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Ancient Monuments Laboratory
Report 57/89

PLANT REMAINS FROM EXCAVATIONS AT 5 ROUGIER STREET, YORK.

Philippa Tomlinson BSc

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Summary

One hundred and eight samples from forty-five contexts of 2nd to 13th century date were surveyed for plant macrofossil remains by examining both the residues and flots from thirty-seven 'test' samples and the residues and wash-overs from bulk-sieved samples. The 1kg 'test' samples were treated by paraffin flotation to extract the insect material before the plant remains were examined. There were four main groups of samples: from the medieval cesspits; from various Roman layers; from a large Roman burnt layer with charred grain; and from the waterchannels and gullies from the lowest levels at the site. All these yielded a wide variety of material. This report also includes the sediment descriptions of all the 'test' samples.

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Introduction and archaeological background

Excavations by York Archaeological Trust took place at 5 Rougier Street, York, in 1981, in a long, narrow trench (12m long and 2.5m wide) (see Ottaway 1981 and 1982). The earliest features on the site were a series of 2nd century water-channels and gullies, overlain by a thick 2nd century burnt deposit containing large quantities of charred cereal grains. Above this was the foundation of a large building, with one elegant classical-type column base. A series of late 2nd to late 3rd century Roman road metallings ran across the NE end of the trench. Adjacent to the road a substantial building on stone piles was found, which was in use until the 4th century. Above this was evidence of post-Roman activity in the form of a black soil and a possible discontinuity with 12th or early 13th century pits forming the last main phase recorded on the site.

Methods

Plant remains were examined from wet residues (in water) and floats (in alcohol) left after processing 1kg 'test' subsamples for insect remains (methods given by Kenward in Hall et al., (forthcoming), based on those of Kenward et al., 1980). Plant remains were recorded on a four-point scale of abundance, following the 'rapid scanning' methods given by Hall et al. (forthcoming). Additional information was obtained from the bulk-sieved samples. The plant material sorted by volunteers and technicians (rough-sorted) was recorded as well as the residues and wash-over material from selected samples. The charred grain deposit was examined in detail; several subsamples were taken from material washed through a 300 micron sieve, the individual grains and chaff fragments being sorted, counted and weighed.

The samples used for 'tests' were given sediment descriptions in the laboratory by ARH, AKGJ and HKK. The descriptions given below are taken from the sediment description sheets which they produced.

Notes on the descriptions

For the purposes of this report the contexts have been divided into eleven Context Groups, based on archaeological criteria. For each Context Group a description of the archaeology and the nature of the deposits is given. This is followed by sediment descriptons and notes on the botanical material from each of the 'test' samples. Additional information from the bulk-sieved (BS) samples is given where necessary. A summary giving an overall interpretation of the Context Group is then given.

A full species list from the whole site is given in the Appendix. The sample by sample lists of results are being prepared for inclusion in the final report (Hall et al. forthcoming). For each bulk-sieved sample the rough-sorted plant remains have been identified. The

residues and/or the washovers of other selected samples were also examined.

The computer analysis and ecological/use groupings system has been developed by Dr. Allan Hall; for further details see Hall et al. (forthcoming). In the descriptions, where a percentage for an ecological/use group is quoted it is the "percentage group taxa total" (i.e. the percentage for the sum of the taxa in that group of the total of all the groups). Where a percentage of 100 occurs this means that all the taxa in that sample occured in this group, but there may be other groups in which some of the same taxa occur. This is also why a total of more than 100% is obtained when the group percentages are added together for one sample. Note that particularly when dealing with ecological groups with overlapping taxa (such as weeds and wasteland plants - e.g. groups CHEN, SECA and ARTE) many of the taxa will occur in two or more of the groups so they will all have high scores. It would not be sensible to attempt to define these ecological groupings more clearly because of the nature of urban archaeological deposits. The group percentage value may be followed by the actual number of taxa in that group. The ecological/use groups with the highest "group score x amount total" are also referred to in the text.

Note that the contexts in square brackets [] refer to the context of the feature i.e. pit, gully or water channel. The samples are usually from contexts which formed the fills of these features. See the Appendix for a complete list of the ecological group codings and their meanings.

CONTEXT GROUP 1: EARLIEST ("?NATURAL") WATER-CHANNEL [1380]

Mid-late 2nd Century

This Context Group within the water-channel was extensively sampled because there was a possibility that this was a natural water-course. The channel was cut into the natural clay, which was found at a depth of 7m. Six 'test' samples (and one subsample) and 13 BS samples were examined. It was hoped that information about the vegetation of the pre-Roman landscape around the stream would be obtained.

Context 1408, Sample 139

> Light to dark grey brown to red-brown and black; moist, crumbly; very heterogeneous; sandy clay silt; with herbaceous detritus (<2cm and >2cm); organic lumps and clay lenses present.

This sample probably came from the lowest fill of the water-channel. It had a higher number of taxa (82) than any other 'test' sample from this site. It also had far more ecological groups represented (44) than the other samples (only samples 135 and 145 come close to these totals). The highest scoring ecological groups were

MOAR (plants of grassland, including wetter hay meadows and pastures) 23.2%, CHEN (nitrophilous weed communities of cultivated land 18.3% and SECA (weeds of cereal fields) 12.2%. Primarily there were grassland taxa representing habitats such as pasture and damp meadows (e.g. Scirpus setaceus, Eleocharis palustris, Danthonia decumbens, Juncus sp(p)., Cirsium/Carduus and Trifolium pratense), or drier, chalky grassland (FEBR) (e.g. Daucus carota, Linum catharticum). There were also several taxa which score in UNCL but could probably be included with these grassland groups. There is also what appears to be a gradient of other habitats, for example, from water-margins, fens, ditches and wet meadows (Ranunculus flammula, Ranunculus sceleratus, Scirpus lacustris, Pedicularis palustris, Filipendula ulmaria and Alisma sp.); to dry heathy grassland and peatland (Medicago minima, Luzula sp., Juncus articulatus, Sphagnum sp., Pteridium aquilinum and Eriophorum sp.); to possible salt marsh (Juncus gerardi and Triglochin maritima). These may represent hay and dung brought in from meadows and grazing land on a variety of habitats around York.

This sample also contained some fragments of probable Cyperaceae epidermis with six papillae around each stomata. These have not been identified more closely (see Tomlinson in press).

There were a variety of nitrophilous weeds of disturbed ground in this sample, such as Chenopodium spp. (including C. ficifolium), Hyoscyamus niger, Papaver argemone, Plantago major, Ranunculus sp(p)., Raphanus raphanistrum, Rumex acetosella, Thlaspi arvense and Sonchus asper. Some of these were also in the cereal field weeds group with Agrostemma githago, Aphanes arvensis and Papaver argemone. There was a fairly large number of taxa in the unclassified group (UNCL 30.5%, 25 taxa). The next main group was food plants, FOOS (7.3%, 6 taxa) and, as there was some cereal bran, it is possible that there was some faecal material in this sample (but the bran could have been from horse dung in stable cleanings, rather than human faecal material?). Note there were no fish bones, only one mussel shell fragment, and that many of the plants in the FOOS group are taxa which are also included in other ecological groups (e.g. Corylus avellana, Sambucus nigra, Linum usitatissimum, Daucus carota and Apium graveolens).

BS samples 140, 141 and 142 add only walnut (Juglans regia) nutshell to the list of taxa from this context. These samples were only rough-sorted (the residue and floats were not examined in detail).

Context 1404, Sample 145

> Light to mid grey-brown; moist, brittle; heterogeneous; silt; with shellfish present; minor matrix component black organic material - ?peat.

This sample was composed of grey brown silt with some small lumps of black organic material dispersed within it. These lumps were thought to be peat - perhaps material from a natural organic layer in the bottom fill of the ditch. The black material was carefully picked out and a subsample of 350g was processed separately from the main 1kg

test sample. The plant remains from both the test and the subsample were very similar. The subsample did contain some lumps of Sphagnum (including S. imbricatum) peat and some Eriophorum sp. stems, but it also had a mixture of other material including food plants such as cereal bran, Malus sp. endocarp and fig seeds, and disturbed ground plants in the CHEN group and grassland species in the MOAR group. Although the subsample did contain a number of taxa which were not in the 'test' sample it seems that they were basically derived from the same material. The assemblage was very similar to that from sample 139. There were many grassland plants, ranging from dry hay meadows to damp meadows to salt marsh, represented by such taxa as Filipendula ulmaria, Scirpus setaceus, Leguminosae flowers, Lychnis flos-cuculi, Rhinanthus sp., Trifolium pratense, Linum catharticum, Taraxacum sp., Triglochin maritima, Juncus gerardi and cf. Glyceria sp. Other 'grassy' taxa included Torilis japonica and Stellaria neglecta. There were bracken pinnules and rachis fragments and a Calluna vulgaris bud. Other food plants included Coriandrum sativum. There was also the usual variety of disturbed ground taxa in the CHEN Group.

