EXCAVATION AT FARRIER STREET AND OTHER SITES NORTH OF THE CITY WALL, WORCESTER: ARCHIVE REPORT

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Preface

This is an excavation archive report. It contains structural and specialist reports, with introductory material and general discussion that together form a comprehensive account of the results of fieldwork. This text will be edited for publication in *Trans Worcestershire Archaeol Soc.*

The text sections 1-17 are arranged in a suitable order and format for publication. The illustrations have been produced to conform to the page size of *Trans Worcestershire Archaeol Soc.* It also contains a number of appendices that will not be included in the publication text, but that present the data on which the interpretations are based.

The conclusions presented here supercede those contained in Darlington (1988) and Dinn (1990). The final report should be referred to as Dalwood, C H, Buteux, V A, and Darlington, J, forthcoming Excavation at Farrier Street and other sites north of the city wall, Worcester, 1988-90, *Trans Worcestershire Archaeol Soc.*

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Hal Dalwood and Victoria Buteux

1 Summary

Excavation was undertaken at Farrier Street, Worcester, in advance of development for offices, following an evaluation. Roman deposits were discovered which were predominantly datable to the 3rd to 4th century. The site was adjacent to areas of ironworking in this period, and was also used for agricultural and domestic purposes. The site was abandoned at the end of the Roman period and was used for agricultural or horticultural purposes through the medieval period. More intensive activity occurred from the 17th century onwards. In the 18th century the area was occupied by buildings.

Although parts of the site were damaged by driven piles, the majority of the deposits are now preserved in situ beneath new office buildings and carparks.

2 Introduction

The area to the north of the medieval city wall of Worcester, occupied in part by the medieval Foregate suburb, has not been subject to detailed archaeological investigation until recent years. This report describes a programme of fieldwork carried out at Farrier Street in 1989 and 1990 which revealed significant new information about the Roman occupation of the area (HWCM 8229; Fig 1). The report also incorporates the results of a number of evaluations carried out north of the city wall.

The site lies on the terrace of sand and gravel underlying the whole of the historic city of Worcester, which rises to a height of *c* 26m OD (Worcester Terrace, Palmer 1982), overlying Mercian Mudstone (Keuper Marl). The medieval city conforms to the limits of this terrace to the west, south and east, as do the limits of Roman occupation. The site lies north of the medieval city wall and adjacent to the medieval Foregate suburb.

Archaeological background

The broad outlines of the archaeology of the city from the Iron Age onwards have been determined from a number of excavations in the 1960s and 1970s within the limit of the city walls (Barker 1968-69, 9-42; Carver 1980; Darlington and Evans forthcoming). Excavations at Deansway in 1988-89 provided comprehensive evidence for the sequence of Roman to medieval occupation, including evidence for Roman occupation and ironworking (in the 2nd to 3rd centuries), the defences of the late Saxon *burh* and related urban occupation and industrial activity, and medieval tenements and a bronze foundry (Dalwood *et al* forthcoming; Mundy and Dalwood forthcoming).

Excavations immediately within the city wall in the northern part of the city revealed evidence of the Dominican friary at Blackfriars, and also exposed a major Roman road running north to south with roadside occupation, together with extensive evidence for Roman iron smelting in the 3rd to 4th century (Fig 14: HWCM 378; Barker 1968-9, 63-98; Mundy 1985). The Roman occupation in the northern part of the historic city is interpreted as a suburb of the Roman small town of Worcester (Barker 1968-9, 15-19; Burnham and Wacher 1990, 232-4).

In the area north of the city walls little evidence of Roman occupation had come to light prior to the fieldwork reported here (Barker 1968-9, fig 2). The most significant

discovery was a circular building 9m in diameter uncovered in 1829 (Allies 1852), which now underlies Springfield in Britannia Square (Fig 14: HWCM 231). The building was associated with pottery and 3rd to 4th century coins and has been interpreted as a temple (Barker 1968-9, 15; Burnham and Wacher 1990, 234).

Fieldwork in the form of evaluations has produced new information on the archaeology of this area comprising: Sansome Street (Fig 13: HWCM 7551; Darlington 1988), Love's Grove (Fig 13: HWCM 9552; Edwards 1990) and Rea's Timber Yard (Fig 13: HWCM 9550; Wichbold 1990). Work at St Oswald's Almshouses (Fig 13: HWCM 9931) will be reported separately (Edwards forthcoming). The evidence from these evaluations, together with the results from Farrier Street, will be used to provide a new synthesis of the archaeology of the northern suburbs of Worcester, in particular the Roman period and to a lesser extent the medieval and post-medieval periods (Section 13).

Historical background

The Farrier Street site lies outside the main area of medieval settlement. It is clear that Foregate Street was developed as a suburb in the 11th to 12th centuries along the major road leading north from the *burh* (Baker *et al* 1992, 73).

The northern line of the city wall was built by the first decade of the 13th century (Beardsmore 1980, 59). Detailed plot-boundary analysis has indicated that the Farrier Street site lay within the medieval Foregate suburb, and that the western limit of the site (Infirmary Walk) formed the western edge of the medieval suburb (Nigel Baker and Richard Holt pers comm). The site lay over 100m to the rear of the frontage on Foregate Street although it was adjacent to The Butts which probably developed as an extra-mural routeway linking the Foregate and the river.

Cartographic sources are uninformative prior to the 18th century. Although Speed showed the Foregate suburb in his map of *c* 1610, he showed no detail of the Farrier Street area and did not show The Butts (*VCH Worcs IV*, facing 376). The anonymous cartographer of the 1651 map of Worcester showed no buildings at all north of the city wall, but this cannot be accepeted as an accurate portrayal (*VCH Worcs IV*, facing 377). The most informative are the 18th century maps of Doherty (1742; HWRO BA 510.899.41) and Broad (1768; HWRO BA 4742 900.400.51). Both of these maps show what appears to be an identical arrangement, with the northern half of the Farrier Street site occupied by a rectangular court of buildings (Fig 14).

The area showed further development by the end of the 18th century, and Young's map (1779; HWRO 989.9.16 BA 1761/1) showed a more detailed plan, with the southern part of the site now occupied by a coal yard and a timber yard (Fig 15). It is clear that Young's map was from a much more accurate survey than those of the earlier 18th century, and it is not clear whether any of the buildings shown on the earlier plan were still standing at the end of the 18th century.

3 Aims

The fieldwork undertaken at Farrier Street was in an area to be affected by the construction of new offices on a site bounded by Farrier Street, Infirmary Walk and the railway viaduct, an area registered on the County Sites and Monuments Record as a site of archaeological interest (HWCM 8229; NGR SO 848551; Fig 1). The site was used for car parking in 1989, all buildings having been demolished.

Two evaluation trenches were excavated in 1989 within the carpark (Fig 1: Trench A and B). These were designed to determine the extent, date and nature of archaeological deposits and provide information for recommendations on the preferred design of any new development (Darlington 1989). As

a result of the evaluation, careful consideration was given to modifying the foundation design to mitigate the impact on archaeological deposits, through negotiations between the Archaeology Section of Hereford and Worcester County Council, Worcester City Council (the landowners and planning authority) and the developers, Conrad Construction Ltd.

