *Vicia faba* (testa fragments), *Linum usitatissimum*, *Anethum graveolens* and *Apium graveolens*. The trace of carrot (*Daucus carota*) perhaps indicates use of the 'seed' for flavouring, along with *Anethum* and *Apium*; it is much more difficult to be certain that it was being grown as a root crop. Alternatively, it can be counted with dry grassland taxa.

Parasitic worms: Large numbers of *Trichuris* eggs were recorded from the three subsamples examined, together with a few *Ascaris*. A large proportion of the former had lost one or both polar plugs. Measurements of *Trichuris* eggs were made.

Insects (/1, /2): Subsample 1 was only briefly examined; it contained a small group of beetles and some fly puparia, including numerous *Leptocera* sp. The /2 subsample, of 2 kg, gave 141 beetles and bugs of 54 taxa. Diversity was quite low and the outdoor component rather small ( $\alpha = 32$ ; SE = 4; %NOB = 6, 9 individuals). Decomposers were proportionally abundant (%NRT = 72), with a large proportion of foul matter species. The decomposer component was of very low diversity ( $\alpha_{RT} = 14$ ; SE = 2). The assemblage was dominated by the foul-matter taxa (%NRF = 33, 45% of the coded decomposers; there were 9 taxa and 49 individuals assigned 'rf'), which formed a characteristic community of rapid invaders of fairly moist conditions: *Cercyon unipunctatus* (18); *C. haemorrhoidalis* (14); *C. terminatus* (11); *C. analis* (6); and *Oxytelus sculptus* (4). There were also nine *Ptenidium* sp. and five individuals of a large *Philonthus*, probably *P. politus*. There can be

little doubt as to the implications of this group—foul moist organic matter was present.

There was a single human flea from the /2 subsample. This also yielded large numbers of fly puparia, which made up a sizeable proportion of the flot, and included numerous *Leptocera* sp. Mites were also abundant.

## Context 27412

*Sample 1829* (GBA): very soft rather reddish to grey-brown organic clay silt.

Plants (/M): The assemblage of 25 taxa from the 0.5 kg subsample of 1829 was of roughly average size for the Period 3 subsamples, though all the plant taxa and other components were recorded with an abundance of 1. Annual weeds of nitrogen-rich places (group CHEN) were by far the most important with *Chenopodium murale* and *C. ficifolium* recorded in addition to other prominent 'Chenopodietae' taxa. The presence of three taxa classified as basic foods—?raspberry (*Rubus* cf. *idaeus*), ?blackberry (*R.* cf. *fruticosus*) and elderberry (*Sambucus nigra*)—may be explained as resulting from nothing more than casual (e.g. bird-sown) dispersal from plants in the vicinity. This assemblage is consonant more with abandonment and natural infilling than use-phase; deliberate infilling with local soil cannot be ruled out.

Parasitic worms: Large numbers of *Trichuris* eggs, mostly poorly preserved, were recorded in the two subsamples examined; there were also a few *Ascaris*. Measurements of *Trichuris* eggs were made.

Insects (/1, /M): The 1 kg subsample gave only very few insect remains—mostly fragmentary puparia—but with a few beetles (N = 22, S = 13). Of the latter, *Carpelimus ?bilineatus*, with seven individuals, was the most abundant, and its presence accounts for the very low estimate of  $\alpha$  (14, SE = 5). Decomposers predominated (%NRT = 64).

All the remains were extremely badly preserved,

with a 'bleached' reddish appearance. It seems likely that this material, like that from Context 27411, was surface soil used to backfill the pit at the end of its useful life, although the presence of *Trichonyx sulcicollis*, typical of deposits in which there appears to have been subsurface 'aerobic' decomposition, hints that this was an organic fill which decayed.

The few puparia included some *Muscina* sp.

The /M group was very small but included 'several' fly puparia; it was not recorded.

### Context 27411

*Sample 1828* (GBA): mottled brown to grey 'earthy', sandy clay silt.

Plants (/M): A rather small assemblage of 17 taxa was obtained from this subsample. Weeds of group CHEN predominated (with *Chenopodium ficifolium* again present), though no taxon scored an abundance of more than 1. It warrants no further comment except that poor preservation or low input of organic matter probably accounts for the small assemblage of little interpretative value.

Parasitic worms: An appreciable number of *Trichuris* were recorded—poorly preserved, in that one or both polar plugs was missing—together with a trace of *Ascaris* in all three subsamples examined. Measurements of *Trichuris* eggs were made.

Insects (/1, /2): The /1 subsample gave a modest beetles assemblage (117 individuals) with rather few species (31). Diversity was thus low ( $\alpha = 14$ , SE = 2). The outdoor component was small (%NOB = 3). Two species were predominant: *Carpelimus bilineatus* (59 individuals) and *Anotylus rugosus* (15). These contributed to the large proportion of decomposer individuals (%NRT = 80) and the extremely low diversity of this component ( $\alpha$  RT = 6, SE = 1). *C. bilineatus* and *A. rugosus* seem likely to have bred in the fill, perhaps in material exposed at the surface and resembling moist organic mud. Non-beetles were extremely rare.

The second subsample was not examined in detail. The few beetle remains present in the small flots were very poorly preserved (e4-5); there were no obvious non-beetles.

**Cut 27478** [Pit C]: The vertical sequence of layers was 27555 (earliest fill) to 27448, with the last overlain by both 27374 and 27444.

### Context 27555

*Sample 1873* (GBA): woody peaty detritus with silt.

Parasitic worms: Trace amounts of *Trichuris* eggs were recorded.

Insects (/1): The flots were large and contained much woody plant tissue together with a variety of invertebrates. Recording was by rapid scanning. Beetle remains were moderately numerous and well preserved, with an estimated 86 individuals of 55 taxa. Diversity was high ( $\alpha = 65$ , SE = 13) and the outdoor component quite substantial (%NOB = 17, %SOB = 25). The most abundant taxa were *Cercyon analis*, *Anotylus nitidulus*, *Platystethus arenarius*, *Corticaria ?punctulata* and a small *Corticaria* sp. ('several' in each case). These contributed to a large decomposer component (%NRT = 72), which was of quite low diversity ( $\alpha$  RT = 27, SE = 6) and seems to have been a breeding group. Foul matter forms were rather abundant (%NRF = 19). It appears that, at this stage, the pit fill was a biologically active, somewhat foul deposit, probably not completely waterlogged.

A record of a single elytron of *Aphodius equestris* is noteworthy since this is today a southern English species.

Fly puparia were abundant, with a number of species, including two individuals of *Spilogona contractifrons* (found in damp places amongst moss and the like). *Leptocera* sp. and Sepsidae sp. were most numerous, however. Mites were abundant ('many'), with more than one species present. There were 'many' earthworm egg

capsules and ‘several’ beetle larvae of at least two species. There was also a single puparium of *Melophagus ovinus*.

#### Context 27554

Sample 1872 (GBA): no action to date

#### Context 27498

Sample 1869 (GBA): resilient organic clay silt with some stones.

Parasitic worms: A single incomplete *Trichuris* egg was recorded.

Insects (/1, /2 (3 kg)): Both subsamples were rapid-scan recorded semi-quantitatively. The /2 gave a larger assemblage and so is dealt with first. The number of individuals was estimated as 51, with 32 taxa. Most statistics were about normal for the site and period, but the decomposer component was substantial (%NRT = 75) and foul matter taxa quite important (%NRF = 14). *Cercyon analis*, *Xylodromus concinnus* and *Platystethus arenarius* were the only taxa with more than two individuals. This could have been background fauna, although the estimate of  $\alpha$  (37, SE = 10) is a little too low and %NRT rather high for this interpretation. Probably, then, the assemblage represents a small breeding community or individuals attracted to the fill. There were several *Leptocera* puparia, but few other invertebrate remains were noted.

The /1 subsample gave a very small assemblage (N = 22, S = 16). While too small for the statistics to be reliable, there was a broad similarity to the fauna from the /2 subsample. There were ‘several’ puparia and a few other non-beetle remains.

#### Context 27486

Sample 1868 (GBA): crumbly, dark grey-brown organic clay silt with much fine sand, patches of clean silt, some lumps of greenish silty clay, and some bone.

Plants (/M): The assemblage of 43 taxa was rather

above average for this group of Period 3 samples. Weeds of groups CHEN and SECA were the most numerous, with abundance scores of 2 being recorded for the two nettles (*Urtica dioica* and *U. urens*). Indeed, with an AIV of 42, this was the fourth highest score for this parameter for group CHEN in the Period 3 samples.

Toad-rush (*Juncus bufonius*), a species of wet, muddy tracks and pond margins, and probably a good candidate for inclusion in the restricted flora of a boggy, trampled riverside slope, also scored 2. The vegetation group to which *J. bufonius* is assigned (ISNA) achieved its highest AIV for the samples from Period 3 in this subsample—with it, were recorded two other plants often found in such habitats: *Montia fontana* ssp. *chondrosperma* and *Scirpus setaceus*.

The range of ‘useful’ plants was rather restricted in this subsample: probable foods included *Corylus avellana*, *Rubus fruticosus* and *Sambucus nigra*, with oil/fibre plants being represented by a trace of hemp (*Cannabis sativa*), a plant recorded from almost half the Period 3 contexts examined by bulk-sieving (but only from one tenth of the contexts examined by means of small GBA subsample).

Possible salt-marsh vegetation was represented by a single tentatively identified mud rush (*Juncus* cf. *gerardi*) seed and by the only record for Anglo-Scandinavian Coppergate of sea-blite (*Suaeda maritima*: three seeds). The original source of such remains is clear; their route to the site is not.

Parasitic worms: There were low counts for *Trichuris* eggs from the single subsample examined.

Insects (/1, /2): Subsample /1 was recorded semi-quantitatively. Approximately 99 individuals of 43 beetle and bug taxa were recorded; there were also ‘many’ fly puparia, mites and insect larvae. Among the puparia, *Leptocera* sp. and Sepsidae sp. were both fairly common. Preservation was recorded as very poor.

Diversity of the beetle and bug assemblage was rather low ( $\alpha = 29$ , SE = 5); that of the RT component was relatively low ( $\alpha_{RT} = 15$ , SE = 3). Decomposers coded 'rd' were rather poorly represented (%NRD = 8), but foul matter taxa were relatively abundant (%NRF = 19, nearly a third of the decomposer component). The RF component was dominated by *Platystethus arenarius* ('many'). Seven taxa were recorded as being represented by 'several' individuals: *Cercyon analis*, *Carpelimus bilineatus*, *Platystethus cornutus* group, *Anotylus nitidulus*, *Neobisnius* sp., an aleocharine and *Cryptophagus* sp. This assemblage probably consisted primarily of species invading exposed foul matter.

The /2 subsample was scan-recorded and produced an assemblage with much in common with that from subsample /1, but also with some substantial differences. Preservation was recorded as being very poor. There were 53 beetle and bug taxa, with 109 individuals. Diversity was moderate ( $\alpha = 41$ , SE = 7), and the outdoor component small (%NOB = 6, mostly accounted for by *Anotylus nitidulus*). Decomposers made up 59% of the assemblage, with a small proportion of 'dry' decomposers (%NRD = 6) and more 'foul' decomposers than usual (%NRF = 15). Diversity of the decomposer component was not far from average ( $\alpha_{RT} = 18$ , SE = 4). As in subsample /1, *Platystethus arenarius* was the most abundant species (11 individuals). There were seven *Oxytelus sculptus*, an aleocharine (6), and *Anotylus nitidulus*, a second aleocharine and *Anobium punctatum* (all 5). The implications were much as for subsample /1. Subsample /2 also provided 'several' puparia.

#### Context 27448

*Sample 1867* (GBA): dark grey, soft to crumbly, organic silty clay to clay silt with much coarse sand.

Plants (/M): The assemblage from 1867 was a little smaller (37 taxa) than that from 1868, and only *Urtica dioica*, *Chenopodium album* and cf. *Marrubium vulgare* (all at 2) scored an abundance of more than 1. Not surprisingly, therefore, the weed groups CHEN and ARTE predominated

amongst the AIVs, both achieving values about one standard deviation higher than the period mean for the respective parameters. *Juncus* cf. *gerardi* was again recorded (six seeds), together with several other *Juncus* spp.; they represent a range of vegetation types, with MOAR (4 spp.) and SCCA (2 spp.) the only ones with more than one representative, though none of the *Juncus* spp. was present in more than small amounts.

Parasitic worms: A single *Trichuris* egg was recorded.

Insects (/1, /2): Subsample /1 was scan-recorded. There were few remains other than beetles, of which 72 individuals of 46 taxa were noted. The remains were pale. Main statistics were of no special note (bearing in mind assemblage size). There were six *Cercyon analis*, five individuals of a *Stenus* species and four of an *Atomaria*. This group was probably a mixture of invading decomposers and background fauna. There were also several fly puparia.

Subsample /2 was recorded non-quantitatively as it appears that part of the material was lost in storage. Preservation was rather poor, with many pale remains. The most abundant species were *Anobium punctatum*, *Carpelimus bilineatus*, *Anotylus sculpturatus* group, *A. nitidulus*, *Platystethus arenarius* and *Ptenidium* sp., so the deposit was probably quite foul and close to worm-infested timber. There were 'several' puparia and mites.

#### Context 27444

*Sample 1835* (GBA): no action to date.

#### Context 27374

*Sample 1825* (GBA): grey-brown, somewhat crumbly clay silt to silty clay of low organic content, with some clean patches of silt; a few stones.

Plants (/M): The assemblage from this subsample was rather larger than the average for Period 3 samples examined in detail, though none of the taxa

used in the numerical analysis scored more than 1 on the three-point scale of abundance. Fly puparia, and tentatively identified *Cenococcum sclerotia* (resting bodies of a common soil-inhabiting fungus) were scored at 2. Nitrophile annual weeds of group CHEN were the most abundant, with perennial weeds of group ARTE also quite well represented (though neither had a particularly high AIV within the context of the Period 3 samples).

Two minor vegetation groups were proportionately well represented in this subsample: EPIL (nitrophilous woodland edge and clearing communities) and SESC (established vegetation of sand dunes and other sandy acidic soils). In the first case, where the AIV of 9 was the third highest for this group of samples, there were four taxa—*Atropa bella-donna*, *Juncus inflexus/effusus/conglomeratus*, *Rumex acetosella* agg. and *Urtica dioica*. However, these do not form a particularly coherent group within EPIL inasmuch as (with the exception of *Atropa* and *Urtica*) they are unlikely to be found growing together. This points to the danger of erecting categories even at such a high phytosociological level as Class (Epilobietea) for the purposes of analysing archaeobotanical data such as these.

In groups SESC, with the highest AIV for the Period 3 samples (4), there were, in fact only two taxa—*Aphanes microcarpa* and *Rumex acetosella* agg., probably both from cultivated land on sandy soil (a type prevalent around much of York) and possibly no more than casual importations on muddy feet.

Foodplants in this subsample were restricted to *Corylus avellana*, *Rubus fruticosus* and *Sambucus nigra*. The record of *Calendula* sp. is interesting; this was probably *C. officinalis*, pot marigold, an ornamental plant and pot-herb of unknown geographical origins, now widely naturalised in Europe, mainly in the south. The plant was also identified (to genus) from the following: as *Calendula* sp. from a BS sample from a Period 4B dump and *C. officinalis per se* from a BS subsample from a Period 5B layer between building phases (see relevant *Technical Reports*). Marigold clearly did not become established around

the buildings at Coppergate and may be no more than an import from other parts of the town or from further afield.

Parasitic worms: There were traces of *Trichuris* and *Ascaris* eggs in the subsample examined.

Insects (/1, /M): The small flot from subsample /1 was quite rich in insect remains, including modest numbers of rather poorly-preserved beetles (it was rapid-scan recorded semi-quantitatively—N estimated as 77, S = 40). Diversity was a little low ( $\alpha = 34$ , SE = 7), the outdoor component small (%NOB = 4), and the decomposer component fairly large (%NRT = 68). Within the decomposer group, neither RD nor RF taxa were particularly important. The most numerous species were *Carpelimus bilineatus*, *Anotylus rugosus*, *Anobium punctatum*, *Oxytelus sculptus*, *Cercyon analis*, an aleocharine, and a *Corticaria* sp. (all ‘several’). The diversity of the decomposer component suggested breeding (or at least attraction in large numbers:  $\alpha$  RT = 19, SE = 4) and at this stage the pit fill may have become a little drier.