There was very little indication of flowing water in this sample which was from the fill of the supposed water-channel, apart from a few marginal aquatics such as Alisma sp, Glyceria sp. and Rorippa islandica. There were also some fragments of wood.

Context 1399, Sample 135

> Mid to dark grey-brown; moist, crumbly; homogeneous; silty fine sand; with very small stones common, bone (<2cm) and shellfish present.

This sample contained a similar mixture of taxa to samples 145 and 139 above. MOAR (24.6%, 16 taxa), CHEN (21.5%, 14 taxa) and FOOS (12.3%, 8 taxa) were the main groups with NACA (13.9, 9 taxa), SECA (12.3%, 8 taxa) and ARTE (13.9%, 9 taxa) also giving relatively high scores. There were mostly grassland taxa suggesting a mixture of origins from drier hay meadows to wetter pastures and salt marshes, a large variety of disturbed ground taxa and several food plants including Satureja hortensis, Ficus carica and Daucus carota (this last would more likely have been from grassland rather than a crop). There was quite a large quantity of wheat/rye 'bran' (score 3) as well as uncharred cereal caryopses and glume bases which suggest animal fodder, rather than human waste. There were several arable weeds including Thlaspi arvense and Agrostemma githago. Other notable taxa were Chrysanthemum vulgare, Achillea millefolium, Hyocyamus niger and Ilex aquifolium leaf epidermis fragments. BS sample 136 from this context added Corylus avellana nutshell, Prunus domestica ssp. institia and Prunus spinosa to the list.

Context 1392, BS Samples 130 and 131

The two bulk-sieved samples from this context were rough-sorted (i.e. the residues and floats were not examined). They only produced a few fruitstones and nutshells.

Context 1383, Sample 138

Mid to dark grey-brown; moist, crumbly; heterogeneous; slightly sandy silt with mottles common; charcoal, wood fragments, bone (<2cm) and leather all present.

This sample was very similar to the other samples in this Context Group. Notable taxa included Lycopus europaeus and Plantago major but these do not assist the interpretation. FOOS, MOAR and CHEN were the main ecological groups represented.

Context 1381, Sample 124

Dark grey-brown; moist, crumbly; homogeneous; sandy clay silt; with very large stones, bone (<2cm) and some sand patches all present.

This sample was similar to the others in this Context Group. CHEN, FOOS and MOAR were the main ecological groups, with some unusual taxa such as Campanula cf. rotundifolia, Empetrum sp., Valerianella locusta and several food plants including Linum usitatissimum, Coriandrum sativum, Prunus Section Cerasus, Prunus domestica sspp. institia and domestica, Prunus spinosa, wheat/rye 'bran' and also some charred Triticum cf. spelta. Non-plant remains included egg, barnacle, and mollusc shell, bone, charcoal and Daphnia sp(p). ephippia.

The BS sample from this context (sample 125) had a similar assemblage but also contained Beta maritima fruit wall fragment, Galium sp., Oenanthe lachenalii, Vitis vinifera, lumps of peat and arable and disturbed ground weeds such as Fumaria sp. and Lapsana communis.

Context 1373, Sample 132

Mid to dark grey-brown; moist, crumbly; very heterogeneous; slightly sandy clay silt, amorphous organic; with small and medium stones present.

MOAR, CHEN and SECA were the main groups in this sample the flora of which was very similar to the other samples in this Group. There were also lumps of peat. The BS samples from this context (numbers 123, 126, 127, 128 and 129) were rough sorted only, they add fruitstones and nutshells (including Juglans regia and Prunus Section Cerasus) to the list.

SUMMARY OF CONTEXT GROUP 1

The main ecological groups represented in this Context Group from the fill of the "natural" water-channel were taxa representing grassland, nitrophilous tall herb communities, heathland and a variety of other habitats. There were several plants associated with upper

saltmarshes and sea cliffs (ecological group ASTE). None of the individual taxa occurred in very large numbers and most scored 1, while only a few scored 2 and only remains resistant to decay such as Ficus carica scored 3. This suggests that the source of material was from a variety of diverse origins.

There were perhaps more indications of flowing water in this channel than in Context Group 2 or 3 below, as there were plants such as Glyceria sp., Alisma sp. and a small-seeded Veronica sp. (which could be V. beccabunga/scutellata/anagallis/aquatica), as well as those mentioned below. Some of these taxa which grow in damp places (e.g. Lychnis flos-cuculi, Filipendula ulmaria, Apium graveolens and Oenanthe sp.) were perhaps growing near the water channel in undisturbed damp grassland or waterside habitats. Otherwise they could have come from damp meadows, perhaps brought into the area in hay.

All the samples, including the very lowest fill layers, contained human refuse, so none of these samples were from a purely natural deposit. It would be difficult to show whether there was originally a natural stream channel before the Roman water channel was constructed.

CONTEXT GROUP 2: "FIRST MAN-MADE WATER-CHANNEL" [1393]

Mid-late 2nd Century

Two 'test' sample and fifteen BS samples were examined from this Group of contexts filling the "man-made water-channel", so-called to distinguish it from Group 1 which was thought during the excavation to be a natural stream course.

Context 1379, Sample 119

> Mid-dark grey; moist; plastic to crumbly; heterogeneous; clay silt; with small and medium stones present and bone fragments (<2cm) common.

This sample mostly contained plants from the ecological group CHEN (36.7%, 11 taxa), a few food plants (FOOS 20%, 6 taxa) including Ficus carica, Coriandrum sativum, wheta/rye 'bran' fragments and some charred Triticum cf. spelta. SECA, ARTE and BIDE were the next most well-represented groups. The flora of sample 119 was slightly different from other samples in this Context Group in that it had fewer taxa in the MOAR group.

The two bulk-sieved samples from this context were sample 120 and 121. Interestingly, the BS sample 120, for which both the float and residue were examined, contained more taxa (78) than 'test' sample 119 from the same context (30 taxa). The 'test' sample was only 1kg whereas the BS was three buckets full (over 100kg). Sample 120 had a hemp (Cannabis sativa) achene.

Context 1334, Sample 101

Mid to dark grey-brown; moist; crumbly; slightly heterogeneous; slightly sandy silty clay; amorphous organic, woody detritus (<2mm and >2mm); with very small stones, bone (<2cm) and shellfish all present.

The main ecological/use groups in this sample were MOAR (23.1%, 12 taxa), FOOS (15.4%, 8 taxa) and CHEN (17.3%, 9 taxa). There were many other ecological groups represented by small numbers of taxa, notably peat bog, fen and heathland plants such as Eriophorum vaginatum, Calluna vulgaris (root), Sphagnum imbricatum and Menyanthes trifoliata.

The BS samples from this context were samples 101, 103, 116, 117 and 118, which added fruitstones, nutshells and a Raphanus raphanistrum pod fragment to the list. Sample 103 was examined in detail (residue and float) and was found to have a similar assemblage to 101. It had a large number of taxa (77).

Context 1269, samples 107, 108, 109, 110, 111

There were no 'test' samples from this context. BS samples 108 and 109 were examined in detail (residue and float both sorted), while the others were rough-sorted only. Samples 108 and 109 both had CHEN, SECA, FOOS and MOAR as the main ecological groups. The plant assemblages were very similar to the others in this Context Group. There was a fragment of Buxus sempervirens leaf epidermis in sample 109. Box leaf fragments often occur in Roman deposits in York. Other notable taxa included Anagallis arvensis seeds, Valerianella dentata fruits and Triticum spelta charred and sprouted caryopses.

SUMMARY OF CONTEXT GROUP 2

No particular groups of plants dominated the assemblages in these samples. None of the individual taxa occured in very large quantities. This suggests a well mixed deposit. There were mostly wasteland taxa, some food plants, such as fig and walnut shell, and hints of peat, arable weeds and hay meadows. There were a few more aquatic taxa than in the timber-lined channel (see below). These included Typha sp., Hydrocotyle vulgaris, Scirpus lacustris and Chara oospore as well as Daphnia sp(p). ephippia, but the numbers were small. Although it is possible that there was a natural stream on this site, all of the deposits, even at the very bottom of the "natural channel" contained evidence of human activity. There were also few truly aquatic plants represented. The assemblages were basically quite similar to those in Context Group 1 described above.

CONTEXT GROUP 3: TIMBER-LINED GULLY [1294]

Mid-late 2nd Century

This timber-lined gully or water-course overlay the "first man-made water-channel" - see Context Group 2 above. The three 'test' samples and six BS samples which were examined from the gully fill contained well preserved waterlogged botanical material.