The design of the building meant that only a small area was to be affected by below-ground works, particularly the base of a lift shaft. In 1990 this small area was excavated during the early stages of construction work (Fig 1: Trench C). The trench was excavated with the aim of retrieving maximum information about Roman and medieval deposits. Salvage recording took place along the line of a sewer trench across the northern part of the site (Fig 1: Trench D). Other areas were also salvage recorded, including the construction of other lift shafts, service trenches and ground beams, as well as the piling operation, but these did not affect significant deposits as defined in the evaluation report (Darlington 1989).

4 Methods

The evaluation trenches were sited at either side of the carpark (Fig 1: Trench A and B). Trench A (40 x 3m) was excavated by machine and stepped down (38 x 1m) to extend the trench to natural deposits. Trench B (17 x 3m) was also stepped down (15 x 1m). In both areas selected features were excavated or partly excavated to provide a datable sequence. The location of the 1990 excavation (4 x 2m) was dictated by the location of a lift shaft in the new building (Fig 1: Trench C). Modern and 19th century deposits were removed by machine and the rest excavated by hand in order to retrieve a detailed sequence through the stratigraphy.

The evaluation and excavation were carried out according to HWCC Archaeology Section standard practice (HWCC Archaeology Section Recording System 1988 as amended). Analysis was carried out in 1991-2, using a method developed for the Deansway excavation (Mundy and Dalwood forthcoming). The recorded contexts were grouped into context groups (prefixed CG) and dated to phases, mostly ceramically defined. The context group structural summaries, the context group matrix and the concordance lists for contexts and context groups are retained in the site archive.

5 The structural sequence

H Dalwood

Phase 1: Natural deposits

Deposits of sand and gravel (CG 1) were encountered at the base of all archaeological deposits excavated.

Phase 2: Roman, 1st to 2nd century

A small number of features were recorded in Trench C, consisting of two shallow pits (Fig 4: CG 6, 7) and two short lengths of shallow gully (Fig 4: CG 8, 9). In Trenches A and B pottery was recovered from soil layers interpreted as contemporary ground levels (Figs 2 and 3: CG 2).

Phase 3: Roman, 2nd to 3rd century

The most significant feature was a road surface constructed of layers of cobbles set in a matrix of fine sand, forming a level metalled surface. A small area was exposed in Trench A (Fig 4: CG 5) and recorded in section in Trench D (Fig 5: CG 5). The width of the road was not established, but it was over 3m wide. It was not excavated and no dating evidence was recovered from it, and therefore it is possible that it was constructed in Phase 2.

Other than the road few features or layers were dated to this phase. Two extensive deposits of burnt soil and charcoal, together with animal bone and burnt plant material, were recorded in Trench A (Fig 2: CG 3, 4).

A single pit in Trench C was also dated to this period (Fig 4: CG 12).

Phase 4: Roman, 3rd to 4th century

A greater number of features were recorded than in the earlier phases. The stratigraphic evidence indicated some chronological development occurred, and this is shown as Phase 4.1 and 4.2 (Fig 4).

There was evidence of iron-working in the form of quantities of iron slag, used as road metalling as well as dumped into pits. The cobble road (Fig 2 and 5: CG 5) was re-surfaced with mixed lumps of iron slag (0.20-0.80m) laid over a foundation layer of soil and sand to form a new road surface (Fig 2: CG 16).

A slag road surface was recorded in section in Trench D (Fig 5: CG 15), which was partially removed before the construction of another slag road (Fig 5: CG 16) of slightly different composition utilising smaller lumps of iron slag (0.10-0.40m), also with a foundation layer of fine sand. This second slag surface was probably the same surface recorded in Trench C (Fig 4: CG 16). A further slag surface was laid to the west of and partially overlapping the second road surface (Fig 5: CG 17). This surface was interpreted as a road-side surface, but as it was only recorded in section interpretation is necessarily limited. All the slag construction layers formed extremely hard surfaces, due to the concretion of the slag. The slag utilised must have come from contemporary ironsmelting, and the concretion indicated that specific type and size of slag was selected to ensure that concretion would occur (Gerry McDonnell pers comm).

A large number of pits in Trench A and C were recorded containing varying quantities of slag, indicating that iron-smelting was being carried out in the general area of the site (Section 12). The slag was all secondary dumps of material, mixed with domestic rubbish, with none of the distinctive primary dumps as recorded at Deansway (Mundy and Dalwood forthcoming). These pits can not be readily interpreted, as none appeared to have been used for primary deposition of domestic or industrial rubbish (Fig 2: CG 20, 21, 22, 23, 24; Fig 4: CG 25, 26, 28, 29, 30).

Two clay-lined pits were possibly functionally associated with industrial activity. One of these in Trench A was a large circular pit 1.05m deep (Fig 2: CG 18); the other in Trench C was a sub-rectangular pit 0.30m deep (Fig 4: 13). The clay lining indicated that these pits were used for holding large quantities of liquid (probably water). A third unlined pit was of similar similar size and adjacent to CG 18 (Fig 2: CG 20). These two pits contained quantities of iron slag, particularly in the upper fills, but it was all secondary dumping (CG 19). There was no direct evidence that these large pits were associated with ironworking.

A number of features post-dated the pits in Trench C, and appeared to constitute a distinct sub-phase of activity. A number of narrow linear features crossed the excavated area (Fig 4: CG 34, 35, 36, 37). These are not readily interpreted, although it is possible they were boundary features. A number of small postholes and small pits were also recorded (Fig 4: CG 27, 31, 32, 33). In Trench A a linear ditch (CG 50) postdated the pits (Fig 2: CG 50). Soil micromorphology provided evidence for domestic and industrial activity (Section 6).

Phase 5: Post-Roman, 5th to 11th century

A thick soil accumulation was recorded overlying Roman levels in Trench A, C and D (Fig 2, 4-6: CG 40). The soil contained residual Roman pottery and was interpreted on site as analagous to the post-Roman dark earth deposits recorded at Deansway (Macphail forthcoming a). Analysis of samples from Trench C (Fig 6: samples 1-3) substantiated this interpretation, although the details of the development differed (Section 6). No artefactual or environmental material

datable to this phase was recovered.

Phase 6: Medieval, 12th to mid-13th century

The Phase 5 soil accumulation (Fig 2, 4-6: CG 40) was interpreted as a ground surface in this phase, and a small quantity of 12th to 13th century pottery was recovered from this soil, and as residual material in later context groups. Soil micromorphology indicated that domestic waste (including ashes) was probably incorporated into the soil in this period.

Phase 7: Medieval, mid-13th to mid-16th century

No features were dated to this phase but about twelve sherds of pottery could be attributed to this period on typological grounds. They were all found in later contexts as residual material.