The rather abundant fly puparia were principally *Leptocera* sp. and Sepsidae sp. Other remains included ‘many’ mites.

The 0.5 kg /M subsample produced an MNI of 100, with 44 beetle and bug taxa, so concentration was quite high. Diversity was fairly low ( $\alpha = 30$ ; SE = 5), and the outdoor component small (%NOB = 5). Decomposers were abundant (%NRT = 74), with %NRT high, 19%, and %NRD low, 6%. The decomposer component was of very low diversity ( $\alpha$  RT = 13; SE = 2). This part of the deposit, then, appears to have been somewhat fouler than that represented by subsample /1. The more abundant decomposers formed a plausible community—*Carpelimus bilineatus* (11 individuals), *Oxytelus sculptus* (10), *Anotylus rugosus* (8), *Cercyon terminatus* (7), *Gyrohypnus ?angustatus* (6) and *Cercyon analis* (4). There were also several foul decomposers represented by two or three individuals. There were five *Anobium punctatum* but no indication of the presence of ‘house fauna’.

**Sample 2116 (Spot):** A lump of indurated material sampled as 'stone' proved to be a concretion with a vesicular and laminated internal structure. An eel (*Anguilla anguilla*) vertebra was visible on its surface. Eggs of intestinal parasitic worms (many *Trichuris* and a few *Ascaris*) were sufficiently abundant to indicate that the concretion was faecal in origin. The shape of the concretion suggested it had solidified from very soft faeces, rather than a firm stool.

**Cut 31064 (Section 2385):** very large pit (approximately 3.5 m diameter and 2.2 m deep), to the E of and abutting pit Cut 31710. It was very irregularly shaped and intersected by the site boundary. The lowest fill, 31062, was not sampled.

**Context 31061:** this lowermost sampled context overlay 31062.

**Sample 1962 (GBA):** slightly organic dark greyish-brown, slightly sandy clay silt with yellow flecking and few inclusions.

**Plants (/M):** The assemblage of 36 taxa was rather larger than the average for the subsamples from this site examined for plant remains. Weed taxa (group CHEN) formed the largest single group, with smaller numbers of taxa representing quite a wide range of habitats or possible uses. Only plants which were probably growing locally as nitrophile weeds—*Urtica dioica*, *Chenopodium album* and *Sambucus nigra*—scored more than 1 on the three-point scale of abundance. Concretions were recorded but these were not thought to be faecal in origin. There were also three mosses indicative of wetland habitats of various kinds—*Scorpidium scorpioides*, *Sphagnum* sp(p), and *Calliergon cuspidatum*; they are perhaps unlikely to have grown together locally to the site and were probably imported for some purpose or incidentally with materials brought deliberately to the site.

**Parasitic worms:** A subsample was analysed but no eggs were recorded.

**Insects (/T):** A fairly large assemblage of insect remains was present in the small flot. Recording was by semi-quantitative rapid scanning, with MNI estimated as 66, and 39 taxa. The statistics were about normal except that the proportion of RD individuals was quite high (%NRD = 24) and diversity of the decomposer component quite low ( $\alpha$  RT = 21, SE = 6). Several *Omalium ?rivulare*, *Cryptophagus* sp. and *Anobium punctatum* were recorded. There were three *Lathridius minutus* group, but no other taxa were represented by more than two individuals. The fauna offered slight hints of an origin in or around buildings.

The record of a single *Tipnus unicolor* is noteworthy, being one of the few well-preserved specimens from deposits of Anglo-Scandinavian date in York. Two more were recovered from the second subsample (below).



The fly puparia included moderate numbers of Sepsidae sp. and *Spilogona contractifrons* puparia. There were 'several' mites.

distinctive species rarely found at Coppergate.

The 3 kg /1 subsample was processed and 'detail' recorded in view of the evidence from the /T subsample. A very large assemblage of beetles and bugs was recovered (N = 421, s = 148). Diversity was high ( $\alpha = 81$ , SE = 6) and the outdoor component was fairly small (45 individuals; %NOB = 11) and of high diversity (to the extent to which such an estimate is reliable:  $\alpha$  OB = 114, SE = 45).

Decomposers were numerous and the RT component accounted for 64% of the assemblage. There were also some uncoded taxa which were probably associates of the decomposers, present in moderate numbers. Taxa coded rd accounted for 20% of the assemblage and 32% of the decomposers—quite high values. Foul-matter taxa were rare (there were only seven rf individuals and %NRF = 2). The diversity of the decomposer component was moderately low ( $\alpha$  RT = 27, SE = 3); clearly there was a rich decomposer fauna breeding *in situ* or imported with dumped material. This component was unusual, with large numbers of a *Corticaria* species (22 individuals), *Phyllo-drepa floralis* (20), *Omalium rivulare* and *Lathridius minutus* group (both 14), *Ptenidium* sp., *Cryptophagus scutellatus* and *Atomaria nigripennis* (all 11). There was a large component of rather to quite strongly synanthropic taxa, including 'house fauna' (there were six human fleas, two *Tipnus unicolor* and eight *Ptinus fur*). It appears possible that this layer consisted of, or included, material brought from a building; as such it is important as perhaps the best evidence from Period 3 for houses nearby. Species associated with wood were rather numerous—29 individuals, 21 of them *Anobium punctatum*, three *Dropephylla vilis* and single individuals of five other taxa, making in total 7% of the assemblage.

It is possible that this assemblage represents a mixture of fauna brought with litter from a building and a community which developed in the exposed dumped material in the pit over quite a long period. There were three *Cryptophagus acutangulatus*, a

The plant-associated component offered hints that there were nettles and crucifers growing in the vicinity. There were two each of *Cidnorhinus quadrimaculatus* and *Heterogaster urticae*, single *Brachypterus* sp. and *Trioza urticae*, and three *Ceutorhynchus contractus*.

Mites were very abundant and excellently preserved. There were also many fly puparia of several kinds. Several ants (?*Myrmica* sp.), at least six human fleas and many aphids were also recorded. There were several elaterid beetles: four abdominal apices of the 'wireworm' larvae of *Athous haemorrhoidalis* (and a single adult of the same species), and one larva of the wood-boring species *Melanotus erythropus*.

**Context 31595:** overlay **31061**.

*Sample 2023* (BS—VW): Plant remains and some other components were recorded by rough-sorting the residue and a more thorough examination of the washover. The sum of taxa (35) was rather above the average for BS samples for Period 3 at Coppergate. It was evident that a major part of this pit fill was faecal material, faecal concretions scoring 2 on the three-point scale of abundance. There was also a modest range of foodplants, including very abundant *Malus sylvestris* pips (with some endocarp also present), and modest numbers of *Sambucus nigra* seeds. Trace amounts of *Prunus domestica sensu lato* and *P. spinosa* were present, along with *Rubus fruticosus* and *Vaccinium* sp(p), a typical range of fruits (probably all wild-collected) for this site in the Anglo-Scandinavian period. Many of these were also scored in the woodland group QUFA, accounting for its rather high AIV in this assemblage; otherwise, the predominant groups were weed taxa in groups CHEN and SECA.

Two mosses primarily of woodland floor habitats were present in this subsample, with one, *Thuidium tamariscinum*, scoring an abundance of 2. It is likely they were used for hygienic purposes.

There were modest numbers of fly puparia in this sample, of which the majority were *Spilogona contractifrons* and Sepsidae sp.

*Sample 2020* (GBA): dark reddish-brown compressed laminar organic silt with some grit. Heterogeneous, with some pale patches of silty clay or clay silt.

Parasitic worms: Modest numbers of *Trichuris* and a few *Ascaris* eggs were recorded; half of the former bore two polar plugs, so the preservation can be seen as quite good.

Insects (/T, /1): A small flot from subsample /T contained 'bran' and abundant insect fragments, including large numbers from larvae and pupae, probably of Diptera. Recording was by rapid scanning. Puparia were numerous, including many *Leptocera* sp. and Sepsidae; there were also 'many' mites and several beetle larvae. Preservation was excellent. There were an estimated 64 individuals of Coleoptera and Hemiptera, with 35 taxa. The statistics were unremarkable, although diversity was a little low ( $\alpha = 32$ , SE = 7), and  $\alpha$  RT was low (18, SE = 5), suggesting that the decomposer component included breeding or colonising taxa. 'Several' specimens of the following were noted: *Omalium rivulare*, *Carpelimus bilineatus*, *Coprophilus striatulus*, a large aleocharine staphylinid and *Rhizophagus paralellocollis*. All remaining taxa were at a frequency of one or two.

Members of the 'subterranean' group were present—*R. paralellocollis*, *Trechus micros* and *Coprophilus striatulus*.

A 3 kg /1 subsample was processed on the basis of the results from the /T subsample; it was 'scan recorded', however. It gave a very large group of beetles and a few bugs (N = 456, S = 104). Diversity was moderate ( $\alpha = 42$ , SE = 3) and the outdoor component relatively small (N OB = 35, %NOB = 8). The latter was also of moderate diversity ( $\alpha$  OB = 40, SE = 14). The combination of ecological diversity and abundance of several taxa suggests the presence of a rich breeding fauna rather than a predominantly 'background' origin, however. Coded decomposers accounted for half of the assemblage (%NRT = 51), but there were several abundant uncoded taxa which probably belonged with the decomposer community.

Diversity of the decomposer component was rather low ( $\alpha$  RT = 17, SE = 2), although this component was rich and varied by inspection; the RD and RF components were both fairly small. Two aleocharines were very abundant (50 and 33 individuals); they may be suspected of being decomposers. The habitats indicated by the rotting-matter taxa were varied, with *Anotylus sculpturatus* group, *Cercyon haemorrhoidalis*, and *Philonthus ?politus*, for example, suggesting fairly foul conditions (and most of the other abundant decomposers were probably ones able to exploit similar habitats to these), but a number of other fairly abundant species suggesting rather drier conditions. Six *Pulex irritans* and a few 'house fauna' taxa were present, so the material may have originally been brought from a building, but this is by no means certain.

Overall, the fauna suggested mouldering to foul organic matter, changing in time or presenting a mosaic of microhabitats in space.

The record of six *Gracilia minuta*, a longhorn beetle which burrows in twigs, is unusual at 16-22 Coppergate—it usually occurs only in ones and twos. There were also seven *Anobium punctatum* (which was, however, frequently abundant at the site). Another notable record is that of two *Tipnus unicolor*

The probable post-depositional invader *Rhizophagus parallelus* was abundant (33 individuals), as was *Coprophilus striatulus*, often found with *R. parallelus* in supposedly 'subterranean' fossil assemblages. There were also four *Trechus micros* and two *Trichonyx sulcicollis*, both typically found in such groups.

In addition to the fleas mentioned above, there were some lice; fly puparia were abundant and varied (most appear to have been *Leptocera* sp. and Sepsidae); there were also many mites and several beetle larvae and an abdominal apex of an *Athous haemorrhoidalis* larva was recorded.

*Sample 2022* (GBA): very wet, dark grey organic silt with moss, wood, and other plant fragments.

Parasitic worms: A few *Trichuris* eggs, the majority with two polar plugs, were noted. *Ascaris* was not recorded.

Insects (/T): The large flot contained huge numbers of insect fragments, including many beetles, fly puparia (mainly *Leptocera* sp. and Sepsidae) and pupae, and abundant beetle larvae. There were also abundant mites and a wing of *Apis mellifera*. Preservation was exceptionally good. Recording was semi-quantitative. The number of beetles was estimated as 96, with 44 taxa, so diversity was rather low ( $\alpha$  = 32, SE = 5). The other main statistics were unremarkable. Decomposers (RT) made up 59% of the individuals, but *Philonthus politus* should probably be included, raising %NRT to 76. The most numerous beetles—'many' of both—were two *Philonthus* species, *P. politus* and *P. cephalotes* (the latter identification confirmed by male genitalia). Other abundant taxa were *Omalium ?rivulare*, *Bruchus ?rufimanus* and *Cercyon haemorrhoidalis* ('several' of each). *B. rufimanus* may have originated in pulses used for food. This assemblage appears to have contained a breeding community of a type observed in other pits at Coppergate and at Oslo (Kenward 1988); the most probable habitat is foul, but not completely waterlogged, decaying matter.

On the basis of the /T assemblage this sample was selected for re-examination using a 3 kg /1 subsample which, however, was scan-recorded. A very large group of beetles and bugs resulted, with a minimum number of 529 individuals of 143 taxa. Diversity was high ( $\alpha$  = 64, SE = 4), remarkably so in view of the presence of many abundant taxa. The outdoor component was absolutely and proportionally modest (54 individuals, %NOB = 10); the diversity of this component was estimated to be very high, suggesting mixed or random origins, but the standard error was large ( $\alpha$  OB = 110, SE = 37). Some unusual outdoor taxa were present, including *Asaphidion flavipes*, *Fleutiauxellus quadripustulatus* and *Picromerus bidens*.

Decomposers were abundant, although decomposer-coded taxa made up only 56% of the

fauna. There were, however, some abundant or moderately abundant taxa which probably formed part of this component, and the presence of very large numbers of individuals of species such as *Philonthus politus* (64), *Omalium rivulare* (25), *Cercyon analis* (24), *Anotylus sculpturatus* group (21) and *Philonthus cephalotes* (21) leaves little doubt that there was a thriving breeding community. Conditions were fairly foul, as suggested by some of these taxa and, for example, *Cercyon haemorrhoidalis*, of which there were 14. *Aphodius* dung beetles appear to have been attracted to the pit—there were nine individuals of five species, including three *A. fimetarius*, two each of *A. prodromus* and *A. rufipes*, and a single *A. contaminatus*. Neither rd nor rf taxa formed a very large proportion of the assemblage, however, and on balance moist but perhaps rather open-textured organic matter is indicated. The material was probably exposed for some time, allowing the rich and rather diverse decomposer community to develop ( $\alpha$  RT = 29, SE = 3) and a good number of individuals of taxa from other habitats to fall in accidentally. The surroundings may have been rather disturbed open ground with a few scattered weeds.

Eight *Bruchus ?rufimanus* were recorded from this subsample. These probably, but not certainly, came from food pulses. Like the subsample from Sample 2020, this gave numerous *Gracilia minuta*; nine individuals in this case.

There were many fly puparia, mites and earthworm egg capsules, ‘several’ Parasitica and a single *Apis mellifera* wing. Beetle larvae were quite common.

The decomposer group in this subsample can be regarded as a ‘type’ for a component observed repeatedly at the site.

*Sample 2021* (Spot): not examined.

**Context 31593:** overlay 31595.

*Sample 2019* (GBA): A small subsample of this sample was examined by P. R. Tomlinson for vegetative plant remains. She noted that there was ‘not much larger-scale plant material’, describing

it as ‘cess with bran, *Trichuris*, *Ascaris*’.

**Cut 31636:** This was a modest pit of about 1.8 m diameter and 1.4 m depth, containing a series of seven fairly substantial fill contexts. Only two were sampled, however.

**Context 31644:** this layer was the third from the bottom.

*Sample 2045* (BS—VW): The small assemblage (13 taxa) from this subsample was mostly of weeds, with only *Rubus fruticosus* and *Sambucus nigra* as possible foodplants, though either might have derived from wild plants in the vicinity or brought by birds from further away.

*Sample 2048* (GBA): rather stiff dark brown to blackish slightly organic sandy clay silt, with fleckings of paler material, fine charcoal, bone fragments and some small stones.

Plants (/M): The small assemblage of only eight taxa is of little interpretative value; none of the plant remains scored an abundance of more than 1, and the only other component present at more than very low levels was charcoal (scoring 2).

Parasitic worms: no eggs were recorded.

Insects (/T2) (/T was processed but no flot jar was available when the analyses were made): This subsample yielded a small flot consisting of plant fragments with some charcoal and/or coal. There were only a few insect remains, of no interpretative significance.