Context 1329, Sample 95

Light to mid grey; moist, plastic; slightly heterogeneous; clay sandy silt; with herbaceous detritus and woody detritus (<2mm), very small stones, limestone and charcoal present. Minor matrix components grey clay and red-grey clay.

Context 1329, Sample 96

Mid grey-brown; moist, crumbly; slightly heterogeneous; sandy silt; with small stones, charcoal, bone fragments and shellfish all present.

Context 1329, Sample 97

Grey-brown; moist, crumbly; heterogeneous; slightly sandy silt; with very small stones.

The three samples from this context had very similar assemblages and are therefore described together. Their main ecological/use groups were FOOS, MOAR, and CHEN. Food plants (FOOS 15-18%, 9 taxa) included such things as Prunus domestica ssp institia, Prunus Section Cerasus, Malus sylvestris, Ficus carica, cereal grains (mainly Triticum spelta), as well as food flavouring plants such as Satureja hortensis, Coriandrum sativum and Apium graveolens. Plants of hay meadow and wet pasture (MOAR 18-20%, 11 taxa), included Apium graveolens, Daucus carota, Eleocharis palustris, Juncus articulatus, Linum catharticum, Plantago major, Potentilla anserina, Potentilla cf. erecta, Prunella vulgaris and Ranunculus Section Ranunculus. CHEN (21-27%, 12-16 taxa) includes nitrophilous weed communities of cultivated fields and gardens with such taxa as Atriplex sp(p), Capsella bursa-pastoris, Chenopodium sp(p), Polygonum sp(p) and Ranunculus Section Ranunculus.

As well as these three main ecological groups there were a few taxa from a wide variety of other habitats, for example: Eriophorum sp., Sphagnum imbricatum and Sphagnum sp. from peat (there were also lumps of peat in these samples); taxa from salt marsh (Triglochin maritima and Juncus gerardi) and reedswamp (Scirpus lacustris). Wet meadow and water margin taxa included Scirpus setaceus and Lychnis flos-cuculi. These may represent a continuum of 'grassland' types from ecological groups MOAR (grassland including wetter hay meadows and pastures) to PHRA (freshwater reedswamp communities) and ARTE (nitrophilous tall herb communities of waste places, river banks and

hedgerows) which came from accumulations of stable and animal fodder refuse dumped into the gully. It is quite likely that this sort of material had being dumped into the gully to dispose of it. Animals may well have grazed on salt marshes and in very marshy fields and have brought material in on muddy feet or in dung.

The next main ecological group was SECA (8-13%, 4-8 taxa) (plants of cereal fields). This included Valerianella dentata, Aphanes microcarpa, Papaver argenome, Vicia cf. hirsuta and Fumaria sp..

Juncus bufonius and Juncus gerardi occurred in all three samples. Taxa of aquatic, aquatic marginal and other damp habitats included Callitriche sp., Typha sp., Oenanthe sp. and Scirpus lacustris, but these may not necessarily have been associated with flowing water in the gully.

Non-plant finds included oyster, mollusc, barnacle and egg shell, fly puparia, fish vertebrae and scales, Daphnia sp(p). ephippia, bone fragments, earthworm egg-capsules, Heterodera-type cysts and stones. There is perhaps an indication here of the inwash or dumping of soil. There were stems and wood fragments as well as the peat lumps.

The BS samples from this context (numbers 92, 93, 94, 95, 96 and 97) produced many fruitstones and nutshells including Juglans regia and also Vitis vinifera seeds. The latter were not found in the test samples. Nepeta cataria, a possible food flavouring or herbal plant was also found in BS sample 93.

SUMMARY OF CONTEXT GROUP 3

There was a general mixture of wasteland and grassland taxa as well as some Eriophorum vaginatum/Sphagnum peat and species indicating faeces in this Context Group. The range of grassland taxa suggested hay meadows or short turf, and thus perhaps animal fodder. There were also hints of wet grassland and salt marsh habitats. This was very similar to some of the deposits at the General Accident Extension site (see Hall et al. forthcoming). As that site was only approximately 60 metres away, it is possible that dung material from the same source was deposited in this gully. None of the main ecologial groups of taxa were particularly abundant and there appeared to be a mixture of assemblage types.

There were virtually no freshwater aquatic species in these samples, suggesting that the fill did not form in water. There were a few marginal aquatic species but these could have been brought in with the other ecological groups of taxa (e.g. hay) and were not necessarily growing nearby. The peat material could have come from the layers dumped on the edge of the gully (Group 4).

CONTEXT GROUP 4: LAYERS ON SURFACE ADJACENT TO THE TIMBER-LINED GULLY [1362]

Mid-late 2nd Century

This single context [1362] formed an organic layer on the surface adjacent to the timber-lined gully (53). Three samples (one 'test' and two BS) from this context were analysed.

Context 1362, Sample 106

> Black moist crumbly; homogeneous; silty amorphous organic herbaceous detritus with charcoal.

This was the only 'test' sample from this context. The material was quite different from all the other 'test' samples from this site. It was largely composed of very well humified Eriophorum-Sphagnum peat. Not surprisingly the top ecological groups in the 'group score x amount total' column are OXSP (plants of raised bogs and wet heaths) 16.7%, 2 taxa, and BOGS (mosses found in bogs) 16.7%, 2 taxa. BIDE, CHEN, MOAR and SECA are the next high scoring ecological groups (each with 16.7%, 2 taxa). There were a few taxa which do not necessarily occur in the peat category (e.g. Carex spp., Daucus carota, Juncus bufonius, Prunella vulgaris, Stellaria media). There were therefore several other ecological groups represented, but only by single taxa. The two main taxa were Eriophorum vaginatum (identified by the presence of stem 'spindles' which only occur in this species) scoring 4, Sphagnum sp. leaves, scoring 3, and Sphagnum sp. capsule lids. Much of the sample remained as intractible peat lumps even after processing. The only other high scoring plant remains were large quantities of fungal sclerotia (score 4).

The two BS samples (112 and 113, context 1362) also contained a large proportion of peat, similar to sample 106, but there was a fair amount of other material mixed with it, including charred Triticum spelta grains, Ficus carica, Sambucus nigra, Rubus fruticosus and Corylus avellana nutshells, so that FOOS is the main group in both samples. There was, however, no positive evidence of faecal material from the plant remains. There were several lumps of peat which contained pollen of Betula sp. and Ericaceae-type. Menyanthes trifoliata seeds, Scirpus lacustris nutlets and Calluna vulgaris root/twig fragments were also recorded. Several broad category taxa occurred, such as Urtica sp(p), Ranunculus sp(p), Fumaria sp., Carex sp(p), Cirsium/Carduus, Chenopodium album, Viola sp., Rubus fruticosus, Sambucus nigra and Prunella vulgaris but none in large numbers or significantly well-represented ecological groupings.

SUMMARY OF CONTEXT GROUP 4

The three samples from this group were very similar. They contained large quantities of Sphagnum/Eriophorum vaginatum peat with very little other material; sample 112, for example, was approximately

90% peat by volume. Peat bog plants found in these samples included: Carex spp. Eriophorum angustifolium, Sphagnum sp., Calluna vulgaris and Menyanthes trifoliata. Why there was a layer of peat dumped on the side of the timber-lined gully it is difficult to say. The peat may have been used for animal bedding or for fuel. There were similar samples containing peat at The General Accident Extension Site (Hall et al. forthcoming) and in the fills of the Skeldergate well (Hall et al. 1980). It must have been brought into York from a nearby peat bog. Perhaps it was stored near here, or was being unloaded from the river, for distibution elsewhere. Boatloads of peat were certainly brought up from Thorne Moor into York later, in the medieval period (Kaner pers. com.).

CONTEXT GROUP 5: CHARRED GRAIN LAYER

Contexts 1205, 1271, 1292, 1293, 1320, 1326

Late 2nd Century

This deposit covered the whole area of the trench and was also found filling the top of the timber-lined gully [1392]. Although the deposit appears from the assemblage of charred cereal grains to represent one feature, several context numbers were given to it. Several samples were taken from some of the main 'burnt layer' contexts (e.g. 1205) and each of these samples consisted of a large number of bags. Sample 70, for example, consisted of 18 large bags which were given subsample numbers (e.g. 70/1) by the excavator, but no record was taken of the exact location or relationship of these. Four 'test' samples and 19 BS washovers and residues were examined from this Context Group. Two subsamples of sample 70 were sampled in detail for their cereal grain content.