Phase 8: Post-medieval, mid-16th to 17th century

The activity in this phase was characterised by four large pits which occupied a large area in Trench A (Fig 2: CG 41, 43, 45, 46). These features were typically between 3m and 5m diameter and over 1m deep (none was fully excavated). They contained sandy fills with little dating material, although all truncated the medieval soil layers. They were interpreted as quarry pits excavated for gravel, the sandy fill being the residue from sieving natural sands and gravels dumped back into the empty pits.

There were a number of other features including a pit and a narrow linear slot in Trench A (Fig 2: CG 42, 44) and a ditch with a stepped profile (0.70m deep) in Trench C (Fig 4: CG 47). The finds from the backfill of this ditch were almost entirely, if not completely, residual and included large amounts of Roman and some medieval pottery. Dumps of late medieval/post medieval roof tiles made up a significant part of the backfill and the latest pottery could be dated to the 17th century. The ditch was interpreted as a boundary feature. It was not a long-lived property division, although it may have been a recut of an earlier medieval boundary that it completely removed (see discussion). It was overlain by a thick deposit of soil (CG 48) containing quantities of domestic refuse (Fig 6: CG 48).

Phase 9: Post-medieval, 18th to 20th century

A thick layer of soil (CG 49) was recorded overlying earlier deposits and contained large quantities of domestic material (Fig 6). This layer was mostly removed by machine in the early stages of excavation. It sealed earlier deposits, and was itself truncated by the foundations of brick buildings and brick-lined cellars.

6 Soil micromorphology

R I Macphail

6.1 Introduction

The excavation recorded Roman features succeeded by *c* 300mm of dark earth-type deposits. Monoliths (500mm long) were sampled (Fig 6, samples 1-3). Detailed analysis was carried out on one monolith (Fig 6, samples 2A to 2E) which permitted a soil micromorphological study of the uppermost Roman levels, the dark earth and the basal part of the overlying post-medieval soil. Analysis was also carried out one sample (Fig 6, sample 3A) adjacent to the deep piling to assess its effects on the archaeological sediment or soil.

6.2 Methods

Monoliths were sent to Stirling University for resin impregnation and thin section manufacture. Thin sections were received and described (Bullock *et al* 1985), and interpreted according to Courty *et al* (1989) and from experienced gained from studying soils at Deansway (Macphail forthcoming a).

6.3 Results

The soil micromorphological descriptions and preliminary interpretations are presented in Appendix 2. The possible effects of piling were looked for but the only possible effect was the more compact (ie lower porosity) nature of parts of sample 3A (Fig 6).

6.4 Discussion

Phases 2 to 4: Roman

Sample 2E (Fig 6: CG 37) was characterised by abundant inclusions of various slag, coarse wood charcoal, burned silty "daub" and other silty soil, and reddened gravel that probably reflected the input of waste from iron working. Although the sediment was strongly affected by post-Roman biological reworking, some original dumped microfabrics remained. They included wood charcoal, probable alluvial silts with phytoliths (Macphail forthcoming a) and much charred organic matter, some perhaps originating from the alluvial material. Clays within the silts had been reddened. This appeared to be ash-residue debris.

Other residual inclusions within the sediment that reflected a domestic input were the abundant amounts of phosphatised bone and coprolitic material, including probable human coprolites (noted under ultra violet light). A rounded fragment of soil with a phosphatised halo was also found. At Deansway these were common and were interpreted as indicating the presence of coprolites from herbivores in the late Roman period. New studies by the writer of stabling floors at Butser Experimental Farm (Hampshire) have confirmed this. At Farrier Street there was only a trace of them, with most of the rubbish input being from domestic (and industrial) activity, rather than from agriculture.

Phases 5 to 7: Post-Roman and medieval

Generally speaking the microfabrics of samples 2D (junction of late Roman/post-Roman) and 2C (post-Roman) were comparable with the dark earth that occured at Deansway. It was highly biologically worked and contained many residual Roman materials (slag), including probable coprolitic remains. The last were ubiqitous, but seemed to decline in number upwards. Charcoal fragments were generally finer, and the soil was dark because of the biological fragmentation of charcoal (Courty *et al* 1989). Most of the reworking has been carried out by earthworms, with some minor, but abundant activity by Enchytraeids. Such biological fabrics are typical of the transformation of anthropogenic sediments into brown soils during the post-Roman period (Macphail forthcoming b), biological homogenisation penetrating deeply into the underlying Roman stratigraphy.

The presence of large stone-size material throughout this post-Roman context (samples 2D, 2C, 2D, 2B) may indicate that Roman levels may have been rather thicker than recognised in the field, and also that there may have been some physical mixing. The massive structure that developed as a post-depositional feature of the soil, along with intense contemporary biological reworking, obscured structural changes that may have been produced by an agricultural impact.

Some fine soil separations may give a hint that the soil was possibly cultivated. Certainly domestic waste (eg sample 2B) including ashes and alluvial silty soils (possibly used for floor construction) were being added (Macphail forthcoming a). This may have occurred in the medieval period as inferred from the pottery (12th to mid-13th century). Samples 2A and 3A also contained evidence of this kind of material being included.

Phase 8 to 9: Post-medieval

The effects of post-medieval formation on the soil appears to be recorded in sample 2A as prismatic (subsoil) structure development and as intact roots. As in the medieval period, manuring or waste dumping seems to have

raised the ground level, but the main processes were natural. The last probably reflected a general agricultural use of the area, as suggested from documentary sources (section 2).

6.5 Conclusions

In general the interpretation of the archaeological and documentary record was well-supported by the soil micromorphological analysis. In this area of late Roman Worcester deposits were primarily the result of debris accumulation from iron working and domestic (midden) waste. There was only a trace of the herbivore stabling activity that characterised Deansway in the Roman period. Post-Roman pedological and biological activity transformed the upper part of the Roman deposits into a brown soil (dark earth), which was possibly manured and cultivated during the 12th to mid-13th centuries. There was no evidence of late Saxon occupation that at Deansway caused major contamination of the post-Roman soil by cess. Dumping and waste disposal/manuring probably continued into the post-medieval period, during which time the area was used for gardens and orchards.

7 Botanical remains

C de Rouffignac

7.1 Introduction

A total of 35 environmental samples were collected from the excavations. These included samples from Roman contexts, post-Roman dark earths and post-medieval cultivation soils. Work on environmental remains from sites with Roman industrial activity, particularly ironworking, is scarce in the literature (Burnham and Wacher 1990, 203-34). There is rather more information on crop processing and storage, chiefly the construction and use of corn driers and granaries.

The Roman material could be compared to previous work in Worcester. As a result of an extensive sampling programme at Deansway, plentiful environmental remains from all periods were obtained (Moffett forthcoming); the evidence consisted mainly of charred spelt seeds and chaff, probably from crops that were produced and consumed locally, as well as seeds of cornfield weeds, and occasional food remains such as hazel (*Corylus avellana*) nut fragments. The plant remains from Roman deposits from Sidbury were few in number and little could be determined from the charred seeds (de Rouffignac forthcoming).