**Context 31637:** the fifth sampled context from the bottom (second from top).

*Sample 2047* (BS—VW): The plant remains from the rough-sorted residue and from the washover totalled only eight taxa, mostly weeds. The *Rubus fruticosus* and *Sambucus* may, with the faecal concretions, indicate a faecal component to this pit fill. This can hardly be seen as a primary fill, however.

*Sample 2046* (GBA): slightly crumbly, dark brown to blackish sandy clay silt with lumps of pinkish-brown clay and white and yellow flecking; some moderate-sized stones and pottery, but otherwise few inclusions.

Plants (/M): Like the BS subsample, this gave a very small assemblage, almost exclusively of weed taxa. Only charred *Corylus* nutshell was added to the list following bulk-sieving all but a voucher subsample of the remainder of this sample.

Parasitic worms: No eggs were recorded from the subsample examined.

Insects (/T): This subsample gave a tiny flot consisting almost entirely of plant fragments, with some coal and/or charcoal. It gave only a single beetle.

*Cut 31710* (Section 2385) [Pit D]: The pit was approximately 1.25 m in maximum diameter and 1.0 m deep and was cut by the site boundary. It had a complicated series of fills and was recut to about half its depth by **31524**, also of Period 3 (its fills, however, were unsampled).

**Context 31696**: the lowest sampled fill, although two lower contexts were identified.

*Sample 2137* (GBA): crumbly, grey-brown, organic clay silt with some stones, bone, sand/gravel and fine charcoal.

Plants (/M): The assemblage here was somewhat larger (21 taxa) than in the subsamples from 2134, 2135, and 2136, though no plant taxa scored more than 1 on the three-point scale of abundance. Faecal material is again indicated by the presence of faecal concretions (and both eggshell membrane and fish bone were also recorded in this subsample), though the range of potential foodplants is somewhat different—along with *Rubus* and *Sambucus*, there were *Apium graveolens* and cf. *Anethum graveolens*, both presumably ‘seeds’ used as flavourings.

Insects (/1, /2): Subsample /1 produced only 50

individuals of 33 beetle and bug taxa. It had a rather large outdoor component and a relatively small decomposer group. The most numerous beetles were *Cercyon analis* and *Omalium rivulare* (four of each); there were three *Platystethus arenarius*, but the remaining taxa were represented only by one or two individuals. Possibly this assemblage was a mixture of background fauna and invaders of rather foul matter. There were ‘several’ fly puparia but other invertebrates were rare.

The second subsample (of 2 kg) gave 98 individuals of Coleoptera, with 51 taxa noted. The outdoor component was a little larger than usual (%NOB = 18) and the decomposer component quite small (%NRT = 45). There were nine *Omalium ?rivulare*, six *Carpelimus bilineatus*, a *Stenus* species with five individuals, and several taxa with four. Diversity of the decomposer component was low ( $\alpha$  RT = 14, SE = 4). Some of the more abundant uncoded taxa may have belonged with the decomposer group. There were few non-beetles. The fauna may have consisted largely of ‘background’ insects, with a small breeding community of open-textured foul matter.

Fly puparia were present in modest numbers, only *Leptocera* sp. being identified.

**Context 31682**: This, and **31695** and **31691**, overlay **31696** in a complicated arrangement.

*Sample 2133* (GBA): crumbly brown clay silt with little plant material, some stones, and bone fragments.

Plants (/M): With 21 taxa recorded, this assemblage was of roughly average size, though only *Urtica dioica* and *Chenopodium album* achieved an abundance of 2. Weed taxa predominated, especially those of disturbed and nutrient-rich soils (group CHEN). The modest component of woodland and scrub taxa (groups QUFA and RHPR) comprised plants that might have been growing in other kinds of habitats and there were, in fact, no good woodland indicators. Plants scored as ‘useful’ were limited to *Rubus fruticosus* and *Sambucus nigra*, neither of which

were necessarily other than casually disposed of—or even dispersed by birds or other animal—in the present context. Overall, the deposit seems to be backfill or post-use slump, largely reflecting the weed flora of the vicinity. In the absence of supporting evidence, the eggshell membrane fragments may be occupation debris rather than faecal in origin.

Insects (/1, /M): The 1 kg /1 subsample, scan-recorded, gave a flot containing a modest number of badly preserved insect fossils (N = 55, S = 34). The assemblage was thus rather too small for interpretation, but the diversity of the decomposer component was low ( $\alpha$  RT = 12, SE = 4), and it is possible that decomposers were at least attracted to the layer. The most numerous were *Anotylus rugosus* (six individuals) and *Oxytelus sculptus* (five), and a number of the other species might have co-existed with these in rather moist decomposing matter.

There were modest numbers of fly puparia, not identified further, but few other remains.

Subsample /M produced a small insect group, including ‘several’ puparia (seven *Sphaerocera* sp. being identified), and a few beetles.

**Context 31695:** overlay **31696**.

*Sample 2135* (GBA): crumbly, very organic sandy silty clay to clay silt, with clay lumps, bone, stones.

Plants (/M): This subsample yielded only 14 taxa, all in small amounts. The presence of faecal material and food remains was rather more obvious here, though, with traces of faecal concretions containing *Trichuris* eggs, as well as one or a few mineralised seeds from a *Prunus* sp. The two other probable foodplants recorded were *Rubus fruticosus* and *R. idaeus*.

Parasitic worms: Two subsamples were examined. One gave an extremely high count for *Trichuris* and a few *Ascaris* eggs, the second quite large numbers of *Trichuris* and again only a few *Ascaris*. Preservation was poor, no eggs of *Trichuris* retaining both polar plugs, and less than

1% retaining one plug.

Insects (/1, /2): Preservation was poor, with the majority of beetle remains very pale. The 3 kg /2 subsample was recorded semi-quantitatively. A quite large group of beetles was present (N estimated at 143, S = 46). Diversity was low ( $\alpha$  = 24, SE = 3) and there were few outdoor forms (%NOB = 7). The decomposer component was not estimated to be very large (%NRT = 58), but several uncoded taxa probably belonged with it. The diversity of this component was extremely low ( $\alpha$  RT = 7, SE = 1).

*Anotylus rugosus*, *Carpelimus bilineatus*, *Oxytelus sculptus*, *Rhizophagus parallellocollis* and *Trichonyx sulcicollis* were the most abundant taxa (all ‘many’), with smaller numbers of *Anobium punctatum*, *Carpelimus fuliginosus* and *Platystethus arenarius* (‘several’). There seem to have been two main, separate, communities: the oxytelines and various taxa often found with them; and the ‘subterranean’ group, taxa from which were unusually abundant. The material was probably protected from background fauna but exposed for at least a moderate period of time. The wood-boring *A. punctatum*, *Grynobius planus* and *Ptilinus pectinicornis* might conceivably indicate that the pit was within a structure. The conditions within the pit were probably fairly foul at the stage at which this deposit formed, but the material appears to have later been sufficiently dry for invasion by subterranean beetles and decomposition of insect remains.

The flot from the 1 kg subsample /1 was quickly examined. Preservation was again poor, and insect remains fairly rare.

**Context 31691:** above **31695**; not on section.

*Sample 2136* (GBA): crumbly, grey-brown clay silt with some clean silt patches; few stones, and some bone.

Plants (/M): The small assemblage of 16 taxa once again gave some evidence for faecal material, with the same *Rubus* spp. as in *Sample 2135* (*R. fruticosus* scored 2, and this accounts for the rather

higher AIV of 12 for group FOOS than in other samples from the pit). Together with eggshell membrane fragments and faecal concretions, there was a modest component of fish bone, probably also indicative of food waste.

Insects (/1): A quite substantial group of beetles was recovered and recorded fully-quantitatively (N = 115, S = 46). Preservation was poor, the remains being very pale. Diversity was rather low ( $\alpha = 29$ , SE = 4), and there was a very small proportion of outdoor forms (%NOB = 3). Decomposers were numerous, making up 72% of the fauna, but the RD and RF groups were both small (5 and 3% respectively). Diversity of the decomposer component was low ( $\alpha$  RT = 12, SE = 2). The more abundant beetles were *Carpelimus bilineatus* (30), *Anotylus rugosus* (15) and *Oxytelus sculptus* and *Anobium punctatum* (5 each). The assemblage had a strong similarity to that from Sample 2135 in the species list and statistics, and the 'subterranean' group was again present, although in smaller numbers. Non-beetles were not very common.

**Context 31688:** apparently one of the latest surviving fills, the upper part of the pit being recut by 31524 [whose fills were not sampled].

*Sample 2134* (GBA): crumbly grey-brown silt with some reddish patches; little plant matter, some bone, angular stones and pottery.

Plants (/M): A rather small assemblage was recovered (15 taxa), most of them weeds in group CHEN. Again only *Urtica dioica* and *Chenopodium album* scored more than 1 on the three-point scale of abundance. It was essentially a depauperate form of the assemblage from 2133 and can be interpreted in the same way, though the presence of traces of faecal concretions points to the inclusion of some faecal material within this layer (possibly reworked from older layers).

Parasitic worms: There were abundant *Trichuris*, of which 16% had one polar plug, the remainder none. A trace of *Ascaris* eggs was also recorded.

Insects (/1, /2): The 2 kg /2 subsample gave 158

individuals of 52 beetle and bug taxa. There were also other remains, including 'several' fly puparia. Diversity was low ( $\alpha = 27$ ; SE = 3); several species were quite abundant.

The outdoor component was moderately large—17 individuals. *Phyllotreta nemorum* group and a small *Ceutorhynchus* (possibly *C. contractus*) may have originated from plants near to the point of deposition, but the remaining outdoor taxa probably had varied origins. There was a single individual of the weevil *Sciaphilus asperatus*. Aquatics were absent and the damp ground/waterside forms probably (apart from *?Kateretes rufilabris*) bred on the site (*Anotylus nitidulus*, 7 individuals; *Platystethus ?degener*, 4).

Decomposers (RT) were calculated to make up 57% of the individuals, but it could be argued that two abundant uncoded taxa (*Trichonyx sulcicollis*, 12 and *Neobisnius* sp., 11), and probably most of the less numerous uncoded species in this assemblage, belong in this group. Most of the decomposers probably invaded moderately foul matter in the pit. The diversity of this component was very low ( $\alpha$  RT = 11; SE = 2) and at least some species either bred or were attracted in considerable numbers.

*T. sulcicollis* was perhaps a post-depositional invader; there were also two *Rhizophagus* ?*parallelocollis*, also regarded as typical of the 'subterranean' fauna, and three *Catops* sp. These last are also often found in subterranean habitats.

The /1 subsample gave 77 individuals of 28 taxa. Diversity was even lower ( $\alpha = 16$ ; SE = 3). The main statistics were generally similar to those for the /2 subsample, with the decomposer component of a similar nature (although diversity was again lower). There was a single, only provisionally identified, *Tipnus unicolor*. There were few non-beetles.

**Cut 36680:** This was a shallow pit, about 60 cm across and a few centimetres deep. It contained what was thought to be a burnt wooden box, and the single sampled context is presumed to have been taken from the fill of the box.

#### Context 26202

*Sample 1679* (GBA): no action to date.

#### *Pits in the southern area of later Tenements C and D*

Eleven sampled cuts, forming a rather tight clump as seen in plan.

**Cut 30442:** One of three fills in this cut (?scoop) was sampled.

#### Context 30549

*Sample 2066* (BS—VW): An assemblage of 23 taxa was recorded, most of which were weeds but with a modest component of foodplants, including *Corylus* nutshell fragments and charred *Triticum aestivo-compactum* grains both scoring an abundance of 2. There were also records for *Hordeum*, *Avena* and cf. *Secale* and one of three records for cf. *Onopordum acanthium* from Period 3 BS samples. The presence of this taxon—if it can be taken as evidence for the plant growing locally—suggests limited disturbance in at least

some parts of the site; biennials like scotch thistle obviously cannot reach flowering and seed set in their second summer unless the plant survives the first.

Wood and charcoal were recorded as abundant in this sample during rough sorting.

*Sample 2065* (GBA): no action to date.

**Cut 30630:** a shallow cut, about 0.45 m deep and 1.1 m across, with two sampled and three unsampled fills.

**Context 30629:** lowermost cut fill.

*Sample 2072* (BS—VW): The assemblage from this sample (32 taxa) was a little above average for the Period 3 BS samples. The best represented use/ecological group was FOOS, with seven taxa (though *Malus* was represented by both seeds and 'core', these being scored as if they were separate taxa). Three of the remaining foodplants were charred cereals; the other two were *Prunus spinosa* and *Corylus avellana*. All were present in very small amounts. Flavourings were present in the form of *Coriandrum* and *Anethum*. Other 'useful' plants included *Cannabis* and *Rubia*.

The remainder of the assemblage comprised annual weeds of cultivated soils, especially cornfields, and there was a modest group of mosses, mainly taxa of woodland and shaded rocks and typically associated with latrine pits elsewhere on the site. Perhaps not surprisingly, small amounts of faecal concretions were recorded from this sample.

*Sample 2072* also gave one of the four Period 3 records of trace amounts of reed (*Phragmites australis*) culm-nodes, perhaps from roofing or floor litter; bracken (*Pteridium aquilinum*) from this sample may also be counted in the latter category.

*Sample 2078* (GBA): no action to date.

**Context 30619:** the uppermost of the two sampled fills and uppermost in the cut.



*Sample 2071* (GBA): no action to date.

**Cut 30692:** This was a shallow cut (to 30 cm deep) of uncertain lateral extent, its fill (Context 30653=30481) apparently cut by 30630.

### Context 30653

*Sample 2082* (GBA): dark grey, crumbly, ‘earthy’ silt with fine organic matter and charcoal.

Plants (/M): The 0.5 kg subsample examined for plant remains gave one of the largest assemblages (61 taxa) for the Period 3 deposits. The presence of faecal concretions (abundance 2) and *Triticum/Secale* ‘bran’ (3) indicates that some of the fill, at least, was faecal in origin, though the AIV for FOOS was not in the top 10% of values for these samples. At 15, however, the AIV for FOOF was equal second highest. Weed groups BIDE and SECA (both the highest values for this group of samples), CHEN (second highest) and ARTE (third highest) were all well represented, though of course they share some taxa in common; no doubt good preservation is partly responsible for these statistics. This subsample also gave the highest values for NACA and OXSP, though this is largely a function of the recording system in which *Calluna* was scored separately as flowers, shoot fragments and twig fragments for both vegetation groups. The grassland group MOAR achieved its third highest AIV here; it is possible that cut grassland vegetation (hay?) was present, though most of the taxa included in the group might have been growing in disturbed grassland communities—on paths and tracks, for example—near the site of deposition. The rather high scores for the woodland/scrub groups QUFA and RHPR are partly a reflection of the presence of foodplants like *Malus* and *Rubus* that were probably collected from such habitats. Amongst the other foodplants, flavourings were rather well represented—*Apium graveolens*, *Anethum*, *Satureja* and *Papaver somniferum* were all recorded.

Parasitic worms: Two subsample were examined; together, they yielded traces of *Trichuris* and

*Ascaris* eggs.

Insects (/T): The flot was very small and contained a small number of rather to very poorly-preserved insects (N = 20, S = 15), which were recorded by rapid scanning; many were reddish and eroded. The assemblage had no special character except that 75% of the individuals were of taxa coded ‘rt’. It seems possible that some or many fossils had rotted completely away.

**Cut 30777:** This cut into the upper part of the fills of Cut 30926. It appeared to be shallow—about 30 cm deep, and about 1 m across. Only one of the two fills recorded was sampled.

**Context 30766:** the upper of the two fills.

*Sample 2113* (GBA): no action to date.

**Cut 30903:** This cut was not adequately recorded on site (no plan, no section).

### Context 30902

*Sample 2178* (BS—VW): Rough sorting of the residue and more detailed examination of the washover yielded a small assemblage (12 taxa) of plant remains of no particular character. All were recorded in trace amounts. Occupation material was evidently present, as indicated by charred cereals (*Hordeum* and *Triticum aestivo-compactum*); *Cannabis* was also present.

*Sample 2177* (GBA): no action to date (rejected in view of an inadequate archaeological record).

### Context 33035

*Sample 2497* (Chemical): indigo to greenish-yellow slag-like material; no further analysis undertaken.