Context 1205, sample 79

> Very dark grey; moist, crumbly; slightly heterogeneous; sandy, clay silt with very small stones, charcoal and tile fragments present; minor component natural brown silt or clay.

All the material in this sample was charred. Food plants, in the form of charred spelt wheat and barley, were the main category (FOOS 29.4%, 5 taxa). The next category was grassland (MOAR 23.5%) but this was represented by only four taxa and they were plants which occur on a variety of other habitats. These included Prunella vulgaris, Stellaria graminea, Ranunculus flammula and Eleocharis palustris. There were a few cereal weeds, notably Anthemis cotula. Details of the cereal grains are described below.

Context 1205 Bulk-sieved samples

The sample numbers were 47, 60, 61, 62, 70, 75, and 80. A large amount of material was bulk-sieved from this Context Group and it produced many fruit pips, fruitstones and nutshells, including Prunus

Section Cerasus, Olea europea, Prunus domestica spp. institia, Ficus carica and Corylus avellana. There were a variety of other taxa, such as Rubus fruticosus, Prunella vulgaris, Urtica urens, Atriplex sp., Chenopodium album, Conium maculatum, Hyocyamus niger, Ranunculus sp(p)., Scirpus lacustris and Oenanthe aquatica, but not enough in any one particular ecological group, or in large enough numbers to suggest more than a mixture of plant materials with origins in a variety of different vegetation types. Sample 70 contained a Diphasium complanatum stem fragment, suggesting that the material had been contaminated with later, ?Anglo-Scandinavian deposits. There is no evidence of this plant being used or imported in the Roman period but copious amounts of it have been recorded from Anglo-Scandinavian deposits at 16-22 Coppergate (Tomlinson 1985, Hall et al. 1984). Eriophorum sp. stems and Sphagnum sp. leaves, and also in sample 60, a lump of semi-charred peat, suggest that peat had been mixed into this context (note the presence of peat layer on the surface adjacent to the timber-lined gully 3). This may again suggest mixing of the layers - perhaps in antiquity.

The main sample within context 1205 was number 70. Eighteen large polythene bags of this were taken and all but two of these were bulk-sieved. The two remaining were examined and found to be almost 'clean' grain with some charcoal, and very little matrix. They were therefore used for more detailed anlayses of the cereals (see below). Note that the comparatively large number of non-cereal taxa in the BS samples in this context is partly a function of the huge amount of material processed.

Context 1292, Sample 71

> Black; moist, crumbly, brittle and layered; heterogeneous; silt; mainly charred grain and laminated organics.

This context lay beneath context 1205. Although it was apparently still within the charred grain/burnt deposit, it was described on site as being a layer of 'peat' within the burnt layer. This was because although it was largely composed of the same plant materials (cereals) as the rest of the context, they were mainly waterlogged rather than charred. The dark brown waterlogged cereals did, indeed, resemble laminated peat. Apart from the cereal grains (discussed below) there were a few wasteland and grassland taxa such as Centaurea sp., Polygonum sp(p)., Prunella vulgaris and Rumex sp(p).. There were a few charred seeds such as Agrostemma githago (whole rather than fragmentary), Avena sativa, Bromus sp(p). and Galeopsis Subgenus Galeopsis which were probably weeds from the cereal crop. There was also a relatively large amount of charcoal (score 3).

Bulk samples were taken from context 1293 (samples 72, 73 and 91), context 1271 (sample 64), context 1319 (samples 77 and 78). These were all rough-sorted. They all produced charred cereal grain, a few fruitstones and nutshells, but very little else.

Context 1320, Sample 82

> Very dark grey; moist, crumbly; homogeneous; sandy silt with charcoal and grain, very small and small stones and plaster present.

This sample was mainly composed of charred cereal grain which is why the % taxa in group FOOS is 33%, though with only three taxa. These were Triticum spelta, Hordeum vulgare and T. aestivum. There were a few waterlogged 'seeds' including Urtica urens, Prunella vulgaris, Chenopodium album and Bromus sp(p)..

Context 1326, Sample 85

> Grey-brown; moist, crumbly; heterogeneous; slightly silty coarse and fine sand with eggshell and sand lenses.

This sample appears to have come partly from the base of the charred grain deposit, where it filled the gully [1294], and partly from the gully fill underlying this (Context Group 4), as it contained a large assemblage of waterlogged plants as well as charcoal and charred Triticum spelta and Hordeum vulgare. It therefore partly represented the very top layer of the gully fill prior to the deposition of the burnt material. Food plants were fairly well represented (FOOS 22.2%, 10 taxa) by wheat/rye 'bran', Ficus carica, Apium graveolens, Coriandrum sativum, Corylus avellana, Malus sylvestris, Papaver somniferum, Rubus fruticosus, as well as the charred cereals. There were various disturbed ground and grassland taxa making CHEN, MOAR, ARTE, PLAN and SECA the next main groups after FOOS.

Bulk samples from this context were numbers 86, 87 and 88. These produced charred grain and Corylus avellana nutshell only.

NOTES ON THE CHARRED CEREAL GRAINS

Of the cereal grains, 80-90% were of the hexaploid glume wheat spelt (Triticum spelta). There was a very small percent of a compact, more rounded wheat which is probably either T. aestivo-compactum or a compact form of T. spelta. This may have been an insignificant crop or perhaps growing as a 'rogue' in the spelt fields. All the chaff fragments found in this layer were glumes, glume bases and spikelet forks of spelt wheat. Because spelt is a glume wheat it is not surprising that few grains were still in their spikelets. Between 4% and 6% of the grains were in their glumes. Approximately 2% of the cereal elements (i.e. all fragments of grain and chaff) were glume fragments. The very low proportion of chaff to clean grain suggests that this was a well threshed and sieved deposit.

Hulled barley formed 5-10% of the cereal grain. The presence of twisted (lateral) grains suggested the presence of 6-row barley (Hordeum vulgare L.). Many of the grains were sprouted and this,

combined with the effects of irregular charring resulting from partial waterlogging, made it difficult to distinguish lateral from central grains. It was possible, however, to identify some grains and show that the proportion of lateral to central grains was lower than 2:1 (twisted:straight), which is the theoretical ratio for 6-row barley. A proportion of twisted grains lower than expected has been found by other workers, e.g. Straker (1984).

The majority of the barley grains had their lemmas and paleas still attached (some still had a hairy rachilla in the ventral furrow of the palea) which suggests that this was hulled barley. The few grains which were naked were evidently still of the hulled form because there were traces of the lemma nerve on their surfaces and they did not have the horizontal wrinkles which are characteristic of naked barley. The paleas, where sufficiently well preserved, showed the presence of prickles and papillae on their surfaces, visible under x50 magnification. Korber-Grohne et al (1980, 220) show that, at this magnification, prickles and papillae are not visible on the charred paleas of naked Hordeum, the surface appearing smooth.

Where sufficiently well-preserved it was possible to observe that the lemma bases of the majority of the Hordeum grains had horseshoe-shaped scars, which indicated the lax eared variety of Hordeum (sometimes called bere) (van Zeist 1970, 51). There was one grain, however, which had the bevel-shaped scar of dense-eared barley.

Up to 50% of the wheat grains had sprouted, and so had about 20% of the Hordeum and Avena. There were many loose coleoptile fragments and also basal shields which had become detached. The coleoptiles were of different lengths showing that there was some variation in the degree of sprouting, but this might not be more than the variation expected in one pile of grain.

A very small proportion of the charred grains had some holes which were not inconsistent with beetle damage. It is very difficult to be certain but one or two were quite convincing. One grain had a small entrance hole and larger exit hole with sharp, clean edges. Sitophilus granarius beetles make a small hole in the grain in which they deposit their eggs; the young larvae then eat the soft starch granules in the grain and subsequently chew their way out leaving a larger hole. It is very unlikely that a grain which had been completely eaten in this way would be preserved as it would soon be squashed and lose its shape. However, a grain which had only been partly eaten might be preserved by charring. A project was carried out on the classification of the damage seen on this charred grain assemblage (Roebuck 1982), but further work on both fossil and modern material would be useful.

SUMMARY OF CONTEXT GROUP 5

This deposit was mostly composed of charred material, but in some samples the plant remains graded from part-charred to waterlogged. Sample 71, for example, contained approximately 75% waterlogged material by volume. The variations between samples seemed to be related to the condition of waterloggging and charring rather than any differences in cereal species composition. Generally the samples had a small number of taxa. Food plants represented 30-45% of the groups - always the largest group represented. The other main groups were nitrophilous weeds of cultivated and disturbed ground (CHEN); weeds of cereal fields (some of which were charred and presumably represented weeds which were part of the cereal crop) (SECA) and plants of grassland, wet hay meadows and pastures (MOAR).