7.2 Aims

It was anticipated that examination of soil samples from the site would produce environmental remains in sufficient quantities to enable identification of charred plant remains; determine which stage of crop processing the charred remains were from; and to enable examination of use of cereal remains for fuel.

7.3 Method

The samples taken from various pits and layers during the course of the 1989 evaluation were recorded, then sieved using a 500μm sieve for the flot, and a 1mm sieve for the residue. Once dry, the samples were scanned for the presence or absence of all environmental remains. For the 1990 excavation the small samples (<5l) were sieved by hand, whilst the larger samples (<15l) were sieved using a Siraf-type flotation system. The mesh sizes used for collection were 5mm and 1mm for the residues and 500μm for the flots.

The samples from the post-Roman dark earth-type soils were sieved at 5mm with no flot collection. Previous experience of dark earths at Deansway showed that the preservation of charred remains from such deposits was generally poor and therefore no attempt was made to collect them.

All residues were sorted to recover artefacts

and environmental remains and were then further examined for hammerscale by passing a magnet over the surface of the residue. The size of sample and the amount sorted are detailed in the site archive.

The flots from all the samples were examined using an EMT-1 low power microscope to enable recovery of all charred plant remains. The seeds were identified as far as possible using the Archaeology Section comparative collection, a seed identification manual (Berggren 1981) and an illustrated site report (Griffin 1988). Comparative descriptions of charred cereal seeds and chaff were obtained (Jacomet 1987), as were habitat descriptions and common names of plants were obtained (Blamey *et al* 1987).

For flots where a considerable quantity of charred remains were recovered, the chaff to cereal seed and cereal seed to weed seed ratios were calculated to aid in identification of the processing stage at which the crop was burnt (Hillman 1981).

A decision was made not to sieve the late medieval and post-medieval samples collected from cultivation soils and the Phase 8 ditch (CG 47). This was due to pressures of time and the probable contamination problems due to piling and later disturbance.

7.4 Results

The samples from the dark earth-type soils and the Roman features were all examined. The numbers of plant remains recovered from the samples collected from the excavation are given in Appendix 3. Appendix 4 contains notes on the habitats and common names of the plant species. Appendix 5 contains comments on all the samples examined.

The plant remains were well preserved and very plentiful from some features. Both charred and uncharred seeds were recovered. The latter type of preservation is difficult to explain as the seeds were not mineralised or waterlogged, but have the appearance of modern seeds without their starchy contents.

Most of the samples were well-sealed and had no evidence of later contaminants. Two samples (Phase 2, CG 9 and 10) contained uncharred seeds of elder (*Sambucus nigra*) which were thought to be contaminants as a result of the piling operation. However, recent work at Deansway demonstrated that apparently intrusive uncharred seeds were of early medieval origin (Moffett forthcoming). Similar uncharred seeds have been encountered at other medieval sites in the region (de Rouffignac 1991a, b), so such seeds are not an isolated phenomenon in Worcester. Uncharred contemporary seeds from Roman deposits have not been confirmed to date, and therefore the evidence from Farrier Street must be treated with caution.

7.5 Discussion

Character of the assemblage

Charred plant remains derive from crops and waste products which have been exposed to fire, either deliberately or accidentally. *Triticum spelta* is a non free-threshing wheat, and it has to be parched to separate the seeds from the spikelets. Therefore the charred remains could represent either waste material from threshing used as fuel in corn driers or furnaces, or accidental burning of a crop being parched.

The weed seed assemblages associated with the cereal remains were fairly low in numbers, and not very diverse. All were species commonly associated with cultivated crops and there were no species associated with heavy clay soils as found at Deansway.

Phases 2 to 3: Earlier Roman

The greatest quantity of charred seeds and chaff came from two Phase 3 pits (CG 7, 12). The majority of the cereal remains were *Triticum spelta*, the most commonly cultivated Roman wheat. The assemblages from the various pits were very similar in

composition. Many of the cereal seeds from the samples were misshapen and small, probably originating from the ends of the ears of the crop, and the chaff from the samples was also mainly from the ears.

The ratios of chaff to cereal seeds were from Phase 3 samples were indicative of waste from a part-processed crop. As chaff is a very bulky material, it was not transported great distances for disposal. The chaff could have been used to fuel corn driers, together with charcoal and wood. The features containing the charred remains in Phase 2 and 3 represented residual waste from the firing process, and so it likely that the processing of cereal crops was being carried out in the vicinity of the pits. Ovens or corn driers were probably situated nearby, but were not encountered in the excavated areas.

Phase 4: Later Roman

The charred assemblages from Phase 4 samples were similar in composition and it is likely that they derived from the dumping of fuel waste rather than an accidental burning event. Crop processing waste was a possible starter fuel for ironworking as it burns rapidly and at a high temperature. There were also a small number of cereal seeds in Phase 4 samples that had become distorted due to exposure to high temperatures. The presence of large quantities of charcoal was also indicative of fuel waste rather than merely the remains of crop processing debris.

Only one straw fragment was recovered (CG 25). Straw would have been utilised for fodder, bedding and thatch rather than being used for fuel. A further sample (CG 27) contained a single charred seed of bedstraw (*Galium* sp). This genus produces plants which tend to germinate in the autumn and therefore are common weeds of autumn-sown crops (Jones 1978). However a single seed is very difficult to associate with a crop.

8 Animal bones

S Pinter-Bellows

8.1 Introduction

The excavation produced a total of 590 bones and fragments. The following species were identified: horse (*Equus caballus*), cow (*Bos taurus*), pig (*Sus scrofa*), sheep (*Ovis aries*), dog (*Canis familiaris*), cat (*Felis domestica*), human (*Homo sapiens*), domestic fowl (*Gallus* sp) and frog (*Rana temporaria*).

Bones which could not be identified to species were assigned to higher order categories: sheep/goat, small artiodactyl (sheep-, roe deer- or pig-sized), large artiodactyl (cow- or red deer-sized), small mammal (cat- or dog-sized) and large mammal (cow-, red deer-, horse-sized). Although some ribs and vertebrae could be identified to species, for quantitative purposes all ribs and vertebrae (except for the axis, atlas, and sacrum) are included in the small artiodactyl and large mammal categories. All the material was recorded following Jones *et al* (1979) and measurements follow von den Driesch (1976). Archive material included data without statistical significance and was retained on paper and floppy disk.

The material was obtained by hand collection from the evaluation trenches and the small area excavation. The contexts were divided into three broad phase groups for study: Roman, Phases 2-4 (mainly Phase 4); medieval, Phases 5-7 (mainly Phase 6); post-medieval, Phases 8-9 (mainly Phase 8).

8.2 Analysis

The distribution of animal bones within Phase is shown in Table 1.