**Cut 30926:** This rather deep pit, approximately 1.3 m across and 1.7 m deep was cut above and to one side by Cut 30927.

**Context 30985:** the lowermost fill context.

*Sample 2288* (GBA): rather stiff, mottled, dark brown to reddish-brown sandy silty clay with patches of paler clay, and with charcoal fragments. Colours range from pinkish through brown to grey.

Plants (/M): Only a small assemblage of 13 taxa was recorded from this subsample of this deposit. Most were certainly or probably weeds of disturbed and cultivated land.

Parasitic worms: No eggs were recorded from the subsample examined.

Insects (/T): The flot was tiny and included small numbers of poorly preserved scraps of insect cuticle; only *Omalium caesum/italicum* was identifiable.

**Context 30974** (immediately overlying **30985**)

*Sample 2277* (BS—V): This sample was washed and rough sorted but gave no identifiable plant remains—merely traces of wood and charcoal fragments.

*Sample 2278* (GBA): slightly crumbly, dark-brown to pinkish-orange silty clay to clay silt, with dark grey-brown clay lumps and white flecks.

Plants (/M): Weed taxa predominated in the modest assemblage of 23 taxa from the small subsample examined. Only *Urtica dioica* reached an abundance of 2; the highest AIVs were for annual and biennial/perennial nitrophile weeds.

Parasitic worms: No eggs were recorded from the subsample examined.

Insects (/T): The flot was very small and included only a few poorly preserved insect remains (two beetles).

**Context 30925:** immediately overlying **30974** and perhaps the uppermost surviving fill of the pit.

*Sample 2272* (BS—VW): Thirteen taxa were recovered from rough sorting the residue and from

the washover; they were mostly weeds, but a trace of *Rubia tinctorum* root was also found.

*Sample 2270* (GBA): heterogenous, crumbly, pinkish-brown to dark-brown silt with low organic context and no obvious inclusions.

Plants (/M): The small subsample yielded 14 taxa, the majority of them weeds, all in trace amounts. Pottery, bone, brick/tile, charcoal and ?glass fragments indicated that occupation debris formed part of this fill; otherwise, its nature could not be determined.

Parasitic worms: No eggs were recorded from the subsample examined.

Insects (/T): The tiny flot included a few unidentifiable scraps of insect cuticle and a single *Anotylus nitidulus*.

**Cut 30927:** This cut truncated what is presumed to have been the upper parts of Cut **33008** and the upper part of one side of Cut **30926**. It contained skeleton **30944**. (Note that pit **36239** also contained part of a skeleton.)

**Context 30936:** the lowermost fill.

*Sample 2231* (BS—VW): A small assemblage of 23 taxa was recorded from the rough-sorted residue and from the washover of this sample. Weed taxa predominated, several present at an abundance of 2. There was a trace of the dyeplant *Rubia tinctorum*, and of *Cannabis sativa*, together with small numbers of possible foodplants; there was no evidence for faecal material.

*Sample 2233* (BS—W): Only the washover from this sample was examined; it yielded five taxa. All but one were possible foodplants. *Cannabis* was again recorded.

*Sample 2245* (Spot): Examination of a subsample for parasite eggs proved the presence of a very small concentration of *Trichuris* eggs, very much the 'background' level for this site.

*Sample 2251* (Spot): The small sample of ‘seeds’ recognised during excavation included a few seeds of the common weeds *Chenopodium album* and *Atriplex* sp(p), together with also egg capsules of earthworms.

**Context 30922:** immediately overlying **30936**.

*Sample 2228* (BS—VW): Only traces of charcoal, wood and *Prunus spinosa* fruitstones were recorded from this sample.

*Sample 2230* (C14, treated as BS—VW): The rough sorting and examination of the washover gave a small assemblage of 20 taxa, the majority weeds of annual and perennial nitrophile communities, abundance scores of 2 for *Urtica urens*, *Chenopodium album* and *Atriplex* giving a rather high AIV for group CHEN. *Cannabis* achenes were rather common—the score of 2 being one of only two at this level for the BS samples from Period 3. The other score of 2—for earthworm egg capsules—perhaps indicates that this fill was either well-drained during or after its formation or that it consisted largely of dumped soil.

*Sample 2232* (GBA): no action to date.

**Cut 30937:** a small pit about 1 m deep and 0.85 m across with near-vertical sides. It was cut from above by scoop **30854**. The main fill of **30937** was **30929**, with a small additional context, **30928**, immediately above it on one side of the pit.

**Context 30929**

*Sample 2226* (BS—VW): The small assemblage of 12 taxa provided no indication of the nature of the fill. They were mostly plants of waste and cultivated ground.

*Sample 2225* (GBA): no action to date.

**Cut 30964:** an irregularly shaped cut, approximately 1.2 m across and 1.0 m deep, in a complex with cuts **30926** (at the same depth), and

**30777** and **30927** (cutting from above):

**Context 30973:** lowest fill of cut.

*Sample 2274* (BS—VW): Only five taxa—all certain or probable weeds—were recorded from this sample.

*Sample 2266* (GBA): crumbly to cheesy-brittle dark brown to blackish organic sandy clay silt (coloured by fine charcoal), with small flecks of reddish-orange clay; stones, gravel and a glass fragment.

Plants (/M): This subsample yielded a very restricted assemblage of 11 taxa, mostly weeds. A trace of tentatively identified clubmoss (cf. *Diphasium complanatum*) is one of the modest number of records for plants associated with dyeing and mordanting from the Period 3 deposits (*Diphasium complanatum* was recorded as a secure or tentative determination from a total of 15 Period 3 contexts, *Genista tinctoria* from five, *Rubia tinctorum* from 18 and *Isatis tinctoria* from three).

Parasitic worms: No eggs were recorded from the subsample examined.

Insects (/T): The tiny flot contained no identifiable insect remains apart from a single *Anobium punctatum* head.

**Context 30969:** this overlay **30973**.

*Sample 2265* (BS—V): No identifiable plant remains were recovered from this sample; it yielded a very few fragments of mammal and fish bone, some shellfish and avian eggshell, together with pottery, metal artefacts (including nails and pins), glass, brick/tile and slag.

*Sample 2275* (GBA): no action to date.

**Context 30963:** uppermost layer of fill, cut by **30927**.

*Sample 2261* (GBA): dark brown, slightly organic sandy clay silt to silty clay, with small flecks of

reddish-brown clay and few inclusions.

Plants (/M): The assemblage from this subsample comprised only 12 identifiable plant taxa, half of which were scored with the annual nitrophile weed group, CHEN, a third with the perennial nitrophile group ARTE. Only *Sambucus nigra* and *Rubus fruticosus* represented possible foodplants. From the list of other components—including brick/tile, fish and mammal bone, charcoal, and mussel and oyster shell fragments—it is evident that this was primarily occupation material, but with a low organic content.

Parasitic worms: No eggs were recorded from the subsample examined.

Insects (/T(1), /T2): The tiny flots gave only a few insect remains of no interpretative significance.

**Cut 30967:** a cut of about 1.6 m across and unrecorded depth contained a single fill.

#### Context 30954

*Sample 2285* (BS—V): The only plant remains observed were from the ‘rough sorting’ of the residue. They included two taxa associated with dyeing and mordanting (*Diphasium complanatum* and *Genista tinctoria*), two mosses of the kind interpreted elsewhere in these deposits as ‘toilet tissue’ (*Neckera complanata* and *Thuidium tamariscinum*) and the probable foodplant *Corylus avellana*. There was also a rather large amount of moss (abundance score 2) that was not identified more closely, but which probably included the two taxa already mentioned.

This sample also gave three puparia of *Stomoxys calcitrans*.

*Sample 2284* (GBA): no action to date.

**Cut 30991:** (section not available)

#### Context 30978

*Sample 2282* (BS—V): Apart from a little

charcoal, no plant remains were recovered from the rough-sorted residue, though pottery, iron nails, glass fragments, mortar/plaster, brick/tile, slag, bone and shellfish shell were all noted during sorting.

*Sample 2281* (GBA) no action to date.

**Cut 33008:** this was a proportionately deep, steep-sided cut, about 0.85 m across and 0.6 m deep. It contained at least nine separately distinguished fills, though few were sampled.

**Context 33148** (this was the context number given to the pit fill as a whole whilst it was half-sectioned):

*Sample 2455* (Spot): one fragmentary *Cepea* sp. (snail) shell.

**Context 33006:** second to uppermost fill.

*Sample 2303* (Chemical): varicoloured (rusty brown to mid grey) indurated rather heterogeneous silty clay; no further analysis undertaken.

**Context 33004:** uppermost fill.

*Sample 2301* (Chemical): light brown indurated silty clay with orange patches; apparently natural drift. No further analysis undertaken.

#### *Pits in the northern area of later Tenement D*

This group comprised seven cuts in the northern part of the north-west corner, again close to the presumed street frontage and fairly tightly clumped.

**Cut 30691:** a pit of modest size, about 1.1 m diameter and 1.45 m deep, with a series of some six fills, three of which were sampled. It was cut to one side by **30630**. *Sample 2077* from **30642** was selected to represent the GBAs on the basis of information on the ‘sample sheets’ completed by the excavators at the time of sampling.

**Context 30652:** the third fill layer from the base.

*Sample 2081* (BS—VW): Thirty-one taxa were recorded, giving an assemblage a little above the mean for Period 3 BS samples. There was a modest range of foodplants but an AIV for FOOS of 50, the third highest for this series of samples and more than twice the mean value. This is accounted for largely by the abundance scores of 3 for *Malus sylvestris* seeds and *Prunus spinosa* stones, and of 2 for *Malus* endocarp and *Triticum/Secale* ‘bran’ (no doubt associated with the faecal concretions in the residue from this sample). Toilet ‘tissue’ is probably represented by the mosses *Neckera complanata* and *Thuidium tamariscinum* (the latter at an abundance of 2) and perhaps also by the wool fragments recorded. Another foodplant not otherwise very well represented in these deposits was *Vicia faba*, present as mineralised hila. (The mean length of a group of seven hila that could be measured was 4.0 mm; this may be compared with mean values for this parameter of 3.9 mm and 4.2 mm for two samples of 20 dry modern field bean (*Vicia faba* ssp. *minor*) seeds of two testa colour variants (mean for the 40 together: 4.0 mm) and means of 4.9 mm and 5.1 mm (overall mean 5.1 mm) for two samples of 20 such seeds after soaking.)

Plant taxa other than foodplants were sparse and mainly comprised weeds.

Perhaps not surprisingly, fly puparia were abundant in this sample, the majority being *Leptocera* sp., with moderate numbers of *Stomoxys calcitrans* and a few individuals of some other species.

*Sample 2080* (GBA): no action to date.

**Context 30648:** immediately overlying **30652**.

*Sample 2084* (BS—VW): In terms of presence/absence of taxa, there was almost a 40% overlap with the sample from **30652**. Although only faecal concretions (with an abundance of 2) were scored at more than 1, the faecal content of this layer was clear. A rather modest range of foodplants was present, including flavourings—the

AIV for FOOF was equal second highest (with three other samples at the same rank) for this series, the four taxa scoring in it being *Anethum graveolens*, *Apium graveolens*, *Coriandrum sativum* and *Satureja hortensis*.

There were immense numbers of fly puparia: over 200 Sepsidae sp., large numbers of *Musca domestica*, *Muscina stabulans* and *Stomoxys calcitrans*, and smaller numbers of *Leptocera* sp. and *Tephrochlamys tarsalis*.

*Sample 2079* (GBA): no action to date.

**Context 30642:** the uppermost sampled fill, not far beneath the uppermost fill.

*Sample 2083* (BS—VW): The sum of taxa (21) was rather below average within this series of samples, though several—*Corylus avellana*, *Hordeum vulgare*, *Neckera complanata* and *Prunus spinosa*—scored 2 on the three-point scale. In addition, fly puparia were rather abundant. These scores of 2 for *Corylus* and *P. spinosa* account for the high AIV for the woodland group QUFA which, unusually, had a higher value than the AIV for the weed group CHEN. With faecal concretions present, there is little doubt that faeces formed part, at least, of this fill context.

Fly puparia were again abundant, with considerable numbers of *Musca domestica*, *Muscina stabulans*, Sepsidae sp. and *Stomoxys calcitrans*.

*Sample 2077* (GBA): nearly black, friable, slightly organic clay silt with some wood fragments.

Plants: not recorded, but both ‘bran’ and *Agrostemma* seeds were observed in the flots for insects.

Parasitic worms: A very few *Trichuris* eggs were recorded.

Insects (/T, /1): The /T subsample, rapid-scan recorded semi-quantitatively, produced an estimated 78 beetles from 31 taxa. The assemblage was estimated to be of low diversity ( $\alpha = 19$ , SE =

4), and included eight taxa estimated to be represented by 'several' individuals. It was dominated by a distinctive group of oxyteline staphylinids together with *Omalius ?rivulare* and *Neobisnius* sp.; in consequence the sample was selected for analysis of a 3 kg subsample.

There were many mites and several fly puparia.

The 3 kg /1 subsample was scan-recorded; it produced a large assemblage of 507 individuals of 89 species of beetles. There were no bugs belonging to the groups used (at the time the analyses were made) in calculating statistics, but there were 'many' *Chionaspis salicis* and 'several' *Lepidosaphes ulmi*.

Diversity of the assemblage was quite low ( $\alpha = 31$ ; SE = 2). The outdoor component was fairly substantial (%NOB = 17) and of very low diversity ( $\alpha$  OB = 15; SE = 3). A large proportion of these 'outdoor' individuals were 'waterside/damp-ground' forms (coded d), principally *Platystethus degener* (22 individuals) and *P. nitens* (14), but *Aphodius granarius* was also abundant (16). The decomposers were dominated by oxyteline staphylinids which may have lived alongside *P. degener* and *P. nitens* in fairly foul moist matter: *Anotylus rugosus* (56); *Carpelimus bilineatus* (37); *Anotylus complanatus* (34); *A. nitidulus* (26); *Platystethus arenarius* (19) and *Oxytelus sculptus* (11). There were also numerous *Neobisnius* sp. (probably *N. villosulus*) (23), *Cercyon analis* (19), *Acrinus nigricornis* (14), *Acrotrichis* sp. (13), two indeterminate Aleocharinae species (13 and 12) and *Cordalia obscura* (10), and lesser numbers of a wide range of taxa likely to have bred in similar habitats to all these species. The *Aphodius granarius* may have been attracted to the fills—this dung beetle is not likely to have bred in very wet pitfills.

There were enough non-decomposer 'outdoor' individuals to suggest that the pit was open for a good while, unless habitats for them were particularly abundant in the surroundings. There were, for example, four *Chaetocnema arida* group. The development of what was clearly a large breeding community of decomposers supports the

hypothesis that the pit was open for many weeks. Water beetles were not very abundant, so the fills probably did not present an open water surface. There were 'several' *Pulex irritans*, but no evidence of deposition into the pit of house floor litter.

There were many mites in this subsample. Puparia were present in modest numbers, the majority being *Nemopoda* sp..

**Cut complex 30851, 30803, 30816:** This was a complex of intercutting pits at the eastern side of the front part of the site. **Cut 30851** was about 1.2 m across and 1.0 m deep; it was cut from above by **30803**, about 0.9 m across and 0.3 m deep, and **30816**, about 1.2 m across and 1.0 m deep. The fills in **30803** appeared to lie between the fills of the other two cuts.

#### **Cut 30851**

**Context 30837:** the basal fill of the lowermost pit, **30851**.

*Sample 2143* (GBA): no action to date.

**Context 30836:** immediately overlying **30837**.

*Sample 2142* (GBA): mottled, mid-brown and grey/orange clay silt with blackish reduced sulphide-rich patches. Some fibrous plant material and fly puparia.

Plants: A small subsample was examined by P. R. Tomlinson for vegetative plant remains. The organic content was rather low, but there was evidence for faeces: *Triticum/Secale* 'bran' and parasite eggs.