The charred arable weed species, which occurred in small numbers, included: Agrostemma githago, Raphanus raphanistrum, Galeopsis Subgenus Galeopsis, Vicia cf. hirsuta, Vicia sp., Avena sp., Bromus sp., Polygonum sp(p)., Bilderdykia convolvulus, Galium aparine and Anthemis cotula. So far there is no evidence that the grain was imported; there were no non-native weed species, such as Lathyrus aphaca and Delphinium/Conslida spp. which were found at Coney Street (Kenward and Williams 1979).

As well as the grain and seeds there were large amounts of charcoal in many of these samples, including some quite large fragments of Quercus sp. and Populus sp..

The questions which arise are: why was such a large proportion of the grain sprouted? does this layer represent material which had fallen through the floor of a wooden warehouse (cf. Coney Street)? had the grain been parched (to remove the grain from the glumes, which is necessary in spelt) before it was brought to the warehouse and if so had the grain sprouted after it was parched? (others might have interpreted such material as being from a malting floor but this seems unlikely).

The archaeological interpretation of this whole charred deposit (Ottaway 1982) is of a riverside grain warehouse, which had burnt down. It is likely that the stone piles raised the floor of the building off the ground to keep it free from damp and exclude vermin. There were no floor deposits from the granary - all that remained were the stone piles and charred timbers. The deposit contained large quantities of burnt daub and wall plaster as well as the burnt timber and grain. It is likely that the grain was slightly damp; this was indicated by the waterlogging of the material and by the large proportion of sprouted grains. Spontaneous combustion may have occurred if the damp grain had become over-heated.

CONTEXT GROUP 6: ROMAN STREET BUILD-UP

Contexts 1222, 1246, 1262, 1288, 1301

Late 2nd Century

Most of these samples were associated with the build-up and agger of the 1st Roman street. Five 'test' samples and three BS samples were examined.

Context 1301, Sample 74

> Very dark grey; moist, crumby; slightly heterogeneous; sandy clay silt; with very small stones, charcoal and tile.

The main groups in this sample were CHEN (28.9%), FOOS (19.2%0), SECA (19.2%) and MOAR (21.2%). An unusually large number of Juncus bufonius seeds were recorded. There were many charred cereal grains which could well have been re-worked from Context Group 5 below, as they were mostly Triticum spelta. Grassland plants and nitrophilous weeds were well represented. Food plants included Ficus carica. The grassland plants suggested that there might have been some hay and or dung mixed in with this deposit.

Context 1222, Sample 59

> Mid grey-brown; moist, plastic to crumbly; very heterogeneous; sandy clay; with stones, limestone, charcoal, bone and tile fragments.

Apart from the charred cereal grains, other food plants in this sample included Ficus carica, Vitis vinifera (charred), Papaver somniferum, wheat/rye periderm 'bran' fragments, Apium graveolens, Corylus avellana nutshell (FOOS 23.3%). There were many nitrophilous weeds of arable land and gardens (CHEN 23.3%). Plants of grassland such as hay meadows and pastures were well represented (MOAR 18.3%). The assemblage suggested a mixture of human faeces, charred material, hay or herbivore dung and weeds of a variety of habitats which might be expected to be found from an urban site. None of these was dominant.

Context 1222, Sample 57

> Mid grey-brown; moist, crumbly; homogeneous; slightly clay slightly sandy silt with stones and some light grey flecks.

There were 67 taxa representing 33 ecological groups in this sample. The main ecological groups were CHEN (28.4%, 19 taxa) and MOAR (20.9%, 14 taxa). Food plants (FOOS 10.5%) included Coriandrum sativum, Apium graveolens, Corylus avellana nutshell, Ficus carica, Papaver somniferum and Vitis vinifera. SECA, ARTE and BIDE were the next main groups represented.

Again, this sample seems to contain a mixture of faecal material, rubbish, wasteland and arable weed taxa, with some charred cereals. There were a few plants from peat, such as Eriophorum sp(p). stems and E. vaginatum stem spindles, Sphagnum sp. leaves and a few lumps of Sphagnum peat. Littorella uniflora, a plant that grows around water with other rooted aquatics such as Ranunculus flammula, also occurred in this sample. There were some Quercus sp. leaf fragments and bud-scales.

Bulk-sieved sample 58, context 1222, contained Triticum spelta charred grains and some glume bases and uncharred fragments. There were several seeds, fruitstones and nutshells of foodplants, including Juglans regia, Ficus carica, Olea europea, Prunus Section Cerasus, Prunus domestics ssp. institia, Prunus spinosa, Sambucus nigra and Corylus avellana. This material was rough-sorted and the residue and washover were not examined in further detail.

Context 1246, Sample 52

This bulk-sieved sample had virtually no plant remains but was mostly composed of clinker and red burnt material. There were some charred Triticum spelta cereal grains (some of them sprouted) and fragments of burnt bone, coarse sand and stones.

Context 1288, Sample 68

> Black; moist, crumbly; slightly heterogeneous; very sandy clay silt; with mottles (reduction/oxidation); very small stones, tile and abundant charcoal.

There were no waterlogged plant materials in this sample, only charred Triticum spelta and Hordeum sp. grains and Polygonum persicaria nutlets. Presumably this sample was largely composed of re-worked material from Context Group 5, the burnt layer, but it actually came from the layer which formed the agger for the first Roman street.

Context 1262, Sample 65

> Mid to dark grey-brown; dry, crumbly; homogeneous; silty coarse and fine sand; with small and medium sized stones, shellfish and tile fragments.

There was very little preserved in this sample: seeds of Juncus bufonius and Juncus gerardi together with bone fragments, charcoal, pebbles and sand.

SUMMARY OF CONTEXT GROUP 6

Samples 58, 65 and 68 contained very little plant material. This was either because of poor preservation or because there was very little organic material mixed in with the sand and stones of which the

street was composed. There was charcoal and charred grain which suggested mixing of material from earlier layers.

The other samples (57,59 and 74) were more informative because the preservation of plant material was much better. Samples 57 and 59 formed part of the build-up of the street. Sample 74 was from part of the agger. These three samples contained assemblages of plant remains which indicated a mixture of human faeces, Sphagnum peat and general rubbish containing wasteland taxa, material from stable cleanings, possible hay meadow or short turf (perhaps grazed pasture) taxa (for example Prunella vulgaris and Linum catharticum) and Pteridium aquilinum, as well as charred grain, presumably mixed in from underlying layers.

Food plants included Ficus carica seeds, Corylus avellana nutshells, Vitis vinifera pips, wheat/rye 'bran', Olea europea, Juglans regia and Papaver somniferum.

It seems that the 1st Roman street and its agger were built up of a variety of material. This included general inorganic rubbish, sand, clinker and burnt material as well as a small proportion of organic waterlogged food plant refuse and a little charred grain, presumably reworked from the layer below.

CONTEXT GROUP 7: 'RED' LAYERS

Contexts 1162 and 1163

Early 4th century

The samples discussed here are from the 4th century and are characterised by the presence of red plaster and pigment material. The deposit contains red and yellow ochre pigments and painted wall plaster which suggested to the excavator that this was refuse from a Roman painter and decorator's work (Ottaway 1982).

Context 1162, Sample 27

> Mid grey-brown; moist, crumbly; very heterogeneous; sandy silty clay; medium and large stones, limestones (<1cm) and charcoal all present; abundant dark maroon pigment (?ore/mineral) Munsell: 10R 3/4 with pale buff patches.

The main characteristic of this sample was the red-coloured material. Very little plant material was preservedin this sample. There was one mineralised cf. Foeniculum vulgare (?fennel) mericarp, some fish vertebrae, pottery, sand and stones.

Two bulk-sieved samples were also examined. Sample 26 (context 1162) had no plant remains and was almost entirely composed of the red pigment. Sample 40 (context 1163) had Corylus avellana nutshell, some

fruitstones, Raphanus raphanistrum pod and a fragment of Gramineae leaf which looked so well preserved that it was perhaps modern contamination. Alternatively, it is possible that the red pigment had somehow preserved it in antiquity.

SUMMARY OF CONTEXT GROUP 7

There were too few plant remains in these samples to add any further comments to the interpretation of this red plaster deposit.

CONTEXT GROUP 8: LATE ROMAN - PRE ANGLO-SCANDINAVIAN SOIL LAYERS

Contexts 1106, 1116, 1128

4th to mid 9th century

The excavator found that beneath the medieval pits there was a discontinuity in the archaeological levels (Ottaway 1981). Instead of the expected Anglo-Scandinavian deposits, directly beneath the medieval layers there was a thick layer of black soil containing large quantities of Roman pottery and building materials. It was interpreted as a layer which probably accumulated in the post-Roman period, the pottery being residual. Two 'test' samples and three BS samples were examined from this Context Group.