Period	Phase	Count	Context group
Roman	2	1	7
	3	6	12
	4	110	22, 19, 50, 16, 34, 27, 25, 30, 26, 10, 13
Medieval	5	18	40
	6	34	40
Post-med	8	386	45, 47, 48
	9	42	48 (and unstratified)

Table 1: Distribution of bones within phases

There had been disturbances in the soil including the modern construction of pilings. The pottery evidence showed there was contamination and residuality; this was especially evident in Phase 8, which was the stratigraphic unit associated with the majority of the bones. The question then arose as to whether the bones from Phase 8 were post-medieval or actually Roman. Bones, aside from radiocarbon dating, are almost impossible to date in themselves unless it is possible to identify species introduced into this island after a specific point in time.

However, there did seem to be a different pattern of preservation associated with the various phases which did not appear to have any relation to context type. There was much more abrasion and erosion of bones in Roman context groups than in medieval or post-medieval context groups. All of the small bone assemblages from Phases 2 and 3 were severely eroded with the outer surface of the bone exfoliated off. In Phase 4, 36% of the bones showed this severe erosion and another 40% showed signs of abrasion with a rounding of the edges of the bones. The small group of bones from medieval phases showed no erosion or abrasion. Less than half a percentage of the bones in Phase 8 displayed erosion and only slightly over 2% showed abrasion. The vast majority of these bones had sharp edges and the glossy appearance of "fresh" bone. Phase 9 had 2% eroded bone and 4% abraded bone.

An explanation for the differnce between the pottery evidence and the appearance of the bone could be that there are just so few bones in the Roman layers that there were few to contaminate other layers. The ratio of bone to pottery in Roman phases was 1:6.1 while for the post-medieval phases it was 1:0.2.

The species and the number of fragments for each phase grouping are listed in Appendix 6. The number of bones from each of these periods was extremely small which did not allow many conclusions to be drawn about species preference, anatomical represenation, butchery patterns, age, animal husbandry, or the market economy on the site. However, throughout the urban areas of the Midlands there is a paucity of excavated bones and there is a need for preliminary reports being disseminated in order to start the more meaningful poolings of data from different sites.

8.3 Discussion

Phases 2 to 4: Roman

Of the 117 bones and fragments identified from the Roman phases, 49 (42%) were totally unidentifiable. Thirty-eight bones (37%), both identifiable and unidentifiable, were very eroded and 44 (37%) had rounded edges and abraded surface. Cattle bones outnumbered those of all the other animals; this was expected as beef was usually the main meat supply during the Roman period (King 1984). It was noted that the distribution of anatomical elements from the main animal species came from all portions of the

carcass (Appendix 7). This can be interpreted as butchery taking place on the site, or the assemblage containing a mixture of domestic and industrial waste. There were a couple of fragments of medium-sized dogs. None of the bones of the other animals showed signs of being gnawed. Either the refuse was being rapidly covered or this lack of bones with gnaw marks is the result of the poor preservation.

There were also two human bones: the proximal ilium portion of an innominate for an unsexed sub-adult aged between 14 and 19 years, and the mid-section of a rib. The cattle metacarpal from these phases which could be measured shows an animal of average size.

Phases 5 to 7: Medieval

Of the 52 bones and fragments identified from medieval phases, 17 (33%) were totally unidentifiable. The preservation of bones from this phase was better with no bones showing erosion and abrasion. Cattle bones again outnumbered those of all the other animals. At least one middle-sized dog was also represented.

Phases 8 to 9: Post-medieval

Of the 428 bones and fragments identified from the post-medieval phase, 133 (31%) were totally unidentifiable. The preservation of bones was quite good with only three (0.07%) of the bones being eroded and eight (2%) being abraded; there was also one bone which had been charred. Cattle bones were the most numerous with sheep/goat bones second and pig third. At least one adult domestic fowl was represented. There were bones from two horses, one less than three years of age and one less than five. There was also at least one adult cat and one adult dog. The measurement from the dog showing it to be small-sized. The frog fragment was probably a fortuitous find.

The distribution of anatomical elements from the main animal species came from all portions of the carcass. In one deposit (CG 48) were the ribs and vertebrae for one cattle. The butchery evidence showed the refuse to be a mixture of domestic and industrial waste. Most of the domestic butchery is seen in the cattle bones, which is often the case as these bones are much larger, while sheep and pigs can simply be disarticulated. Two cattle innominates have saw marks; in one the ilium (the area where the sirloin comes from) was sawn vetically and in the other the medial section of the acetabulum (the areas of the rump roast) was sawn. There was a cattle distal femur and patella whch have both been chopped (the area of the hindshank). There was also a large mammal and small artiodactyl rib which has been chopped in the mid-section.

The two industrial butchery marks are both on cattle bones: one was a horncore which had been chopped distally where it attaches to the skull, the unit which would be given to an individual working with horn. The second bone was the proximal end of a metatarsal which had been sawn off 20mm below the articular end. The mid-shaft of this bone is dense and durable and was used for the handles of knifes and other articles.

There were four pathologies. There was a cattle acetabulum which showed eburnation and grooving on the medial section. This shows that the cartilage has been worn away by the movement of the hip joint, resulting in the bone wearing against bone. This type of injury suggests the animal was used for draught purposes. There is ongoing discussion whether the injury is caused by the stress of the activity itself or trauma from the constant thumps on the animals' limbs on the hard unyielding surface of cobbled streets and metalled roads (Baker and Brothwell 1980). There was a cattle central tarsal with osteophytes ringing the distal articular surface, probably the result of

stress or a traumatic occurrence to the joint. There was a cattle tibia belonging to an immature individual in which the distal half of the anterior surface had a thin covering of unhealed periostitis (a non-specific inflammatory infection affecting the outer layer of the bone, the periostium). As there were no other bones which can be identified as coming from this individual it was impossible to say whether the periostitis was the result of localized infection or a more generalised one. A femur from a sheep had osteophytes around the edge of the distal condyles, this again could result from stress or trauma to the joint.

8.5 Conclusions

The small collection of bones examined here has led to more questions than they have answered. In all three phase groups cattle bones were the most numerous, which conformed to expectations of culture and urban diet. However there were not enough bones to be sure of the changing importance of pig and sheep between the Roman and the medieval and post-medieval periods. Excavation of other Roman areas are needed to examine the reason for the non-meat bearing elements; was there a bone industry in the same area as the iron working or did they perform their own butchery instead of procuring meat from city butchers? In the future perhaps questions of changes in breeds throughout this time period and socio-economic questions could also be answered.

9 The pottery

V A Buteux

9.1 Method

Pottery from both the evaluation and the excavation was examined by context and each context assigned a *terminus post quem*. Abraded sherds were noted and an assessment made of the amount of residual material present. The pottery was divided by fabric and form using the HWCC fabric and form type series held at the Archaeology Section. The presence and type of decoration was also noted for each fabric. Detailed descriptions of fabrics referred to in the text can be found in Appendix 9.

The pottery was quantified by weight and count. A total of 771 sherds (11,395g) were recovered of which 718 (10,046g) were from Phases 1 to 9, the rest being unstratified. Due to the absence of independent dating evidence for the site the pottery was used to provide a chronology. Recent excavations in Worcester, at Sidbury (Morris 1980; Evans forthcoming a) and Deansway (Evans forthcoming a; Buteux forthcoming) have produced large ceramic assemblages but, whilst the range, form and relative sequence are well known, the disturbed nature of the urban deposits means that the dating of fabrics and forms has depended largely on the date assigned to them elsewhere.