(/M): Faeces were also recorded via concretions in this subsample (though they were only scored at 1 on the three-point scale). There was a long list of taxa (53), well above average for this series of samples, with mosses well represented (13 taxa). The AIVs for the use and vegetation groups relating to vascular plants were not especially high (except where the score of 2 for *Pteridium* pinnule

fragments inflated minor groups NACA, QUER and RHPR), but some of those for mosses were the highest for these samples—DUNS, FENS, GRAS, LIGN, MARS, OLIT, SLIT and WOOF (though inevitably some taxa score in more than one of these groups and *Thuidium tamariscinum* at 2 inflated the AIVs for LIGN, SLIT and WOOF).

Bud-scales of birch and oak and bark fragments of *B. cf. pendula* recorded from this subsample may indicate the use of timber at or near the site at this period, though the scales may well have arrived in moss or with other woodland floor litter. Such remains were rather rare in Period 3 as a whole. Evidence for possible roofing or flooring was also present—in the form of the *Pteridium* pinnule fragments and culm-nodes of Gramineae/Cerealia (?from straw/reed). There was not, however, a clearly-defined grassland component that might suggest that hay was present.

Insects (/T): The flot was small and included many woody plant fragments. Insects were well preserved, but beetles not very numerous (N estimated at 34, S = 24). The main statistics were undistinguished, except that the decomposer component was of low diversity ( $\alpha$  RT = 14, SE = 5). *Omalium ?rivulare* ('several') and *Anotylus rugosus* (3) were the only taxa represented by more than two individuals. This small group may have included beetles which bred in or were attracted to the pit fills (supported by low  $\alpha$  RT), but the majority could well have been background fauna.

Fly puparia were recorded in quite large numbers; most were *Leptocera* sp.

**Context 30835:** immediately overlying 30836.

*Sample 2141* (BS—VR): Only the rough-sorted remains and the residue from this sample were examined; it is possible that there was no washover or that it had been recombined with the residue after disaggregation. Though there were only ten identifiable plant taxa, there was little doubt about the nature of this deposit. Faecal concretions scored 3 on the three-point scale, and there were abundant *Prunus spinosa* (score 3) and *P. domestica* (2) fruitstones, *Triticum/Secale* 'bran' (2), and moss,

including *Thuidium tamariscinum* (2). This was evidently almost pure faeces. Fly puparia were very abundant. The great majority were *Leptocera* spp. but there were significant numbers of *Muscina* sp., Sepsidae sp. and *Tephrochlamys* sp.

*Sample 2140* (GBA): very dark reddish-brown 'structured peat', with visible insect and plant remains; probable faecal concretion; matrix silty.

Plants: A small subsample examined by P. R. Tomlinson was found to contain further abundant evidence of faecal material and food debris. Together with faecal concretions, there were *Triticum/Secale* 'bran' fragments, endocarp ('core') and seeds of *Malus*, and pod fragments of *Vicia faba* ssp. *minor*; possible plant litter was present in the form of pinnule and stalk fragments of *Pteridium aquilinum* and epidermis fragments of a *Carex* sp. There were also parasite eggs.

(/M): The 50 taxa in this subsample gave further good evidence for faeces, with *Triticum/Secale* 'bran' scored at 3 and faecal concretions again present. The AIV for FOOS was the second highest for this series of samples (56, from 15 taxa), with three taxa scored in FOOF (*Apium graveolens* and *Anethum graveolens* both at a score of 2, with *Satureja hortensis* at 1) giving the second highest AIV for that group, too. Amongst the foodplants was *Allium* cf. *porrum*, one of only four records for this taxon from this series of subsamples (though there were five records of cf. *Allium porrum* from BS samples from Period 3). *Vicia faba* ssp. *minor* was represented by traces of testa and hilum as well as by waterlogged pod fragments—this was a taxon recovered from only eight contexts of Period 3 date.

The high scores for *Pteridium* (3 for pinnule fragments and 2 for stalk fragments) account for unusually high AIVs for groups in which they are counted but which are otherwise poorly represented—USEF, NACA, VAPI, RHPR and QUER). However, it is perhaps unlikely that bracken brought for bedding, for example, would carry with it a large component of 'incidental' plant taxa and these other vegetation types might therefore be unrepresented except by bracken.

Tentatively identified cereal culm-nodes may indicate a further 'litter' component in the assemblage.

Mosses of the kind likely to have been used—*inter alia*—as toilet tissue were again quite well represented, with the group HEMO achieving its highest AIV (perhaps *these* were plants imported with bracken—or at least from the same area?).

There was almost 30% overlap in the composition of identifiable plant taxa between this subsample and that from the underlying context.

Insects (/T): The moderately large flot included 'bran' fragments and quite abundant insect remains. Recording was by rapid scanning. Beetles were not numerous (N = 33, S = 29) and no species was represented by more than two individuals. The fauna was too small and diverse for interpretation but was probably rather similar to that from the subsample from 2142. Mites were abundant and there were several puparia of *Leptocera* sp. and Sepsidae sp.

#### **Cut 30803**

**Context 30828:** this underlay 30804 and 30827 of Cut 30816, in a separate small cut.

*Sample 2131* (GBA): crumbly, dark grey-brown, somewhat organic silt, with small stones, ?ash, charcoal and fine plant detritus.

Plants (/M): The assemblage of 31 taxa was a little above the mean for this group of samples. Faecal material was probably present—'bran' being scored at 2; the only other taxon with an abundance greater than 1 was *Urtica urens* (also at 2). Five moss taxa were recorded, three of them giving proportionately large AIVs for the groups FENS and MARS. They may have been deliberately collected, though all were present in small amounts. Apart from the 'bran', foodplants were scarce in this subsample, only *Corylus* and *Sambucus nigra* being scored with it for the FOOS group.

Insects (/T): The small flot consisted mostly of

insect remains, a large proportion of them beetles. 'Bran' was present in the flot. Recording was by rapid scanning. The number of beetles and bugs was estimated at 53, with 28 taxa recorded. Diversity was low ( $\alpha = 24$ , SE = 6) and the diversity of the decomposer component very low ( $\alpha$  RT = 15, SE = 4). *Anotylus complanatus* was abundant ('many'). The assemblage may reflect a short-lived community of the rapidly colonising *A. complanatus* with invading individuals of other decomposers, followed by burial and invasion by subterranean taxa such as *Trechus micros* and *Rhizophagus paralellocollis* (two of each). There were several puparia of *Leptocera* sp., but few other non-beetles.

**Cut 30816:** cut into the top of 30851 and with 30803 apparently cut into it

**Context 30830:** lowermost fill of 30816, overlying 30835 in the truncated top of 30851.

*Sample 2132* (GBA): clay with a low organic content except for ?reworked lumps of highly organic detritus.

Plants: A small subsample examined by P. R. Tomlinson was found to contain *Triticum/Secale* 'bran' and parasite eggs, together with modest amounts of stalk fragments of bracken. The material was not examined for insect remains.

**Context 30827:** immediately overlying 30830.

*Sample 2127* (GBA): no action to date.

**Context 30804:** immediately overlying 30827.

*Sample 2126* (GBA): A small subsample examined by P. R. Tomlinson for vegetative plant remains was found to comprise a mixture of essentially organic and inorganic materials, the former probably faecal matter. Plant remains identified were *Malus* seeds and stalk and pinnule fragments of *Pteridium*. The sample was not examined for insect remains.

**Context 30826:** a more substantial fill, lying above



the previous sequence of three fills in Cut **30816** but extending across the whole width of the pit.

*Sample 2139* (BS—VW): The assemblage of 36 taxa from this sample was rather above average; there were several scores of 2—for *Pteridium* pinnule fragments, *Agrostemma* seed fragments, *Malus* seeds and endocarp fragments, *Prunus spinosa* stones, and *Triticum/Secale* ‘bran’—and faecal concretions scored 3. There is thus no doubt that this was still being used as a latrine pit. The AIV for FOOS (47) was the third highest for the Period 3 BS samples, with proportionately high values for groups FOOO, with *Papaver somniferum* (one of only five records for Period 3), *Linum usitatissimum* and *Brassica rapa* all present. The trace amounts of *Crataegus monogyna* pyrenes may indicate the use by the Anglo-Scandinavian inhabitants of Coppergate of a wild-growing fruit now very little eaten in Britain.

As in other samples from this pit complex, *Pteridium* was present in some quantity, and this sample also yielded traces of the clubmoss, *Diphysium complanatum*, implicated in textile dyeing. There was a modest range of mosses representing woodland, heathland/moorland and wetland habitats, though all were present in small amounts.

Parasite eggs: two subsamples of faecal concretion gave modest numbers of *Trichuris* eggs, most of them entire; some were measured.

Large numbers of fly puparia were recorded from this sample, the majority being *Leptocera* spp. and Sepsidae spp., with smaller numbers of *Muscina stabulans* and *Nemopoda* sp. A few other taxa were also recorded.

*Sample 2138* (GBA): described by the excavators as ‘highly organic’.

Plants: A small subsample was examined by P. R. Tomlinson for vegetative plant remains. The material was clearly faecal in origin, being rich in *Triticum/Secale* ‘bran’, with *Trichuris* and *Ascaris* eggs. Also present were pinnule fragments of

*Pteridium aquilinum*, some epidermis of *Carex* sp(p). and stems and epidermis of unidentified Umbelliferae. Moss identified as *Hypnum* sp. was also present. The sample was not examined for insect remains.

### Context 30808

*Sample 2124* (BS—VW): The 36 taxa recorded formed an assemblage somewhat larger than the average for the Period 3 BS samples. It achieved its highest AIVs for the following groups: FOOS (58, from 14 taxa), QUFA (26 from 9) and RHPR (18 from 8). These high values reflect the score of 3 for *Corylus avellana* and *Prunus spinosa*, and of 2 for *Rubus fruticosus*, *Malus* and *Triticum/Secale* ‘bran’. Unusually, *Coriandrum* also scored 2. As in other samples from this sequence of fills, *Pteridium* was present, though there were only two mosses; one of them, *Neckera complanata*, is a species regularly associated with faecal deposits. There were quite large numbers of *Muscina stabulans* and Sepsidae sp. puparia, several *Stomoxys calcitrans* and small numbers of some other taxa.

*Sample 2125* (GBA): Despite a field description of this deposit as ‘highly organic’, it proved to be clay-rich and the only identifiable plant remains from a small subsample examined by P. R. Tomlinson were *Pteridium* stalk fragments. The sample was not examined for insect remains.

**Cut 30970**: a large pit, about 2.3 m across and 1.6 m deep, cut from above by **33232**.

**Context 33094**: one of the lower fills of the pit, extending across the whole width as seen in section.

*Sample 2490* (BS—VW): This sample gave the second largest assemblage for the Period 3 BS samples, in terms of numbers of taxa. Three taxa were scored in rather large numbers (abundance 2): *Chenopodium album*, *Hyoscyamus niger* and *Ranunculus flammula*. These scores account in part for the high AIVS for CHEN (fifth highest for the series), ARTE (third highest) and LITT (highest—with two other taxa contributing); other

groups well represented here were MOAR (highest), FEBR (second highest, though with only three taxa), PHRA (second highest) and SCCA (highest—though with only three taxa), and there was very little overlap of taxa between the groups. This suggests that marginal aquatic, wet meadow and dry grassland habitats were exploited, perhaps for cut vegetation for roofs, floors or bedding. The sole Period 3 record for a plant assigned to the floating-leaved aquatic vegetation group POTA—in this case *Sparganium* sp(p).—came from this sample. The high AIV for NACA rested on the records for five taxa, none exclusively heathland/moorland plants, so this statistic is probably of small interpretative significance. Similarly, the five taxa in EPIL are (with the exception of *Atropa bella-donna*) all scored for at least one other group and probably have little value.

Amongst the ‘useful’ plants, the biggest component was fruits—including *Prunus* spp. and *Ficus carica*; the latter has only two records from Period 3 samples, both apparently from contexts that are unlikely to have been contaminated from below or above. The numbers of food remains were small, however. The dyeplants *Rubia tinctorum* and *Diphysium complanatum* were also present in this sample; the *Myrica* might also have been used as a source of dye, as well as a flavouring, a medicinal herb, or perhaps simply a component of cut vegetation from a fen or bog. Another plant that may have had herbal uses is *Marrubium vulgare* (one of only two secure determinations from Period 3), though this has only been scored with the perennial weed group ARTE for the numerical analysis.

**Cut 33105:** to N. of **30970**, approximately 0.7 m across and 1.1 m deep and cut from above by another pit. The only sampled contexts were **33083** and **33072** (which contained **33083**), which together formed the second-to-uppermost fill.

### Context 33072

**Sample 2415** (BS—VW): The assemblage of taxa (18) was well below the average for Period 3 BS samples. It contained equal numbers of foodplants and annual nitrophile weeds, all taxa being recorded in small amounts. The foodplants included *Prunus* Section *Cerasus*, the only record for this taxon from Period 3 deposits (it was rare in the Anglo-Scandinavian period at Coppergate, but much commoner in post-Conquest deposits).

### Context 33083

**Sample 2359** (GBA): no action to date.

**Cut 33119:** This was a rather large cut, about 1.8 m across and averaging 0.65 m in depth; the base of the single fill, **33115**, was irregular as seen in section.

### Context 33115

**Sample 2441** (GBA): no action to date.

### *Pits in the rear area of later Tenements B and C*

Ten cuts formed a fairly well-defined group in the central part of the site.

**Cut 34824:** This was a modest-sized pit, wattle-lined below, and of about 1.85 m diameter and 1.9 m depth. There were several fills of which two were sampled.

**Context 36233:** the second-to-lowest fill.

**Sample 25183** (GBA): mid-dark grey to grey-brown plastic, somewhat heterogeneous, silty clay with traces of charcoal and wood fragments and granules and streaks of paler mineral soil. No further analysis undertaken.

**Context 34817:** the next but one layer above **36233**.

*Sample 25182* (GBA): no action to date.

(above it were **36080** and **36146**, both with unsampled fills)

**Context 34789**: the uppermost fill, possibly slump across the top of the pit.

*Sample 2432* (BS—V): The small size of the assemblage (14 taxa) reflects (at least in part) the fact that only the rough-sorted remains were available for this sample. Two dyeplants, *Rubia* and *Diphasium* were recorded from this material, however, along with *Cannabis* and some food taxa. With three large hypnoid mosses and eggshell membrane present, there is some likelihood that the deposit contained some faeces (and see below). This suggests that some primary use-phase material was present.

Parasitic worms: A subsample from a faecal concretion gave a very few poorly preserved *Trichuris* eggs.

*Sample 2431* (GBA): A small subsample examined for vegetative plant remains by P. R. Tomlinson yielded *Triticum/Secale* ‘bran’, *Trichuris* and *Ascaris* eggs (confirming that faeces were present), fragments of *Pteridium* stalk, and remains of plants associated with dyeing—*Rubia* and *Diphasium*, as in the BS sample, together with *Genista tinctoria*. The sample was not examined for insect remains.

**Cut 34839** (= **36132** = **36264**)

**Context 34833**

*Sample 2502* (Spot): sample not examined.

**Cut 34898**: section not available; three fills, of which one was sampled.

**Context 34885**

*Sample 2510* (Spot): no action to date.

*Sample 2434* (Spot): no action to date.

**Cut 36079**: the lowermost of a series of cuts

**Context 34882 (=32722=32673)**

*Samples 2454/2492* (BS—W): A written record for processing exists for 2454 but not for 2492. However, remains were only recorded from the washover of 2492, on which sample no rough sorting appeared to have been carried out. This washover gave an assemblage of 37 taxa, well above the average for this series of samples. However, no particular group achieved an unusually high AIV except for RHPR (though the value of 15 from eight taxa—the fourth highest for Period 3 BS assemblages—was mainly a function of the presence of wild-growing ‘hedgerow’ fruits in the foodplant component FOOS which, at 39 was the seventh highest score for this group for the series). That faecal material was present is no doubt also attested by the score of 3 for ‘bran’, and the presence of small amounts of faecal concretions, but there were also traces of the dyeplants *Rubia* and *Isatis* (and perhaps *Agrimonia* may be counted with these).

Fly puparia were abundant: there were large numbers of *Leptocera* sp. and Sepsidae sp. and a few *Muscina* sp. A single ?*Hydrotaea dentipes* was also recorded.

*Sample 2453* (GBA): no action to date.

**Cut 36081:** a rather large cut, about 2.2 m across and 2 m deep from which spot samples only were taken from two fill contexts.