Context 1116, Sample 35

> Mid to dark grey-brown; moist, crumbly; homogeneous; clay sandy silt; minor matrix component orange brown clay silt; with very small stones, limestone (<1cm), charcoal, bone (<2cm), pot and iron concretions all present.

Sample 35 had one Sambucus nigra seed.

The two BS samples from contexts 1106 (18) and 1116 (32) contained very little apart from Corylus avellana, Triticum spelta (including sprouted grains), bone, charcoal, fish vertebrae, limestones and stones.

Context 1128, Sample 36

> Mid to dark grey-brown; moist, crumbly; slightly heterogeneous; sandy silty clay with very small stones, limestones common and tile fragments common.

Sample 36 and the BS sample 33 from this context contained only a few Corylus avellana nutshells, a few bones, fish vertebrae, a fish otolith and some sand and small limestone fragments. The soil layer was perhaps well aerated and exposed during its formation, and

therefore virtually no plant remains or other organic matter was incorporated into it or preserved.

SUMMARY OF CONTEXT GROUP 8

It was hoped that the botanical evidence would indicate the nature of the soil layer and shed light on early post-Roman activity in the area. It would have been useful to discover whether it was cultivated land or waste ground. There was unfortunately, however, virtually no plant material preserved. The lack of preservation could well be due to the layer being well aerated, if it was a soil layer exposed for a long period and possibly cultivated. There may well have been very little plant material or organic matter actually incorporated into the deposit. The only plant remains found were those which are resistant to decay, such as Corylus avellana nutshell, Sambucus nigra seeds and some charred Triticum spelta (some of which had sprouted) which suggests there was some re-working from the Roman layers below. The type of deposit and the lack of post-Roman pottery suggest it was either wasteland or cultivated soil. It seems less likely that it was the latter since cultivated land might be more likely to have concentrations of artefacts and bones (Hall and Kenward 1980). The organic material spread on cultivated land to increase the fertility would rot down very quickly, leaving a concentration of artifacts and bones, as seen on modern allotments and gardens today.

CONTEXT GROUP 9: ANGLO-SCANDINAVIAN PIT [1140]

?9th-10th century

Two 'test' samples were examined from the fill of this pit which was in the southern-most corner of the site.

Context 1143, Sample 22

> Dark grey; moist, plastic to crumbly; slightly heterogeneous; sandy silty clay with stones, limestone and ?faecal concretions.

Context 1142, Sample 29

> Vari-coloured black to reddish brown via grey-brown,; wet, plastic to crumbly; thixotropic; very heterogeneous; slightly clay, silty fine to coarse sand; with small stones present and charcoal common.

These two samples can be discussed together. There were three or four food plants (FOOS 25-57%) in each sample, some mineralised faecal concretions, fish bones and rat-tailed maggot (Syrphidae) 'tails'. Food plants included wheat/rye 'bran' fragments, Papaver somniferum, Rubus fruticosus, Sambucus nigra and charred hilum and testa of Vicia

faba. Much of the material was mineralised or charred. Other plants were mostly nitrophilous weeds (CHEN 28-41%) and general wasteland weeds. Preservation was very poor. There was some charred peat in sample 29. Both samples contained charcoal bone and stone.

SUMMARY OF CONTEXT GROUP 9

There were indications of faecal material in this poorly preserved pit-fill material, but there was nothing which particularly suggested its being Anglo-Scandinavian rather than 12th century or later. The two samples contained mainly mineralised and charred material, but also some waterlogged seeds, a few food plants and taxa of disturbed and waste ground.

CONTEXT GROUP 10: MEDIEVAL PITS

[including 1115, 1118, 1076 and 1099]

Late 12th to mid 13th century

Eleven 'test' samples and seven BS residues and washovers were examined from six pits. One of the pits (fill 1104) was dated to the late 12th to early 13th centuries. The other five pits were dated early to mid 13th century. Preservation was mostly very poor, but a few samples contained mineralized material. The following sample descriptions are arranged within each pit.

PIT CONTEXT [1099]

Context 1108, Sample 4

> Mid red-brown; moist, crumbly; slightly heterogeneous with grey brown silt; slightly clay organic silt; with bone and abundant very small concretions, ?degraded faeces.

Only four taxa were preserved in this sample, but there were mineralised faecal concretions. There were a few plants suggesting food remains, for example mineralised Vicia faba and one charred cereal fragment. There was also Sambucus nigra in the FOOS category, although this could have been no more than an urban weed. There were impressions of Agrostemma githago seeds in the faecal concretions. Bulk-sieved material from this context (sample 4) contained a few bone fragments, fish bones, charcoal and stones.

Context 1109, Sample 5

> Mid to dark grey-brown; moist, plastic to crumbly (degraded faeces?); slightly heterogeneous; coarse sandy, silt clay; with stone, charcoal and reddish patches.

All the plant material in this sample was mineralised including the plant remains, faecal concretions, fly puparia and fish bones. There were a few food plants: Papaver somniferum, Fragaria vesca and charred Triticum sp. grain. The rest were weeds, mostly in the ecological groups CHEN and SECA, including nitrophilous weeds and weeds of cereal fields. There was a mineralised ?mouse dropping which might indicate mice living on a floor or scrabbling around in the pit.

Context 1112, Sample 7

> Light grey; dry, crumbly; homogeneous; sandy silt with very small and small stones common and bone fragments (>2cm and <2cm), common.

Again there was mineralised and charred material in this sample but also waterlogged Gramineae sp., Conium maculatum and Juncus sp. 'seeds'. There was a little mineralised faecal material but the only taxa in the FOOS group were such plants as Sambucus nigra and Rubus fruticosus which could well represent plants growing on wasteland near the pit rather than faecal material. There were various bones including some cat bones. Mineralised rat-tailed maggot (Syrphidae) 'tails' were also present.

Context 1113, Sample 8

> White to grey; moist, crumbly; sandy clay silt; with limestone rubble and abundant limestones (>1cm and <1cm).

Only six taxa were found in this sample and these were all charred or semi-mineralised. There was a charred Sambucus nigra seed and a fragment of charred grain. The sample had bone fragments and a lower inscisor of an aged sheep, charcoal, mortar, fly puparia, rat-tailed maggot tail and fish bones.

Context 1114, Sample 9

> Vari-coloured grey to reddish brown; moist; crumbly; slightly heterogeneous; slightly sandy silty clay; with charcoal present; mineralised patches/pan.

This sample contained faecal concretions and some mineralised plant material, including a Triticum sp. caryopsis. There were a few waterlogged taxa including Agrostemma githago, Atriplex sp. and Sambucus nigra. Three taxa were from the ecological group FOOS (42.9%), including Corylus avellana nutshell and the inner kernals of Prunus sp.. Juncus gerardi seeds were also present. Trichuris sp. was noted (in passing) in this sample. There were fish bones, rat-tailed maggot (Syrphidae) 'tails', charcoal and bone fragments.

Bulk-sieved samples 3 (context 1100) and 7 (context 1112) were also examined from this pit, but add nothing to the above.

PIT CONTEXT [1118]

Context 1117, Sample 12

Mid to dark, grey-brown; moist, crumbly; slightly heterogeneous; slightly sandy, slightly clay silt; with very small stones, charcoal and bone (<2cm) all present.

Three taxa were recorded from this sample, Sambucus nigra being the only possible food plant. There was a lump of burnt peat, bone fragments (some burnt), fish bones, stones, charcoal and mineralised fly puparia.

Context 1121, Sample 14

Mid grey to grey-brown; moist, crumbly; heterogeneous; sandy clay silt; minor matrix component grey-brown silt with charcoal rich patches; with charcoal common.

In this sample, apart from some Corylus avellana nutshells there were only taxa which indicated general urban refuse, such as Solanum spp., Stellaria media and Carex sp.

Context 1251-3, Sample 56

This wood sample was taken from a series of five vertical stakes which went around the half of the pit that was excavated. By the time they were examined in the laboratory they were in a poor state of preservation, but the fragments which were large and firm enough were identified as hazel (Corylus avellana).

PIT CONTEXT [1115]

Context 1091, Sample 16

Mid-grey; moist, crumbly; homogeneous; sandy silty clay; with limestones present and abundant charcoal, bone (<2cm) and ?lime present.

Context 1144, Sample 30

Mid-grey; moist, plastic to crumbly; homogeneous; sandy silty clay or clay silt; with limestone and bone fragments present, and charcoal common.