9.2. Residual and intrusive material

Figure 7 represents an attempt to estimate the quantity of contempory and residual pottery in each phase. Such a quantification of residual material can only be an estimate based on the accepted date ranges for each fabric, where known (Brooks 1987, 120-5). Because of the small size of the assemblage from Farrier Street the discussion of fabrics and forms includes material known to be residual in later contexts. Some fabrics, for instance, only occured in unstratified contexts and 60% by count (71% by weight) of all Roman pottery from the site was recovered from non-Roman contexts. A small amount of intrusive medieval material was present in Roman levels (Fig 8), probably due to disturbance by piling.

9.3. The Roman pottery (Fig 9)

A total of 548 sherds weighing 7,827g were recovered from Phases 1-9 (31 sherds weighing 965g were recovered from unstratified contexts).

Severn Valley wares (Fabrics 12, 12.1, 12.2 and 12.3)

As is usual in this region the assemblage was dominated by Severn Valley Wares (50% by count and 54% by weight of the Roman pottery). Fabric 12 was the most important fabric in this group (43% by count and 50% by weight). The forms present were, in order of frequency, wide mouthed jars, bowls, tankards, narrow mouthed jars and one flagon. These types are well known in the area (Webster 1976; Waters 1976) and have been found before in Worcester (Evans forthcoming a). Fragments of two small bowls were recovered of a type not previously recorded from Worcester (Fig 12). Whilst not all the forms can be dated closely, the majority fit into the second half of the Roman period and more probably the 3rd to 4th centuries. All the form sherds apart from one 1st century tankard were found in contexts dating from Phase 4 or later. A few form sherds dated to the 1st and 2nd centuries on typological grounds were present (Webster 1976, fig 7) but these were all residual in later contexts.

Fabric 12.2 was present only in small proportions and first occurs in Phase 4. The only form sherds present were from a large storage jar. It has been suggested that this fabric is the predominant Severn Valley ware varient in the 1st and 2nd centuries (Webster 1976; Evans forthcoming a; Evans forthcoming b). Evidence from the other sites in the northern suburb confirms this. Figure 12 illustrates the predominance of fabric 12.2 over fabric 12 at Rea's Timber Yard (1st to 2nd centuries) as opposed to Love's Grove (3rd to 4th centuries). The relative paucity of fabric 12.2 at Farrier Street, therefore, points to a lack of activity on the site in the early Roman period.

Only twelve sherds of the reduced Severn Valley wares (fabrics 12.1 and 12.3) were recovered, all from the rusticated jar forms, common in these fabrics at Deansway and Sidbury and dated to the 1st to 2nd centuries (Evans forthcoming a; Evans forthcoming b). The first occurrence of this vessel type on Farrier Street was in Phase 2.

Grey wares (fabrics 14 and 15)

Fine and coarse sand-tempered grey wares comprised 4% by count and 5% by weight of the Roman assemblage. The finer fabric (fabric 14) occured from Phase 2 onwards and the vessels found included small rusticated jars very similar to those produced in the reduced Severn Valley Wares, as well as bowls of types also noted at Deansway and Sidbury (Evans forthcoming a; Evans forthcoming b). Sherds in the coarser ware (fabric 15), however, first appeared in Phase 4 and included copies of plain rimmed black-burnished dishes.

Malvernian wares (fabrics 3 and 19)

Sherds of handmade Malvernian pottery (fabric 3) were found from Phase 2 onwards in small quantities (6% of the Roman assemblage by count and 7% by weight). Vessel types in this fabric included the lids and tubby cooking pots well known from other sites in the region (Peacock 1968), although the majority of body sherds appeared to be from larger storage/cooking jars. Wheelmade vessels from the same area (fabric 19, 4% by count and 2% by weight), did not occur until Phase 4 and the vessel types, whilst including storage jars, also featured vessels obviously influenced by black burnished bowls. This pattern was similar to that observed at Sidbury (Evans forthcoming a) where native-type vessels were more common up to and including

the 2nd century, and the black-burnished influenced vessels became more common in the later 3rd century.

Black-burnished ware (fabric 22)

This ware made up a considerably larger proportion of the Roman assemblage (21% of the Roman assemblage by count and 11% by weight) than that observed at Sidbury or Deansway (Evans forthcoming a; Evans forthcoming b) and one which probably reflected the relatively small proportion of 1st to 2nd century pottery from this site. Only two sherds of fabric 22 were recovered from Phase 3, including a beaded-rim bowl of early 3rd century type (Gillam 1976), the rest being found in Phase 4 or later contexts.

The most common form in this ware was the bowl, usually of the plain rimmed type which cannot be closely dated. Second century types (Gillam 1976, forms 36, 41 and 69) did occur as well as the slightly more common 3rd and 4th century types (Gillam 1976, forms 44 and 69).

Two sherds of 3rd century cooking pot were recovered but more common were the later 3rd and 4th century versions, and the majority of decorated sherds were of obtuse-angled lattice considered to be an indicator of a late 3rd to 4th century date (Gillam 1976). The assemblage also included one sherd of miniature cooking pot/beaker (Gillam 1976, form 18) and a fragment of a 2nd century beaker (Gillam 1976, form 129).

Other non-regional wares

As is the norm on Roman sites in Worcester a small amount of pottery produced in Oxfordshire was recovered (thirteen sherds). This included abraded fragments of a bowl and beaker of red/brown colour-coated ware (fabric 29), and body sherds of white colour-coated vessels (fabric 30), all dated to the 3rd and 4th centuries (Young 1977). Sherds from 2nd to 3rd century Oxfordshire white-ware *mortaria* were also found although not in Roman contexts.

The assemblage also contained three sherds of 3rd and 4th century *mortaria* from the kilns at Mancetter/Hartshill (fabric 32) and 15 body sherds of other white wares of unidentified source (fabric 41).

Imported wares

The small size of the assemblage precluded any meaningful discussion of the imported wares but the types present and their relative quantities was similar to that observed on Deansway and Sidbury (Evans forthcoming a; Evans forthcoming b). Samian (fabric 43) made up 6% by count and 4% by weight of the Roman assemblage. Single examples of plain cups (forms 27 and 33), bowls (forms 38 and 18/31R) and *mortarium* (form 45) were recovered. Only one decorated sherd was found and one sherd mended with a lead rivet. One body sherd of a 1st to 2nd century Rhenish Ware beaker (fabric 44) was recovered from an unstratified context.

Nine sherds of Dressel 20 *amphora* (fabric 42.1) were recovered. This vessel type, principally used for the transportation of olive oil (Peacock and Williams 1986, 136) was also found at Sidbury and Deansway. The single rim form recovered from Farrier Street dated to the end of the 1st century (*ibid*) although the fabric was first found in Phase 4 contexts.

9.4 The medieval pottery (Fig 10)

A total of 52 sherds weighing 820g were recovered from Phases 1 to 9 (one sherd weighing 2g from an unstratified context).