**Context 34981**

*Sample 2445* (Spot): recorded on site as eggshell but not seen in the laboratory.

*Sample 2505* (Spot): recorded on site as eggshell but not seen in the laboratory.

**Context 34933**

*Sample 2444* (Spot): recorded on site as ‘seeds’ but not seen in the laboratory.

*Sample 2503* (Spot): a cache of about 200 sloe

(*Prunus spinosa*) fruitstones.

**Contexts 34934 and 34935** (apparently from this fill) were single alder (*Alnus*) and oak (*Quercus*) stakes, respectively.

**Cut 36158:** This appeared to be a pit into which a later pit had been cut that had a similar centre point, so that only a small amount of the fill of the earlier feature remained. The basal fill, **36154** was sampled.

**Context 36154**

*Sample 2463* (BS—VR): Rough-sorted plant remains were supplemented by material from the residue; the washover was not seen (it may have been very small and returned to the residue after processing). Perhaps in part reflecting this, the total number of taxa (9) was within the bottom quartile for this parameter for Period 3 BS samples.

The largest component of the residue was evidently faecal concretions, which had an abundance of 3. There was also a very large number of *Prunus spinosa* stones (3) and small numbers of several other foodplants. The wool fragments presents may have been from toilet tissue.

Hundreds of puparia of *Leptocera* (perhaps several species) and Sepsidae sp., large numbers of *Muscina* sp. (many certainly *M. stabulans*) and *Musca domestica*, and moderate numbers of Fanniidae were present.

*Sample 2462* (GBA): fairly crumbly, stratified, dark brownish black organic silt with plant fragments, puparia and leather fragments and lumps of buff (?natural) clay.

Plants (/M): With an assemblage of 51 taxa, this subsample yielded the eighth richest species list for this series of samples. The AIV for FOOF was the highest of all for Period 3 (18, based on five taxa), that for FOOS the fourth highest. The former group comprised *Anethum graveolens*, *Apium graveolens*, *Humulus lupulus*, *Papaver somniferum* and *Satureja hortensis*, with *Apium*

scoring 2, the remainder 1. (*Nepeta cataria*, scored in the group HERB but not in FOOF, might also be counted as a flavouring; it may be significant that those contexts in which *Nepeta* was recorded from Period 3 gave AIVs for FOOF that were at or above average for this statistic for contexts yielding flavourings of some kind.) *Triticum/Secale* 'bran' scored 3 and, together with faecal concretions at 2, there is no doubt that this deposit was largely faecal in origin. A rare record of hila from field bean was made for this subsample.

Parasitic worms: A small number of *Trichuris* eggs, most bearing both polar plugs were recorded; some were measured.

Insects (/T): A few well-preserved beetle fragments were present in the large flot, which consisted mainly of plant tissue. Single individuals of eleven beetle taxa were recorded by rapid scanning. A modest group of fly puparia was also present, with several *Leptocera* sp. and Sepsidae sp. Other remains were rare.

**Cut 36239:** a rather large pit of about 3.2 m diameter and 1.4m depth.

**Context 36530:** the basal context.

*Sample 25203* (GBA): mid-dark grey plastic somewhat heterogeneous very slightly humic or charcoaly sandy clay silt with traces of limestone fragments larger than 10 mm, bone fragments, and modest amounts of charcoal. This sample was rejected for detailed plant macrofossils and insect analysis but a 10 kg sample was bulk-sieved after the main phase of sample processing. It yielded a range of animal and plant remains and occupation debris, including a coin and a nail head.

**Context 36317:** immediately above the last.

*Sample 25202* (GBA): no action to date.

**Context 36251:** immediately above the last.

*Sample 25201* (GBA): dark grey-brown, crumbly to just plastic, humic slightly sandy clay silt with

modest amounts of wood fragments, traces of ?faecal concretions and abundant coarse plant detritus. This sample was rejected for detailed plant macrofossils and insect analysis but a 7 kg sample was bulk-sieved after the main phase of sample processing. The residue comprised abundant faecal concretions, with smaller amounts of charcoal, ?peat, wood/twig fragments and a lump of ?iron corrosion. There is little doubt that this was primarily faecal material.

**Cut 36276:** as seen in section, this was a cut truncated by **34824** (q.v.) It contained at least three fill contexts, of which only one was sampled.

**Context 36275**

*Sample 2519* (GBA): dark grey plastic to crumbly, somewhat heterogeneous silty clay with inclusions of pinkish-brown silty clay, traces of charcoal and modest amounts of bone fragments larger than 20 mm.

Insects (/TP): The flot contained only the remains of three beetles and a fly puparium.

The remaining 17 kg of sediment was bulk-sieved; it yielded modest amounts of bone, much shellfish shell, a little leather, pottery, brick/tile and slag, and small amounts of wood, charcoal, charred cereal grains and nutshell.

**Cut 36568:** GBA samples taken from block of sediment including Contexts **34910** and **34886**, the two major fills of this cut; for database purposes, they have been assigned the former context number.

**Context 34910**

*Sample 2524* (GBA): no sample sheet available; no action to date.

*Sample 2525* (GBA): no action to date.

**Cut 36576:** a small cut into the uppermost surviving fills of Cut **36081**; one sampled fill.

## Context 34975

*Sample 2526* (GBA): no action to date.

## *Pits to the rear of the site*

Seven pits cuts towards the rear of the site were sampled. They were scattered throughout the width of the excavated area (which was only the western half of the site as a whole).

***Cut 24950***: This small pit of about 0.8 m diameter and 0.75 m depth was wicker-lined. It was roughly circular, with near-vertical sides.

**Context 26016**: the lowest fill of the pit.

*Sample 1655* (BS—VW): A total of 38 plant taxa was recorded from this sample—rather above the mean for this series of 27—though all were in small amounts (i.e. abundance score 1). The most numerous were weeds of cultivated and waste ground and foodplants; some of the latter—wild fruits—also account for the component of woodland/hedgerow taxa. Possible flavourings included hop (*Humulus lupulus*) and summer savory (*Satureja hortensis*). Traces of the dyeplants woad (*Isatis tinctoria*) and madder (*Rubia tinctorum*) and of the clubmoss *Diphasium complanatum*, likely to have been used in mordanting, were also present.

Four taxa from this sample were scored in the medicinal herb group, HERB: deadly nightshade (*Atropa bella-donna*), white bryony (*Bryonia dioica* ssp. *cretica*), caper spurge (*Euphorbia lathyris*) and *Humulus lupulus*. Both the *Bryonia* and *Euphorbia* might have been used as purgatives, though there is no firm evidence that this was a latrine pit. Though *Atropa* and *Humulus* were quite widely recorded from Period 3 deposits, the record for *E. lathyris* is the only one for this phase and that for *Bryonia* is one of only three. There were only six more records of *E. lathyris* from later deposits of the Anglo-Scandinavian period at Coppergate, whilst *B. dioica* was rather more regularly recorded from Periods 4B and 5B.

There was, then, no particular evidence from the plant remains for the nature of this cut fill—it appears to have received a ‘background’ flora from the site. Frog and toad bones were recorded amongst the remains extracted during rough

sorting; this may indicate an open pit with standing water.

*Sample 1658* (Spot): This sample comprised a total of eighteen *Helix aspersa* shells, possibly modern intrusions.

**Cut 26943**: Although no section was available, it appeared that the one sampled context, **26946**, from this rather large pit (approximately 2.3 x 1.8 m across and 1.4 m deep) was the next-to-lowest in a series of six layers.

### Context 26946

*Sample 1785* (BS—VW): The modest assemblage of plant remains (33 taxa—a little above the mean for this series) were all present in small amounts, except for blackberry (*Rubus fruticosus* agg.) seeds, recorded at 2 on the three-point scale of abundance. Possible foodplants were the second most numerous group (after weeds of disturbed soils, group CHEN), and included sloe (*Prunus spinosa*) and ‘plum’ (*P. domestica*) stones, apple (*Malus sylvestris*) seeds and hawthorn (*Crataegus*) pyrenes. Charred field bean (*Vicia faba* ssp. *minor*) was also present and other charred remains included bread/club wheat (*Triticum aestivo-compactum*), barley (*Hordeum* sp(p).) and ?rye (cf. *Secale cereale*). The clue to the nature of this pit fill lies in the presence of faecal concretions.

*Sample 1786* (GBA): Dark grey-brown organic silt with yellow flecking; rather homogeneous, but a few twig fragments present.

Insects (/T): A small assemblage (N = 39, S = 34), was recorded by rapid scanning. It consisted principally of decomposers; the proportions of RD and RF were normal. There was nothing to distinguish the assemblage from the bulk of Anglo-Scandinavian samples and it could merely have been background fauna. There were ‘several’ puparia, including one *Melophagus ovinus*, and several mites.

**Cut 28038**: This was a large pit of about 2.5 m

diameter and 1.25 m deep. It had a relatively uncomplicated series of fills, of which one, from the lowermost third, was sampled. The pit was cut by **26993** of Period 4B date but the deposit sampled from **28038** would have been beyond the reach of contamination from above.

### Context 28033

*Sample 1844* (BS): This sample gave the fourth largest assemblage (55 taxa) for this series, though only hazel nut (*Corylus avellana*, with a score of 2, had an abundance greater than 1. The foodplant component in general was moderately high (the AIV for FOOS of 37 was well above the mean for this statistic (22) for the Period 3 BS samples), with a mixture of fruits, nuts (walnut, *Juglans*, as well as hazel) and cereals.

Particularly noticeable in this sample was the proportionately high component of plants scored as DYES. *Diphysium complanatum*, *Genista tinctoria* (both stem and pod fragments) and *Rubia tinctorum* were all present, and *Humulus lupulus* has also been included with this group for the numerical analyses; it can give a yellow dye). In view of the apparent integrity of this deposit, it seems unlikely that these remains were intrusive from later levels. The presence of *Genista* very largely accounts for the unusually high scores within this series of samples for groups HERB, MOAR, and TRGE; they would be no better represented than in most other Period 3 BS samples were the two records for *Genista* parts excluded from them.

In a similar way, the rather high AIV for the woodland group QUFA largely depends on some woodland plants also included in group FOOS; *Ilex* seeds were recorded in this group, too, but is perhaps unlikely that holly berries were eaten by the inhabitants of Coppergate. Holly seeds were regularly recorded from later Anglo-Scandinavian deposits at Coppergate but there were only three records for Period 3, the other two being for leaf epidermis fragments. *Ilex* may, of course, have arrived at the site with woodland moss—all five moss taxa recorded from this sample are scored in at least one of the various moss groups that could

represent woodland habitats—SLIT, LIGN and WOOF.

Two of the seven records for remains of *Calluna* from Period 3 deposits (from a total of only four contexts) were from this sample—they were flowers and twig fragments. *Calluna* has not been scored with the DYES group, though it might well have been used for dyeing; it may have had one or more other uses, including roofing and bedding.

*Sample 1845* (GBA): richly organic very dark grey-brown brittle silty 'peat' with wood and much fine plant detritus. Some layering and pinkish-grey buff (natural) clay.

Insects (/T): Recording was by semi-quantitative rapid scanning. A small group of insects was recovered, including several scale insects and an estimated 57 individuals of 34 taxa of Coleoptera. Diversity was quite low ( $\alpha = 36$ , SE = 9) and the outdoor component small (%NOB = 4). The decomposer group was quite substantial (%NRT = 67) and of low diversity ( $\alpha$  RT = 20, SE = 9). The most abundant beetles were three oxytelines—*Carpelimus bilineatus*, *C. fuliginosus* and *Anotylus complanatus* (all 'several'). This seems to have been a small breeding or 'attracted' group. Both outdoor individuals were of waterside taxa (*Bledius* sp. and *Platystethus cornutus* group). The layer may have been rapidly sealed.

There were many well preserved mites, and many puparia, probably mostly *Leptocera* sp. A single *Melophagus ovinus* adult was present.

**Cut 28385**: Only a small portion of this cut fill remained, sandwiched between the robber-trench of the NNE-SSW Roman wall **28412**, and a later cut and its fill. Context **28384** overlay **28403**, which was the lowest fill of the pit.

#### Context 28403

*Sample 1898* (GBA): crumbly, mid- to dark reddish-brown, highly organic silt with some clay.

Plants (/M): This deposit was clearly largely faecal

in origin, for faecal concretions—recorded as being very granular and decayed—were scored at an abundance of 3. In other respects, however, the subsample yielded a rather ordinary assemblage, the number of taxa (22) being rather below the mean for the Period 3 samples in this series. Amongst the foodplants, mineralised field bean (*Vicia faba*) testa fragments, unusually, scored 2 (*V. faba* was normally rare in the Period 3 deposits and variously represented by charred whole seeds, waterlogged hila, and pod fragments, as well as by testa fragments, these last being recorded as mineralised only in the present sample.) There were also hila in the subsample of *1898* (not recorded separately in the numerical analysis), one of which was 6.2 mm long (about 20-25% longer than the hila of some modern imbibed 'field beans' measured by ARH, see above under *Sample 2081*), and a whole bean whose breadth was 9.5 mm, a little less than the mean breadth for the same set of modern field beans.

Parasitic worms: Two subsamples were examined; one yielded very large numbers of *Trichuris* eggs (a number of which were measured), the other rather smaller numbers of *Trichuris* (and a trace of *Ascaris*).

Insects (/T): This subsample was semi-quantitatively rapid-scan recorded. Insect remains were rare (N estimated as 25, S = 18), pale and scrappy. 'Several' *Carpelimus bilineatus* and three *Anotylus rugosus* were recorded, but none of the remaining taxa were represented by more than one individual. The fauna could be a random extract from that of the overlying context.

#### Context 28384

*Sample 1897* (GBA): dark brown, soft, friable richly organic silt with no obvious inclusions.

Plants (/M): The assemblage from this subsample (27) was somewhat larger than that from *1898*, though with apparently poorer quality of preservation (faecal concretions were again present, but *Vicia faba* testa fragments were identified only tentatively, and there was a record for mineralised seeds of *Prunus*). There was a



moderate similarity (of 28%) between the two assemblages (based on 'part' taxa), and the ecological/use analysis gave rather similar results, except that cornfield weeds (SECA) were qualitatively and quantitatively better represented in 1897.

Parasitic worms: There were modest numbers of *Trichuris* eggs, most of which had lost one or both polar plugs; some were measured.

Insects (/T): Some uncertainty existed as to whether the flot jar labelled 1897/T was, indeed, from that subsample. However, the similarity of the fauna to that from 1897/1 suggests that it was. Superbly preserved insect remains made up a large proportion of the fairly small flot. Recording was by semi-quantitative rapid scanning. Number of individuals was estimated at 167, with 34 taxa. Diversity was very low ( $\alpha = 13$ , SE = 2), and the outdoor component small (%NOB = 4), while the decomposer component was huge (%NRT = 87). There were no RD taxa, and RF taxa accounted for 7% of the assemblage. The diversity of the decomposer group was very low ( $\alpha$  RT = 7, SE = 1). *Anotylus rugosus* and *Carpelimus bilineatus* were extremely abundant (estimated at a minimum of 50 in each case), while there were 'several' *Rhizophagus parallelocollis*, *Falagria caesa/sulcatula*, *Coprophilus striatulus*, *Platystethus arenarius*, Aleocharinae sp., *Cercyon analis* and *Neobisnius* sp. This was clearly a breeding group in fairly moist organic matter. It may have been protected from 'background fauna' or quite rapidly covered—perhaps a well-established fauna was catastrophically sealed by the overlying layer.

There were a few fly puparia, mostly *Leptocera* sp. and Sepsidae.