Preservation was very poor in these two 'test' samples and in BS samples 17 (context 1091) and 31 (context 1174). There were a few charred grains, Corylus avellana nutshell and Prunus sp. charred fruitstone fragments. Weeds included Atriplex sp(p). and Avena sp., both charred. Several components suggest a cess pit, but nothing inherently faecal, e.g. bones, fish bone, mineralized fly puparia, rat-tailed maggot tails, eggshell, oyster shell. There was one cereal 'bran' fragment.

PIT CONTEXT [?]

Context 1126, Sample 19

Mid to dark brown; moist, crumbly; homogeneous; humic; slightly sandy silt; mottles common; with <1cm limestone present and faecal concretions present.

Plant material in sample 19 was mineralised and poorly preserved. There were mineralised Pisum sp. and Vicia sp. hila and also the inner cotyledons of such things as Brassica sp(p). and seeds of Prunus sp(p).. There were also fish bone fragments.

Context 1134, Sample 20

Dark grey-brown; moist, crumbly; very heterogeneous; humic; sandy clay silt; with minor matrix component of patches of lighter grey, orange and darker material; very small and small stones present, bones (<2cm) and pottery fragments present.

Sample 20 had slightly better waterlogged preservation, with arable weeds such as Agrostemma githago, Chrysanthemum segetum and Bilderdykia convolvulus. Five food taxa were identified: Sambucus nigra, Papaver somniferum, Pisum sp., Vicia faba and some wheat/rye 'bran' fragments. There were also mineralised faecal concretions, bone, charcoal, eggshell, earthworm egg capsules and fly puparia. The main groups were CHEN (28.6%, 4 taxa) and FOOS (28.6%, 4 taxa).

PIT CONTEXT [?]

Context 1202, Samples 44 and 45

44 and 46 were both BS samples which had several taxa probably indicating contamination from the Roman deposits into which these pits were dug, for example Vitis vinifera seeds, charred Triticum spelta grains, (also coleoptiles, glume bases and sprouted cereal grains), Ficus carica seeds and Juglans regia nutshells. None of these occurred in any of the other medieval pit samples.

SUMMARY OF CONTEXT GROUP 10

The pits had a variety of linings such as wood, clay and wickerwork (Ottaway 1981). In one pit (context 1118) there was a series of stake holes around the pit. Some of the stake fragments were identified as hazel (Corylus avellana).

Samples from this group contained the mineralized remains of food plants such as the kernels of fruitstones (for example Prunus sp.), legumes, Fragaria vesca and Papaver somniferum. There were also bran fragments, mineralised faecal concretions and many small fish bones

(which were picked out and passed on to AKGJ). Trichuris sp. eggs were present in sample 9 (not looked for in other samples by the author). Most samples contained earthworm egg capsules, fly puparia, egg shell and mineralised rat-tailed maggot (Syrphidae) 'tails'. All these biological remains confirm that these are cess pits (perhaps with the exception of the pit from which samples 44 and 46 were taken), containing faecal material and rubbish. Syrphidae mineralised 'tails' suggest an unpleasant, watery pitfill, but these do not seem to preserve in the waterlogged pits, only when there is mineralisation.

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Appendix a) Complete list of taxa from Rougier Street in taxonomic order.

Diphasium complanatum (L.) Rothm. (complanate clubmoss)
Pteridium aquilinum (L.) Kuhn (bracken)
Salix sp(p). (willow)
Juglans regia L. (walnut)
Corylus avellana L. (hazel)
Quercus sp(p). (oak)
Ficus carica L. (fig)
Cannabis sativa L. (hemp)
Urtica dioica L. (stinging nettle)
Urtica urens L. (annual nettle)
Polygonum sp(p). (knotweeds, etc.)
Polygonum aviculare agg. (knotgrass)
Polygonum hydropiper L. (water-pepper)
Polygonum persicaria L. (persicaria/red shank)
Polygonum lapathifolium L. (pale persicaria)
Bilderdykia convolvulus (L.) Dumort. (black bindweed)
Rumex sp(p). (docks)
Rumex acetosella agg. (sheep's sorrel)
Beta vulgaris L. (beet)
Chenopodium Section Pseudoblitum (red goosefoot etc.)
Chenopodium murale L. (nettle-leaved goosefoot)
Chenopodium ficifolium Sm. (fig-leaved goosefoot)
Chenopodium album L. (fat hen)
Chenopodium/Atriplex sp(p). (goosefoot/orache)
Atriplex sp(p). (oraches)
Montia fontana ssp. chondrosperma (blinks)
Stellaria media (L.) Vill. (chickweed)
Stellaria neglecta Weihe in Bluff & Fingerh. (greater chickweed)
Stellaria graminea L. (lesser stitchwort)
Cerastium sp(p). (mouse-ear chickweeds)
Lychnis flos-cuculi L. (ragged robin)
Agrostemma githago L. (corncockle)
Silene vulgaris (Moench) Garcke (bladder campion)
Silene alba (Miller) Krause in Sturm (white campion)
Ranunculus Section Ranunculus (meadow/creeping/bulbous buttercup)
Ranunculus sceleratus L. (celery-leaved crowfoot)
Ranunculus flammula L. (lesser spearwort)
Papaver somniferum L. (opium poppy)
Papaver argemone L. (long prickly-headed poppy)
Papaver cf. hybridum L. (?round prickly-headed poppy)
Fumaria sp(p). (fumitories)
Cruciferae (cabbage family)
Rorippa islandica (Oeder) Borbas (northern marsh yellow-cress)
Capsella bursa-pastoris (L.) Medicus (shepherd's purse)
Thlaspi arvense L. (field penny-cress)
Brassica sp(p). (cabbages, etc.)
Brassica rapa L. (turnip)
Brassica nigra (L.) Koch in Rohling (black mustard)
Brassica sp./Sinapis arvensis (brassica/charlock)
Raphanus raphanistrum L. (wild radish)
Rosaceae (rose family)
Filipendula ulmaria (L.) Maxim. (meadowsweet)
Rubus sp(p). (blackberries, etc.)
Rubus idaeus L. (raspberry)
Rubus cf. idaeus L. (?raspberry)
Rubus fruticosus agg. (blackberry/bramble)
Potentilla sp(p). (cinquefoils, etc.)
Potentilla anserina L. (silverweed)

Potentilla cf. erecta (L.) Rauschel (?tormentil)
Potentilla cf. reptans L. (?creeping cinquefoil)
Fragaria vesca L. (wild strawberry)
Fragaria cf. vesca L. (?wild strawberry)
Aphanes arvensis L. (parsley-piert)
Aphanes microcarpa (Boiss. & Reuter) Rothm. (slender parsley-piert)
Malus sylvestris Miller (crab apple)
Prunus sp(p). (sloe/plum/cherry, etc.)
Prunus spinosa L. (sloe)
Prunus domestica sl L. (plums, etc.)
Prunus domestica ssp. domestica (plums, etc.)
Prunus domestica ssp. insititia (plums, etc.)
Prunus Section Cerasus (cherries)
Leguminosae (pea family)
cf. Leguminosae (?pea family)
cf. Vicia sp(p). (?vetches, etc.)
Vicia cf. hirsuta (?hairy tare)
Vicia faba (field bean)
cf. Vicia faba (?field bean)
Pisum sp(p). (peas)
cf. Pisum sp(p). (?peas)
Pisum cf. sativum (?garden/field pea)
Medicago lupulina L. (black medick)
Medicago minima (L.) Bartal. (bur medick)
Trifolium pratense L. (red clover)
Linum usitatissimum L. (cultivated flax)
Linum catharticum L. (purging flax)
Ilex aquifolium L. (holly)
Buxus sempervirens L. (box)
Vitis vinifera L. (grape)
Malva cf. sylvestris L. (?common mallow)
Hypericum sp(p). (St John's-worts)
Viola sp(p). (violets/pansies, etc.)
Bryonia cretica ssp. dioica (white bryony)
Umbelliferae (carrot family)
Hydrocotyle vulgaris L. (marsh pennywort)
Coriandrum sativum L. (coriander)
Aegopodium podagraria L. (ground elder)
cf. Aegopodium podagraria L. (?ground elder)
Aegopodium podagraria/Conium maculatum (ground elder/hemlock)
Oenanthe sp(p). (water-dropworts)
Oenanthe lachenalii C. G. Gmelin (parsley water-dropwort)
Oenanthe cf. lachenalii C. G. Gmelin (?parsley water-dropwort)
Oenanthe aquatica (L.) Poiret in Lam. (fine-leaved water-dropwort)
Aethusa cynapium L. (fool's parsley)
cf. Foeniculum vulgare Miller (?fennel)
Anethum graveolens L. (dill)
cf. Anethum graveolens L. (?dill)
Conium maculatum L. (hemlock)
Apium graveolens L. (wild celery)
cf. Apium nodiflorum (L.) Lag. (?fool's watercress)
Pastinaca sativa/Heracleum sphondylium (wild parsnip/hogweed)
Heracleum sphondylium L. (hogweed)
Torilis japonica (Houtt.) DC. (upright hedge-parsley)
Daucus carota L. (wild carrot)
Calluna vulgaris (L.) Hull (heather, ling)
Empetrum sp(p). (crowberry)
Anagallis arvensis L. (scarlet pimpernel)