Local sandy wares (fabrics 55 and 64.1)

Small quantities of unglazed cooking pot and glazed decorated tripod pitcher dating to the 12th and 13th centuries were found from Phase 6 on and comprised 73% of the medieval assemblage by count (60% by weight). These wares are by far the most common on medieval sites in Worcester (Morris 1980; Buteux forthcoming) and are likely to be the products of local kilns in and around the city (Hurst 1990).

White wares (fabrics 64.2 and 64.3)

One sherd of a glazed white ware jug of a type known from 13th to 15th century contexts from Deansway (Buteux forthcoming) and two base sherds fronm a chaffing dish (Fig 13) in a similar fabric were recovered from 16th and 17th century layers. Such white wares make up a small but significant part of most medieval assemblages from the town. Although often difficult to source, white wares from Worcester are known to have come from Ham Green (near Bristol), Sneyd Green (Staffordshire) and probably a number of other as yet unlocated sources (Buteux forthcoming).

Southern white ware (fabric 70)

Four sherds were recovered of this 15th century ware probably from the lobed cups which in Worcester are the most common vessel type in this fabric (Buteux forthcoming).

Oxidised glazed Malvernian ware (fabric 69)

This fabric is found in assemblages in Worcester from the 14th century to the end of the 17th century by which time it is the dominant ware in the town (Buteux forthcoming) and the region (Vince 1977). Farrier Street has provided no examples of the 14th and 15th century jugs seen at Sidbury and Deansway and the earliest forms were a chaffing dish and cups influenced by the Cistercian and Tudor Green vessels of the 15th century. These vessel types comprised 10% by count (11% by weight) of the medieval (pre mid-16th century) assemblage. However the majority of the vessels in this fabric could be dated to the late 16th and 17th centuries and included the cisterns and shallow bowls typical of this fabric (*ibid*).

9.5 The post-medieval pottery (Fig 10)

A total of 119 sherds weighing 1399g were recovered from Phases 1 to 9 (21 sherds weighing 382g from unstratified contexts).

The majority of sherds in this group dated to the late 16th and 17th centuries (112 sherds weighing 1307g). This pottery consisted almost entirely of the later Malvernian (fabric 69) storage/cooking vessels discussed in Section 9.4, and Blackware tygs (fabric 78). The Malvernian wares comprised 44% of the assemblage by count and 59% by weight, and the thin-sided tygs represented 36% by count and 14% by weight. The rest of the pottery consisted of small quantities of tin-glazed wares (fabric 82), buff black-glazed earthernwares (fabric 91), and 19th and 20th century "china". Sherds of 17th-18th century north Devon gravel-tempered ware (fabric 75), midlands yellow ware (fabric 77) and stoneware (fabric 81) were recovered from unstratified contexts.

9.6 Discussion

Phase 2: 1st to 2nd century

Whilst the evidence recovered from Phase 2 contexts was minimal (eleven sherds), material dating to the 1st and 2nd centuries was present in later contexts. Sherds from forms which can be dated to this period comprised 10-15% by count of the total number of Roman form sherds from the site and, while many factors affect this figure, it can be used as a

rough estimate of the amount of material originally present.

The only form sherds present in 1st and 2nd century contexts were rims from a tubby cooking pot (fabric 3) and a rusticated jar (fabric 12.1) along with an unidentified samian form. Other 1st to 2nd century vessel types recovered included storage, cooking and table wares from regional and continental sources (Fig 9). Both the vessels and fabrics were similar to those found at other sites in Worcester in this period and the small size of the pottery assemblage and its abraded nature suggested that it may derive from waste spread on fields or gardens close to an area of occupation. The range of fabrics and vessel types were similar to those recovered from the 1st to 2nd century deposits at Rea's Timber Yard (HWCM 9550).

Phase 3: 2nd to 3rd century

By the mid-2nd century the structural evidence indicated to an increase in activity in the area of the site with a cobbled road and associated features. During this phase the site was in agricultural use. Only sixteen sherds were recovered from 2nd to 3rd century contexts and they were all small and abraded. The only form sherds from these contexts were the rim of a straight-sided tankard (fabric 12), usually dated to the 1st to 2nd centuries and therefore probably residual, and the rim of a black burnished bowl (fabric 22).

Form sherds tentatively dated to the 2nd to 3rd centuries were found in later contexts, and it would appear that 20-26% by count of all Roman form sherds were of this date. These were almost entirely storage/cooking pots and bowls although mortaria from a variety of sources were also present in small quantities (Fig 9).

Phase 4: 3rd to 4th century

The pottery recovered from this phase represented 89% by count and 90% by weight of the assemblage from Roman contexts (41% and 28% of the total Roman assemblage) and reflected the enormous increase in activity on the site during this period. The majority of vessels, as in Phase 3, were cooking pots/jars and bowls, although mortaria and drinking vessels were present in small quantities. The amount of 3rd to 4th century pottery recovered from this phase would imply that it was used and discarded by those involved in the agricultural and industrial activities occuring on site, rather than deriving from domestic waste elswhere in the town. The relatively restricted range of vessel types contemporary with this phase was noticable and was also observed at the 3rd to 4th century site at Love's Grove (HWCM 9550).

Phase 5: 5th to 11th century

No pottery dating to this period was recovered from the site and the 5th to 11th centuries appeared to be a period of abandonment. Despite evidence of activity in the town during the early and middle Saxon period (Mundy and Dalwood forthcoming), pottery of this date has never been found in Worcester. However, the late Saxon period was represented at Sidbury and Deansway by a small but important assemblage of vessels manufactured in or around Stafford, Stamford, St Neot's and the Cotswolds (Buteux forthcoming; Morris 1980). The most northerly find of late Saxon/Norman pottery from Worcester so far is one sherd (fabric 57) from The Butts (Buteux 1992).

Phase 6: 12th to mid-13th century

A small amount of pottery (eight sherds), mainly sherds from local cooking pots (fabric 55) and tripod pitchers (fabric 64.1), was found trampled into deposits which had been developing from the late Roman period. However, the majority of

pottery from contexts in this phase was Roman (Figs 7 and 8), and at this period the site was probably in horticultural use. The absence of cooking pots made in Malvern (fabric 56) usually found in Worcester in late 12th to 13th centuries is noteworthy but may be due to the small size of the sample.

Phase 7: mid-13th to mid-16th century

The assemblage contained only twelve sherds from vessels dating on typological grounds to the mid-13th century to the mid-15th century and these were all found in later contexts. This was in contrast to the assemblages from sites within the city walls which contained huge numbers of cooking pots and jugs from this period (Buteux forthcoming). Later 15th century cups in Southern White Ware (fabric 70) and oxidised Malvernian wares (fabric 69) occured in small quantities as did early 16th century chaffing dishes (fabrics 64.3 and 69) and cisterns (fabric 69).