Following inspection of the /T subsample, a 3 kg/1 subsample was processed. It produced a quite large and somewhat unusual assemblage of beetles (N = 186, S = 48). The concentration of remains appears to have been substantially lower than in the /T subsample, even allowing for the effects of minimum number estimation. Whole assemblage diversity was unusually low ( $\alpha = 21$ , SE = 2), and the outdoor component was both proportionally and

absolutely small (8 individuals, 4%). Coded decomposers accounted for 81% of the individuals, with the RD and RF groups relatively poorly represented. Diversity of the RT component was low ( $\alpha$  RT = 10, SE = 1). *Carpelimus bilineatus* was the predominant species, with 72 individuals (39% of the assemblage), but there were also 23 *Anotylus rugosus* (these two species were, of course, responsible for the depression of the  $\alpha$  values). Other more abundant taxa were *Omalium rivulare* (8), *Cercyon analis* (6), *Neobisnius* sp. (5) and an aleocharine, *Anobium punctatum*, and *Ptinus fur* (all four). There were hints of 'house fauna', suggesting a possible origin for at least part of the material dumped in the pit, but there was undoubtedly a strong breeding colony of the two abundant oxytelines and doubtless some of the other decomposers were also established. Non-beetles were not very common.

**Cut 28542:** a pit of the order of 1.0 m deep and across, cut into earlier deposits and itself cut by the construction cut for a wattle-lined feature, 27070. Of the five contexts identified on excavation, three were sampled.

**Context 28557:** the lowermost fill context.

**Sample 1930 (Spot):** A 100 g subsample was washed and examined briefly for plant remains; the material was dominated by blackberry (*Rubus fruticosus* agg.) seeds, with seeds and fruit fragments of *Vaccinium* sp(p). (probably bilberry, *V. myrtillus*), rowan (*Sorbus aucuparia*), rose (*Rosa* sp(p).) and apple (*Malus sylvestris*). The matrix was rich in 'bran' of *Triticum/Secale* and *Trichuris* eggs were recorded from a slide mount. Faecal concretions were scored at 2, and eggshell membrane fragments were also present. Wool fragments and moss from this subsample may represent toilet tissue substitutes.

The high concentrations of foodplant remains led to the AIV for FOOS of 63, the highest for this entire series of Period 3 samples, even though the number of taxa recorded (26) was a little below the mean, as might be expected from a small subsample.

Parasitic worms: A separate subsample examined specifically for parasite eggs showed *Trichuris* to be present in small numbers.

*Sample 1931* (GBA): dark reddish brown to orange brown, compressed highly organic detritus with faecal concretions, snail (*Helix aspersa*) and woodlouse.

Plants (/M): The size of the assemblage from this 0.5 kg subsample (38) was rather above the mean for this series. Again, foodplants were predominant, giving the third highest value for FOOS of 53 from the same number of taxa as in the spot sample from 1930. There was a 32% overlap between the assemblages from these two subsamples, each taken as a whole; of the 11 taxa scored in groups FOOS in the subsample from 1930, eight were also recorded from that from 1931—a 57% similarity. This figure is enhanced even further—to 60%—if the actual plant taxa are used in the calculation, rather than the ‘part’ taxa recorded; thus the three ‘parts’ of *Vaccinium* from 1930 become one true taxon. The present assemblage included ?leek (*Allium* cf. *porrum*), *Corylus* and *Linum usitatissimum*, absent from 1930; the latter yielded *Rosa* and two ‘part’ taxa of *Vaccinium* in addition to seeds.

A modest range of mosses was present—probably imported for sanitary purposes—and *Sphagnum* shoots were also recorded. This absorbent and (when fresh) antiseptic moss would be a very good candidate for use in this way or as a wound dressing or perhaps in feminine hygiene. Faecal concretions scored 1 in this subsample, but *Trichuris* eggs from a smear of undisaggregated sediment were scored as 2.

For the rest, there were modest components of cornfield weeds in group SECA (inflated to some extent by the score of 2 for corncockle (*Agrostemma*) seed fragments, a probable component of faeces, the seed having been milled with grain), and annual weeds in group CHEN. However, there seems little doubt that the bulk of this context was human faecal material.

Insects (/T): The flot was a little larger than usual

and contained abundant, well-preserved insect remains, including moderate numbers of beetles. Recording was fully quantitative. A total of 109 beetles of 59 taxa was noted. Diversity was moderately high ( $\alpha = 52$ , SE = 9). Other statistics were normal, except that RD and RF were a little high (21% and 9%, respectively). There were six *Lathridius minutus* group, five *Ptenidium* sp., and four each of *Xylodromus concinnus*, *Atomaria* sp. and two *Corticaria* species. *Aphodius* spp. included three *A. prodromus* and single individuals of *A. rufipes* and a third species. This deposit may have been exposed for some time or have been redeposited surface material (unlikely, in view of its nature and other constituents). The species list includes taxa hinting at an origin in or near to a structure; subjectively, the list is rather unusual.

There were ‘many’ fly puparia, most being *Leptocera* sp. There were a few Sepsidae and a small number of other insect remains.

The /1 subsample (of 3 kg) was processed on the basis of the initial inspection of the /T subsample. It produced ‘many’ fly puparia, ‘several’ mites and scale insects, 12 human fleas, a variety of other invertebrates and a substantial assemblage of 357 individuals of 104 beetle and bug taxa. Main statistics were generally unremarkable, although the RD component was substantial (%NRD = 18) and the outdoor component was of fairly low diversity ( $\alpha$  OB = 39, SE = 13). This was a somewhat unusual assemblage in terms of species composition, however—more clearly so than the /T subsample discussed above.

The most abundant taxa were as follows: *Ptenidium* sp. (23 individuals), *Omalium ?rivulare* (22), *Cryptophagus* sp. (21), *Anobium punctatum* (14), *Lathridius minutus* group (12), and *Orthoperus* sp. (11). There were also nine individuals of *Cercyon analis*, *Anotylus sculpturatus* group and *Philonthus politus* (the last identified on the basis of male genitalia). There were 20 other taxa with four or more individuals, including six *Bruchus ?rufimanus* (which perhaps may have originated in pulses). Quite possibly this fill included floor debris from a nearby house—the

human fleas and other 'house fauna' were strongly represented. There were probably other components of the fauna, however, some perhaps introduced in dumped materials (including faeces), some being invaders of foul and other organic matter and some originating as background fauna of circumjacent origin (from weedy vegetation).

There were many fly puparia of more than one species, and several mites and various other arthropod remains. Hair was abundant in the flot; it did not all appear to be sheep's wool.

**Context 28541:** overlying **28557** and separated from it by the unsampled layer **28569**.

**Sample 1929 (GBA):** dark reddish brown highly organic detritus.

**Plants (/M):** Another very large assemblage (54 taxa) was recovered from this subsample. A very high score of 3 for *Urtica dioica* achenes accounts for the relatively high AIVs for groups ALNE, ARTE, EPIL, QUFA and RHPR—a clear case of distortion of the statistics by superabundance of one taxon. The plant remains were quite rich in food remains, with 'bran' (scoring 3), faecal concretions and *Ascaris* and *Trichuris* eggs were all present. Cornfield weeds were again well represented (fifth highest AIV for SECA), weeds in group CHEN being perhaps much more abundant than in samples from **28557**, with more than twice as many taxa, though only *Chenopodium album* scored 2, the rest 1. The implication of this is perhaps that the deposit received a smaller proportion of faeces to other rubbish and/or that such nitrophile weeds were becoming established around the pit and were dispersing their propagules into it.

Two other groups achieved unusually high AIVs within the context of this series of samples from Period 3: ASTE and NACA. The former was represented by two taxa—mud rush (*Juncus gerardi*) and ?sea aster (cf. *Aster tripolium*). (*A. tripolium* was only identified tentatively from this Period 3 context and from one from Period 4B and two from Period 5B at this site, and was recorded from one sample of deposits of similar date from

6-8 Pavement, Lloyds Bank site, by Hall *et al.*, 1983) The significance of certain or probable saltmarsh taxa is discussed elsewhere. The high AIV for NACA is somewhat misleading; with the exception of *Juncus squarrosus*, all the taxa scored in this group are also scored in one or more other groups. Their coincidence here is probably not good evidence for the exploitation of heathland/moorland, though *J. squarrosus* might be taken to indicate commerce with, or the importation of materials (?turf) from such habitats.

**Parasitic worms:** There were a very few eggs of *Trichuris* and *Ascaris* amongst the five subsamples examined.

**Insects (/T):** Insect remains, including fly puparia, made up a substantial proportion of the small flot. Preservation was generally good, occasionally poor. Recording was by semi-quantitative rapid scanning and N estimated at 57, with 32 taxa. The main statistics were unremarkable, except that diversity was low ( $\alpha = 30$ , SE = 7) and the diversity of the decomposer component very low ( $\alpha$  RT = 15, SE = 4). *Anotylus rugosus* was abundant ('many'), and there were 'several' *Omalium rivulare* and three *Anobium punctatum*. Other taxa were represented by one or two individuals. A fused pair of elytra of *Tipnus unicolor* was recorded.

There were many *Leptocera* sp. puparia and some Sepsidae sp. 'Several' mites were recorded and there was a single larval apex of *Melanotus rufipes* and a nymph of the human louse, *Pediculus humanus*.

/1: On the basis of the assemblage from the /T subsample a 3 kg /1 subsample was processed and 'detail' recorded. This gave a large assemblage of beetles and bugs—321 individuals of 118 taxa. Diversity was high ( $\alpha = 67$ , SE = 6), but the proportion of outdoor individuals relatively low (%NOB = 11); the concentration of outdoor forms was not especially high. Decomposers were fairly abundant (%NRT = 61), with 'dry' decomposers not particularly well represented (%NRD = 14) and 'foul' taxa (comparatively) fairly numerous (%NRF = 9). The decomposer component was of

moderate diversity ( $\alpha$  RT = 27, SE = 3), presumably because a rich, varied, decomposer community had developed. The beetle assemblage was distinctive, with *Omalius rivulare* the most abundant species (23 individuals), followed by *Anotylus rugosus* (14), *Anobium punctatum* (13), *Ptenidium* sp. (12), *Anotylus sculpturatus* group and *Mycetaea hirta* (both 11) and *Lathridius minutus* group (10). Other well-represented taxa included *Cercyon haemorrhoidalis* (9) and *Platystethus arenarius* (7), indicative of fairly foul conditions. *Philonthus ?politus* is another typical component of assemblages interpreted as having formed under foul conditions. Dung beetles appear to have been attracted, for there were three each of *Aphodius equestris* and *A. fimetarius*, two *A. granarius*, and a single *A. rufipes*. This seems to have been a rather foetid layer, probably exposed for quite a long time. The material contributing to it may have been redeposited from elsewhere, however, since a 'house fauna' element was present (*A. punctatum*, *M. hirta*, five *Atomaria nigripennis* and two *Cryptophagus scutellatus*). There was, however, only a single flea.

There may have been nettles nearby, for there were single individuals of four nettle-feeding taxa.

There were also three individuals of the rather southern dung beetle *Aphodius equestris* (as mentioned above) and a single *Platystethus nodifrons*, also southern.

Puparia were abundant and there were several mites, Hymenoptera, and millipedes of two species. A single *Melophagus ovinus* puparium was also recorded.

**Sample 1948 (Spot):** This sample of eggshell was examined in the laboratory but not identified further.

**Sample 1949 (Spot):** This sample comprised three unemerged and 25 emerged puparia of the fly *Muscina* sp.

**Sample 1950 (Spot):** This sample was a cache of *Rubus fruticosus* agg. seeds with *Triticum/Secale* 'bran' and *Trichuris* eggs. It was clearly faecal

material, the reddish colour recorded on excavation perhaps derived from the fruit.

**Sample 1951 (Spot):** There were five medium to large 'plum' *Prunus domestica* ssp. *domestica* fruitstones in this spot sample.

**Context 28408:** overlying 28541 and separated from it by unsampled context 28568.

**Sample 2025 (Spot):** This sample comprised a single charred caryopsis of oat (*Avena* sp.) and two charred caryopses tentatively identified as bread wheat (cf. *Triticum aestivo-compactum*).

**Cut 28959:** This cut was only about 25 cm deep, but about 1.4 m across and is probably the base of a truncated pit. Of its five fills, only one was sampled.

**Context 26576**

**Sample 1710 (GBA):** crumbly dark reddish-brown organic silt with a few wood fragments and stones.

**Plants (/M):** The size of the assemblage from this subsample—28 taxa—was just above the mean for this group, though the AIVs were mostly of rather modest size. Weed taxa predominated, especially perennial nitrophiles, group ARTE here achieving the second highest value for its AIV for Period 3 GBA subsamples; this was partly a function of the abundance scores of 2 for *Urtica dioica*, *Ballota nigra* and *Hyoscyamus niger*. Despite the presence of faecal concretions at a score of 2, there was little evidence of foodplants and it may be that the faecal material present was not very well preserved.

**Parasitic worms:** No eggs were recorded from one of the two subsamples examined, a few *Trichuris* from the other.

**Insects (/T):** The 1 kg sample gave rather poorly preserved remains of about 195 individuals of 47 taxa (the numbers of the more abundant taxa were estimated). Diversity was low ( $\alpha$  = 20; SE = 2) and the outdoor component small (%NOB = 4, 8 individuals). Decomposers were predominant

(%NRT = 78) and plainly bred in the fill ( $\alpha$  RT = 9; SE = 1). In all, 48% of the decomposer component was contributed by foul-matter taxa (there were an estimated 60 *Platystethus arenarius* and five *Cercyon haemorrhoidalis*, species particularly likely to occur together in dung-like material), and most of the more abundant 'rt' taxa were eurytopes which would have lived happily with these (*Oxytelus sculptus*, 15; *Omalium rivulare*, 10; *Cercyon analis*, 6, for example). There were moderate numbers of a few decomposers indicative of less foul conditions, and five *Anobium punctatum*.

There were some puparia of both *Leptocera* sp. and Sepsidae sp.

**Cut 32994:** This was a small pit of about 1.2 m diameter and 1.0 m depth with a wicker lining, inserted into the fill of an earlier cut, **32918**. A single context from the main, basal fill was sampled.

#### Context 32980

*Sample 932980* (BS—VW): Although none scored more than 1 in this assemblage, there were 28 taxa (i.e. it was close to the mean for this series of samples). Weed groups were predominant, though the AIVs were not especially high in the context of the Period 3 cut fills—that for CHEN (24), for example, was at the mean for Period 3 cut fills and for Period 3 samples as a whole. Foodplants were not well represented either—the five taxa comprised *Corylus avellana*, *Prunus spinosa*, *Sambucus nigra*, *Secale cereale* and *Triticum aestivo-compactum*. (*Secale* was recorded with certainty from only seven contexts of Period 3, four of them fills of a single cut.)

*Sample 2488* (GBA): no action to date.

**Cut 37079:** This was a small pit with only one fill, lying less than a metre to the east of cut 28038.

#### Context 28075

*Sample 1914* (Spot): Only two modern *Helix aspersa* (snail) shells were sampled from this deposit.

### Other cuts and depressions

These fall into four groups:

(a) 'depressions' (also called scoops, a term rejected since at least some of the features concerned could not definitely be proved to have been cut, but may simply have been hollows left by the accumulation of deposits around them); these were all in the north-west corner of the site.

(b) gullies—two separately numbered cut contexts from what proved to be the same linear feature were sampled.

(c) wells—a single well was sampled.

(d) post-holes—39 features designated as post-holes were sampled.

### Depressions

**Cut 30190:** This cut appeared to be for a large hole, more than 2 m across, with shallow sloping sides.

#### Context 30189

*Sample 1946* (GBA): no action to date.

*Sample 2033* (GBA): no action to date.

*Sample 2534* (Spot): This sample, a small piece of daub, was found to contain one half-achene of hemp, *Cannabis sativa*.

#### Context 31618

*Sample 2035* (Spot): several large fragments (to 10 x 7 x 0.5 cm) of immature puff-ball spore-mass—the interior of a large fungus, probably *Langermannia gigantea*.

**Cut 30739:** A cut about 1.2 m long and ca. 20 cm deep (it was not completely excavated), **30739** was cut in turn by **30190** (*q.v.*). There is no detailed record of its fills.

#### Context 30738

**Sample 2103** (GBA): dark grey-brown clay silt to silty clay with paler flecks of red, pink, white, grey and green; some pinkish natural; interpreted as ash-like material; containing bone and stone.

Plants (/M): The plant list, with only 20 taxa, was modest. Only nettles and fat hen (*Urtica dioica*, *U. urens* and *Chenopodium album*) were recorded at an abundance of 2, the remainder at 1. Almost all the taxa present were weeds of various kinds and the only evidence for the nature of the fill comes from the records of bone and charcoal, with some oolitic limestone and micaceous sandstone fragments. The charcoal and the bone, some of which was burnt, may support the on-site interpretation of this fill as containing ash.