Fraxinus excelsior L. (ash)
Olea europaea L. (olive)
Menyanthes trifoliata L. (bogbean)
Galium sp(p). (bedstraws, etc.)
Galium aparine L. (goosegrass, cleavers)
Myosotis sp(p). (forget-me-nots)
Callitriche sp(p). (water-starworts)
Labiatae (mint family)
Galeopsis sp(p). (hemp-nettles)
Galeopsis Subgenus Galeopsis (hemp-nettles)
Lamium Section Lamiopsis (annual dead-nettles)
Stachys sp(p). (woundworts)
Nepeta cataria L. (cat-mint)
Prunella vulgaris L. (selfheal)
Satureja hortensis L. (summer savory)
cf. Satureja hortensis L. (?summer savory)
Lycopus europaeus L. (gipsywort)
Mentha sp(p). (mints)
Atropa bella-donna L. (deadly nightshade)
Hyoscyamus niger L. (henbane)
Solanum sp(p).
Solanum nigrum L. (black nightshade)
Solanum dulcamara L. (woody nightshade)
Veronica beccabunga-type (brooklime/water/marsh speedwells)
Pedicularis palustris L. (marsh lousewort)
Rhinanthus sp(p). (yellow rattles)
Plantago major L. (greater plantain)
Plantago lanceolata L. (ribwort plantain)
Littorella uniflora (L.) Ascherson (shore-weed)
Sambucus cf. ebulus L. (?danewort)
Sambucus nigra L. (elder)
Valerianella dentata (L.) Pollich (narrow-fruited cornsalad)
Scabiosa columbaria L. (small scabious)
Campanula cf. rotundifolia L. (?harebell, bluebell)
Compositae (daisy family)
Anthemis cotula L. (stinking mayweed)
Achillea millefolium L. (yarrow)
Chrysanthemum segetum L. (corn marigold)
Arctium sp(p). (burdocks)
Carduus/Cirsium sp(p). (thistles)
Centaurea sp(p). (knapweeds, etc.)
Centaurea nigra L. (lesser knapweed)
Hypochoeris sp(p). (cat's ears)
Leontodon sp(p). (hawkbits)
Picris hieracioides L. (hawkweed ox-tongue)
Sonchus asper (L.) Hill (prickly sow-thistle)
Sonchus oleraceus L. (sow-thistle)
Sonchus palustris L. (marsh sow-thistle)
Taraxacum sp(p). (dandelions)
Lapsana communis L. (nipplewort)
Alisma sp(p). (water-plantains)
Triglochin maritima L. (sea arrowgrass)
Potamogeton sp(p). (pondweeds)
Juncus sp(p). (rushes)
Juncus inflexus/effusus/conglomeratus (hard/soft/compact rush)
Juncus squarrosus L. (heath rush)
Juncus gerardi Loisel. (saltmarsh rush)
Juncus bufonius L. (toad rush)

Juncus acutiflorus Ehrh. ex Hoffm. (sharp-flowered rush)
Juncus cf. acutiflorus Ehrh. ex Hoffm. (?sharp-flowered rush)
Juncus articulatus L. (jointed rush)
Juncus cf. articulatus L. (?jointed rush)
Luzula sp(p). (woodrushes)
Gramineae (grasses)
Cerealia indet. (cereals)
cf. Glyceria sp(p). (?sweet-grasses)
Bromus sp(p). (bromes, etc.)
Triticum sp(p). (wheats)
Triticum/Secale (wheat/rye)
Hordeum sp(p). (barley)
Hordeum vulgare (six-row barley)
Avena sp(p). (oats)
Avena sativa (cultivated oat)
Agrostis sp(p). (bent grasses, etc.)
Danthonia decumbens (L.) DC. in Lam. & DC. (heath grass)
Cyperaceae (sedge family)
Scirpus maritimus L. (sea club-rush)
Scirpus setaceus L. (bristle club-rush)
Eriophorum sp(p). (cotton-grasses)
Eriophorum vaginatum L. (cotton-grass)
Eleocharis palustris sl (common spike-rush)
Carex sp(p). (sedges)
Sphagnum sp(p).
Sphagnum imbricatum Hornsch. ex Russ.
Polytrichum sp(p).
Plagiomnium sp(p).
Leucodon sciuroides (Hedw.) Schwaegr.
Neckera complanata (Hedw.) Hub.
Thamnobryum alopecurum (Hedw.) Nieuwl.
Thuidium sp(p).
Thuidium tamariscinum (Hedw.) Br. Eur.
Drepanocladus sp(p).
Calliergon sp(p).
Calliergon giganteum (Schimp.) Kindb.
Calliergon cuspidatum (Hedw.) Kindb.
Homalothecium sericeum/lutescens
Eurhynchium sp(p).
Eurhynchium striatum (Hedw.) Schimp.
Eurhynchium praelongum (Hedw.) Br. Eur.
Hypnum cupressiforme Hedw.
Rhytidiadelphus squarrosus (Hedw.) Warnst.
Hylocomium splendens (Hedw.) Br. Eur.
Chara sp(p).

Appendix b) List of ecological/use group codings and their meanings

Uses

DYES : Plants used in dyeing or mordanting
FIBR : Plants used for fibre extraction
FOOF : Plants used as flavouring, including herbs and spices
FOOO : Plants with oil-seeds
FOOS : Plants forming a major component of diet - cereals, pulses, nuts, fruit, vegetables
HERB : Plants used for medicinal purposes
ORNA : Plants used for ornamental purposes
USEF : Plants useful in some way other than those already defined
WOOD : Parts of woody plants other than fruits/seeds

Vegetation

ALNE : Plants of alder carr
ARTE : Nitrophilous tall-herb weed communities of waste places, river banks, waysides and hedgerows
ASTE : Plants of upper salt-marsh and sea-cliff vegetation
BIDE : Nitrophilous weed communities of pond edges, ditches and other places subject to periodic inundation
BULB : Plants of brackish and saline reedswamp
CAKI : Nitrophilous weedy communities of shingle beaches and sandy strandlines
CHAR : Submerged aquatic vegetation dominated by Characeae
CHEN : Nitrophilous weed communities of cultivated and other disturbed land (especially rootcrop fields and gardens)
EPIL : Nitrophilous woodland edge and clearing communities
FEBR : Plants of drier, typically calcareous, grassland
ISNA : Short-lived dwarf rush communities of winter-wet (often sandy) habitats, pond edges, etc.
LEMN : Free-floating aquatic communities of eutrophic waters
LITT : Rooted aquatic vegetation at the edge of (usually) oligotrophic waters
MOAR : Plants of grassland, including the wetter hay meadows and pastures, and adjacent paths
MOCA : Plants of oligotrophic springs and flushes, mainly upland
NACA : Plants of grass and dwarf-shrub- (typically Calluna-) dominated dry heaths and moors
OXSP : Plants of raised bogs and wet heaths
PHRA : Freshwater reedswamp communities
PLAN : Plant communities of trampled places
POTA : Rooted aquatic vegetation of still or slow-moving water
QUER : Deciduous woodland on poorer soils
QUFA : Deciduous woodland on better soils
RHPR : Woodland edge scrub communities
SCCA : Communities of poor and intermediate fens (acid to mildly basic peat)
SECA : Weeds of cereal fields
SESC : Established vegetation of sand dunes and other sandy acidic soils
SESL : Montane dwarf-shrub heaths and grassland, mainly on calcareous substrates
TRGE : Species rich communities of grassland/scrub boundaries, often calcicolous
VAPI : Conifer forest and scrub of upland areas (mainly non-British)

Ecology

CALC : Calcicolous plants
FUGE : Calcifuge plants

Mosses

BOGS : Mosses found in bogs
DUNS : Mosses of dune-slacks
FENS : Mosses of fens
GRAS : Mosses of grassland
HEMO : Mosses of heathland/moorland
LIGN : Mosses of living and dead bark and wood
MARS : Mosses of marshes
OLIT : Mosses of drier, unshaded rocks, stones, and walls
SLIT : Mosses of shaded, moist rocks, stones, and walls
SOIL : Mosses of bare, usually well-drained soil in unshaded places
WOOF : Mosses of woodland floor habitats, principally humus and litter

UNCL : Unclassified in any way