Insects (/T): The flot contained only very few insect remains. There were single individuals of ten beetles and bugs, and almost no other remains. This may have been background fauna, although the single *Trichonyx sulcicollis* may have been a post-depositional burrower.

**Cut 30756:** This cut was at least 2.5 m across, but barely 30 cm deep at its thickest; it was interpreted by the excavator as a scoop, rather than a pit *sensu stricto*.

#### Context 30704

**Sample 2100** (C14/BS-V): The assemblage of 28 taxa was roughly of average size for this group of samples; all were recorded at trace amounts, however. Weed groups predominated, with the 'wet nitrophile' group BIDE achieving its third highest AIV for the Period 3 BS assemblages (with six taxa). Amongst the possible foodplants there were (?wild-collected) *Rubus* spp. and the possible flavourings, *Humulus lupulus* and *Apium graveolens*.

**Cut 30781:** a small cut or scoop, about 45 cm across and 25 cm deep.

**Context 30780:** the single fill context.

**Sample 2118** (GBA): no action to date.

**Cut 30814:** a small cut or scoop about 20-30 cm across and at most 24 cm deep. It was cut from above by post-hole **30509** (*q.v.*).

#### Context 30730

**Sample 2121** (Chemical): This was a dark grey, moist, crumbly, slightly clayey silt with traces of wood fragments; no further analysis was undertaken.

**Cut 30818:** contained a skeleton.

#### Context 30863

**Sample 930863** (Spot): This spot find (*sf 12149*) consisted of a fragment of the spore-mass from the interior of an immature puff-ball, probably *Langermannia* sp., in a matrix of clay.

**Sample 2161** (GBA): no action to date.

**Cut 30854:** a small cut or scoop, about 70 cm across and 30 cm deep.

#### Context 30855

**Sample 2153** (GBA): no action to date.

**Cut 30891:** a shallow cut, about 1.5 m across but only 20 cm deep, cut into the top part of the fill of cuts **30892** (unsampled) and **30893** (*q.v.*).

#### Context 30715

**Sample 2198** (Spot): This sample comprised a root/stump base of elder, *Sambucus nigra*, very

likely to have been growing *in situ*.

**Cut 30893:** This cut into the fill of Cut **30892** (unsampled) and was itself cut by **30891** (*q.v.*). There was a single fill of about 10 cm in thickness, the diameter being at least 90 cm.

#### **Context 30882**

*Sample 2279* (BS—VW): The 16 taxa from this sample were predominantly weeds, some in rather large numbers: there were abundance scores of 2 for *Chenopodium album*, *Atriplex* sp(p), and *Hyoscyamus niger*. Hemp, *Cannabis*, was recorded at a score of 1, but otherwise ‘useful’ plants were rather scarce. The score of 2 for *Sambucus nigra*, together with traces of *Prunus spinosa* and *Rubus fruticosus* may suggest that some food remains were present, but these ‘seeds’ might also be bird-sown or have fallen from plants growing in the vicinity.

*Sample 2199* (GBA): no action to date; not processed in view of complexity of archaeological location.

**Cut 30949:** a small, shallow scoop about 0.5 m in maximum width and 0.1 m deep. It was filled with a clay deposit.

#### **Context 30945**

*Sample 2257* (Chemical): varicoloured (grey to red to pinkish) clay; probably ‘dirty’ natural drift; no further analysis was undertaken. *Sample 2258* (Chemical): for Dr J. Hunter.

#### *Gullies*

#### **Cut 28050**

#### **Context 28477**

*Sample 1923* (Spot): a single shell of the land snail *Oxychilus alliarius*.

**Cut 26784A:** This was the cut of a linear trench with a straight (spade-cut) base, and filled with **24939**. It was about 60 cm across and 30-40 cm deep.

#### **Context 24939**

*Sample 1826* (GBA): mid to dark grey-brown crumbly, slight sandy silty clay with traces of mortar, brick/tile and bone.

Plants (/T3; 3 kg): there was only a very small residue of sand and gravel with a washover of a few grammes of charcoal including material similar to the basal twigs/upper roots of heather (*Calluna*); the only other identifiable material comprised one or a few badly preserved apple pips, seeds of henbane and a tentatively identified charred oat grain.

Parasitic worms: No eggs were recorded from the subsample examined.

Insects (/T3; 3 kg): Invertebrate remains were heavily eroded and badly fragmented. There were six beetle taxa, all represented by single fragments, an earthworm capsule, and a fly wing, which was rather well preserved and possibly contaminant.

#### *Well*

**Cut 28794:** This was the construction cut for barrel well **27231**. It contained fill **27418** (unsampled) and wicker **28451** had been inserted around the top of the cut to hold back the sides above the barrel.

**Context 28451**

*Sample 1922* (Wood): a sample of wicker from around the top of the barrel. Nine pieces were measured, identified and their annual growth rings counted. All were found to be hazel (*Corylus*), mostly nearly circular in section, and with a mean diameter of 19 mm (range 16-23 mm). They had clearly been selected for size to make the lining, since there was a broad spread of ages based on ring counts. Thus one of the smallest pieces (whose diameter was 17 mm) had a ring count of 28, one of the largest (19.5 mm diameter) had only six. The latter was evidently well-grown wood and might have originated in a coppice stool; the former was probably old wood from unmanaged or neglected timber, perhaps growing in dense woodland where annual incremental growth was small.

**Context 27194:** the fill of the well barrel itself.

*Sample 1815* (BS): Perhaps not surprisingly, given the nature of the depositional circumstances, this was one of the richest of the BS samples from Period 3 in terms of number of taxa (53), though only *Corylus*, at 2, scored an abundance greater than 1, and the AIVs do not have especially high values (SECA is the sixth highest at 25). Traces of the dyeplant madder (*Rubia tinctorum*) were recorded, along with the clubmoss probably used as a mordant, *Diphysium complanatum*. Agrimony (*Agrimonia eupatoria*) may represent a further dyeplant, although its hooked fruits might be brought accidentally to the site on clothing or sheep's fleeces, and the plant may also have been used as a medicinal herb. One of only two records for Period 3 for heath grass (*Danthonia decumbens*) was from this sample; it is possible that this plant was brought to the site with turves.

*Sample 1814* (GBA): dark grey-brown, very fine organic, slightly clay silt with fine sand, gravel, stones, bone and wood fragments.

Plants (/M): The assemblage of 74 taxa was the largest for any small subsample from Period 3 deposits, a further testimony to the richness of this kind of deposit. Weeds of groups BIDE, CHEN, PLAN and SECA were all well represented (these

groups achieved respectively their third, third, first and fourth highest values for this subsample). The score for grassland taxa in MOAR was also quite high and the flowers identified as Leguminosae and cf. *Trifolium* may belong with this group (they are usually well represented in deposits where unequivocal grassland taxa are abundant).

Useful plants other than those mentioned were rather scarce, though both seeds and capsule fragments of *Linum usitatissimum* were recorded and wheat/rye 'bran' was present. The common leaves and/or shoots of *Sphagnum* may be of significance as possible evidence of toilet tissue, if some faecal material eventually found its way into these fills, as suggested by the high counts of *Trichuris* (together with smaller numbers of *Ascaris*) eggs from one of two subsamples examined. The common 'bast' fragments recorded might repay further investigation (were they simply from bark deliberately or accidentally cast into the fills?).

Parasitic worms: The two subsamples were very different; one yielded almost no parasite eggs, the other was rich in *Trichuris* (almost all lacking one or both polar plugs), with a small number of *Ascaris*.

Insects (/1, /2): Insects from the /2 subsample were recorded semi-quantitatively. Number of individuals was estimated at 104 and there were 66 beetle and bug taxa. Diversity was high ( $\alpha = 77$ , SE = 14). The outdoor component was large (%NOB = 25) and its diversity was very high ( $\alpha$  OB = 92, although with a very large SE of 54). The decomposer component was quite small (%NRT = 47), with a moderately large RF component (%NRF = 9). The diversity of this element was quite low ( $\alpha$  RT = 23, SE = 6). The more abundant taxa were *Anobium punctatum*, a *Stenus* sp., *Platystethus arenarius* and *Cercyon analis* (all 'several'). These, and the remaining taxa, form an ecologically rather mixed but undistinguished fauna of Anglo-Scandinavian urban type. It perhaps consisted of a breeding decomposer group with a larger proportion of more diverse background fauna than usual in these pit fills. This would not be surprising, since the pit



was located at the extreme southern end of the excavation, very close to the River Foss and, it may be guessed, some kind of semi-natural vegetation. It was also perhaps more likely to have been left open, as it was presumably far away from habitation.

There were also modest numbers of Sepsidae sp. puparia, larvae of nematoceran flies, three aphids and abundant mites. A fragment of modern plastic sponge was also identified.

### *Post-holes*

(N.B. These are listed in cut number order. Almost all the samples were collected for 'chemical' analysis and none has been examined in the EAU, other than to make a description of lithology and, in one case, to identify some wood. No archaeological information has been sought for this group.)

#### ***Cut 29934***

**Context 29933:** *Sample 2416* (Chemical): light-mid grey, crumbly, silty fine sand with modest amounts of charcoal.

#### ***Cut 30495***

**Context 30493:** *Sample 2029* (Chemical): mid yellowish-grey-brown, crumbly, silty ash.

#### ***Cut 30496***

**Context 30494:** *Sample 2030* (Chemical): mid grey, crumbly, slightly clayey sandy silt with traces of 2-20 mm stones, charcoal and tile fragments.

#### ***Cut 30507***

**Context 30508:** *Sample 2036* (Chemical): no action to date.

#### ***Cut 30531***

**Context 30530:** *Sample 2039* (GBA): no action to date.

#### ***Cut 30539***

**Context 30538:** *Sample 2040* (Chemical): mid-dark grey-brown, crumbly to brittle, humic silty fine sand, with traces of 2-60 mm stones, charcoal, wood fragments and bird eggshell.

#### ***Cut 30541***

**Context 30540:** *Sample 2041* (Chemical): dark grey, crumbly, humic slightly clayey sandy silt with traces of 2-60 mm stones and charcoal, with white flecks.

#### ***Cut 30545***

**Context 30544:** *Sample 2042* (Chemical): mid grey, crumbly, humic slightly clayey silt with traces of stones 2-20 mm, charcoal and bird eggshell.

#### ***Cut 30551***

**Context 30514:** *Sample 2044* (Chemical): mid grey, plastic, slightly sandy silty clay, with traces of stones 2-20 mm, micaceous sandstone fragments and lime.

#### ***Cut 30574***

**Context 30573:** *Sample 2053* (Chemical): mid-dark grey, crumbly to brittle, clayey silt with modest amounts of wood fragments.

#### ***Cut 30579***

**Context 30577:** *Sample 2056* (Chemical): mid-dark grey, crumbly, slightly sandy, silty clay with iron staining and traces of 20-60 mm stones, charcoal and wood fragments and inclusions of pinkish-grey 'natural' clay.

**Context 30580:** *Sample 2057* (Chemical): mid grey, plastic, slightly sandy silty clay with traces of charcoal, wood fragments and small bone fragments, and some white flecks.

***Cut 30581***

**Context 30578:** *Sample 2058* (Chemical): mid grey, crumbly, rather heterogeneous, slightly clayey sandy silt with traces of charcoal and white flecks, and with inclusions of more clayey material of the same colour as matrix, and small clasts of pinkish 'natural' clay.

***Cut 30588***

**Context 30568:** *Sample 2051* (Chemical): mid grey-brown, crumbly, humic, slightly sandy slightly clayey silt with traces of charcoal, wood, shellfish and tile fragments.

***Cut 30589***

**Context 30567:** *Sample 2050* (Chemical): mid-dark grey, crumbly to brittle, slightly clayey, sandy silt with traces of 2-20 mm stones, small limestone fragments, shellfish and pot fragments.

***Cut 30590***

**Context 30591:** *Sample 2060* (Chemical): mid-dark grey, crumbly to brittle, slightly sandy clay silt with traces of wood fragments.

***Cut 30595***

**Context 30594:** *Sample 2062* (Chemical): mid grey, slightly plastic to slightly crumbly, slightly sandy silty clay with traces of 20-60 mm stones, charcoal and wood fragments.

***Cut 30597***

**Context 30598:** *Sample 2064* (Chemical): mid-dark grey, crumbly, silty fine sand, with traces of 2-20 mm stones, wood fragments and tile.

***Cut 30599***

**Context 30600:** *Sample 2063* (Chemical): mid-dark grey, plastic to crumbly to brittle, slightly sandy silty clay with traces of charcoal.

***Cut 30613***

**Context 30614:** *Sample 2067* (Chemical): mid-dark grey, crumbly, slightly silty clay with traces of 2-20 mm stones and wood fragments.

***Cut 30617***

**Context 30618:** *Sample 2069* (Chemical): mid grey-brown, crumbly, humic fine-sandy clay silt with traces of 2-20 mm stones, wood and shellfish fragments.

***Cut 30627***

**Context 30628:** *Sample 2070* (Chemical): mid-dark grey, slightly crumbly to brittle, sandy clay silt, with traces of large and small limestone fragments, wood and tile fragments, ?slag and evidence of iron salts.

***Cut 30632***

**Context 30631:** *Sample 2075* (Chemical): mid-dark grey-brown, crumbly, slightly sandy silt with traces of small bone fragments and local patches of pinkish-grey silty ?'natural' clay.

***Cut 30634***

**Context 30633:** *Sample 2073* (Chemical): light-mid grey-brown, crumbly, sandy silt with traces of charcoal and patches of pinkish-brown ?'natural' clay.

***Cut 30639***

**Context 30638:** *Sample 2076* (Chemical): light grey, crumbly, silty sand with traces of 2-20 mm

and 60-200 mm stones, and root/wood fragments.

***Cut 30640***

**Context 30636:** *Sample 2074* (Chemical): mid-dark grey to grey-brown, crumbly, somewhat heterogeneous, slightly clayey sandy silt with evidence of internal contortions and mixing.

***Cut 30671***

**Context 30667:** *Sample 2092* (Chemical): dark grey, crumbly, humic slightly sandy silt.

***Cut 30672***

**Context 30666:** *Sample 2089* (Chemical): dark grey, crumbly, slightly sandy clay silt with traces of charcoal, white flecks of ?mortar, and lumps of pinkish-brown 'natural' clay.

**Context 30673:** *Sample 2091* (Chemical): dark grey, crumbly, sandy humic silt.

**Context 30674:** *Sample 2090* (Chemical): dark grey, crumbly, slightly sandy silt.

***Cut 30722***

**Context 30723:** *Sample 2096* (Chemical): dark grey, crumbly, slightly clayey silt with traces of charcoal and vivianite, and bands of grey ?ash.

***Cut 30724***

**Context 30725:** *Sample 2097* (Chemical): dark grey-brown, crumbly, slightly sandy humic silt with traces of charcoal and slag.

***Cut 30726***

**Context 30721:** *Sample 2099* (Chemical): dark grey, crumbly, slightly sandy clay silt.

**Cut 30754**

**Context 30753:** *Sample 2108* (Chemical): varicoloured compressed ash, varying from white to black, with abundant charcoal.

**Cut 30782**

**Context 30783:** *Sample 2119* (Chemical): dark grey, crumbly to slightly plastic, clayey silt.

**Cut 30788**

**Context 30789:** *Sample 2122* (Chemical): mid-dark grey (with slight olive tinge), crumbly, slightly sandy clay silt.

**Cut 30911**

**Context 30912:** *Sample 2207* (Chemical): mid-dark grey-brown, plastic to crumbly, slightly sandy silty clay. *Sample 2208* (Chemical): Sent to Dr J. Hunter.

**Cut 31346**

**Context 27216:** *Sample 1812* (Wood for dendro. dating): oak (*Quercus*) timber with 15 annual rings; unsuitable for dating by dendrochronology.

**Cut 33009**

**Context 33005:** *Sample 2302* (Chemical): mid-dark grey-brown, crumbly, slightly sandy silty clay with traces of tile fragments.

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