Phase 8: Mid-16th to 17th century

Pottery from 16th and 17th century contexts comprised 39% of the total pottery assemblage by count and 40% by weight but the majority of this was residual Roman material disturbed by quarrying (Fig 8). The contemporary pottery was in two main groups, black-glazed drinking vessels (fabric 78) and oxidised Malvernian bowls and cisterns (fabric 69). At this period wares produced by potters in the Malvern area dominated the regional markets (Vince 1977) and the proportion of fabric 69 at Farrier Street reflected the patterns observed at Deansway and Sidbury (Buteux forthcoming; Morris 1980).

Phase 9: 18th to 20th century

Due to the excavation methods only a small amount of pottery from the modern period was recovered.

9.7 Conclusions

Despite its small size the fabrics and forms present in the pottery assemblage from Farrier Street broadly reflected trends in pottery supplies to Worcester observed at larger excavations within the city walls. However, activity was sporadic and large gaps occured in the pottery sequence. The pottery evidence indicated that the site lay outside the core of the Roman small town in the 1st and 2nd centuries. Pottery of 2nd century date and ceramic roof tile from the evaluation at Rea's Timber Yard suggested another settlement focus immediately to the north of Worcester in the 2nd century and Farrier Street may have been agricultural land between two settlement areas during this period.

It is clear that in the late Roman period the northern suburb was economically important and stretched for some distance from what has previously been considered to be the core of the town. The pottery assemblages of this date from Farrier Street but particularly from Love's Grove (HWCM 9552) are more than usually dominated by Severn Valley wares, and a show a very limited range of forms (mainly jars and bowls). There is no evidence of the pottery being used for industrial purposes but it is possible that these assemblages were not truely "domestic" and reflect the vessels needed to contain or cook food consumed during the day by those working on the site. Alternatively the assemblage could reflect the status of those living in the area.

In the Saxon period the area appears to have been almost abandoned and despite the fact that the site was within the suburb of St Nicholas from 11th/12th century at least, the medieval period is virtually unrepresented on the site.

10 Medieval floor tiles

H A White

10.1 Introduction

A total of ten fragments of medieval floor tile were recovered from the excavation, forming a mixed residual group, of varying quality and manufacture. In the current state of floor tile research in Worcestershire, little can be said about these or their dating. All the floor tiles are catalogued in Appendix 10.

10.2 Discussion

There was one two-coloured tile fragment (cat no 1), which tend to be the most diagnostic type for interpretation and dating. This *fleur-de-lis* tile with a distinctive honey-coloured glaze is similar to a small number of tiles from Deansway that carry coats of arms (White forthcoming), although in this case the design is not so deeply imprinted. It probably dates from the 14th century.

The two joining fragments of plain tiles (cat no 7) are also of interest. Tiles in the 125mm square range are the commonest type throughout Worcestershire, and several sites have produced small mosaic tiles produced by cutting down these tiles. Excavations at Evesham Abbey produced several sizes and shapes of mosaic pieces, including this one (White 1990a), as have the recent excavations at St Augustine's Church, Dodderhill (White 1991). There were however no close indications of date for either of these collections.

Cut tiles are also reported from Worcester Cathedral (Keen 1978) and from the tile waster dump at Silver Street (Brown and White 1990). These are difficult to date and may represent a fairly long decorative tradition. They may be associated with the production of 120mm tiles with nine small letters stamped diagonally on them. These are still a relatively rare find in the county, individual examples having only been reported from Worcester Cathedral (Eames 1980), Claines Church (White 1990b), and Deansway (White forthcoming), although it must be mentioned that cut-down examples have not been reported. None of these came from a medieval context, but they may be 14th century.

The mosaic fragments from Farrier Street are unworn and may have been discarded near the point of production. A possible waster (cat no 9) supports this suggestion. A number of tile kilns are known from documentary sources to have lain outside Worcester city walls in Claines parish in the medieval period (P Hughes pers comm; White 1990b). Without a fuller study being undertaken of kiln sites in the Worcester area, together with fabric analysis, it is not possible to assign an exact place of production, other than to suggest that these tiles may have been made in or near Worcester.

11 Artefacts of ceramic, metal, stone, bone and glass

V A Buteux

11.1 Possible clay oven

One fragment (68g) of a slab-built ceramic vessel in fabric 3 was recovered from a Phase 6 context (CG 40). Similar objects have been found at Sidbury and Deansway (Evans forthcoming a; forthcoming b) and elswhere in the county (James Dinn and Derek Hurst pers comm). The earliest examples date from the 3rd or 4th centuries and suggestions for their function have ranged from portable bread ovens to bee-hives.

11.2 Kiln furniture

One kiln spacer was recovered from an 18th to 20th century context. Its form and

fabric would indicate that it originated from Worcester porcelain works. Debris from the works can be found over large areas of the city and beyond.

11.3 Ceramic building material

The tile and brick were sorted by fabric and form and quantified by count and weight for each context. The fabric descriptions can be found in Appendix 11. A total of 753 fragments weighing 60.5kg were recovered from stratified contexts.

Phase	count	weight	%count	%weight
2	0	0	0	0
3	1	4	<0.5	<0.5
4	11	978	1.5	1.5
5	0	0	0	0
6	2	28	<0.5	<0.5
7	0	0	0	0
8	704	55722	93	92
9	35	3788	5	6

Table 2: Quantity of ceramic building material by phase

Fabric	count	weight	%count	%weight
2a	39	3202	4	4
2b	192	9936	25.5	16.5
2c	336	32354	44.5	53
2d	160	13259	21	22
2e	1	132	<0.5	<0.5
3	16	1288	2	2
10	18	1169	2.5	2

Table 3: Quantity of ceramic building material by fabric (all phases)

Type	count	weight
Tegula	3	1034
Unident Roman	17	1080
Ridge	13	960
Peg	11	730
Nibbed	27	3734
Pegged & nibbed	3	490
Flat roof tile	638	47955
Brick	20	4136
Unident b/t	21	401

Table 4: Quantity of ceramic building material by form type (all phases)

Roman ceramic building material

Only a small amount of Roman ceramic building material was recovered from the site (20 fragments weighing 1,114g). All the identifiable fragments were from *tegula*, none of which were complete. The most common fabric was ceramic building material fabric 2a although small amounts of 2d and one fragment of 2e were also recovered. Whilst the very small size of this Roman ceramic building material assemblage makes any comparison of fabrics with other sites in Worcester open to mis-interpretation, the pattern seen at Farrier Street reflected that observed at Sidbury (Lentowicz forthcoming), but not at Deansway where the most common Roman fabric was 2d (Cleverley forthcoming).

The scarcity of Roman ceramic building material from this site mirrored that at Deansway where Roman contexts from four large excavations produced only 716 fragments weighing 44.5kg (Cleverley forthcoming). The much smaller Sidbury excavations produced 1,355 fragments of ceramic building material weighing 96.5kg (Lentowicz forthcoming).

A comparison of the ratio of ceramic building material to pottery found at Farrier Street and the other sites noth of the city wall would seem to confirm the evidence of the pottery in pointing to a settlement focus immediately to the north of Worcester.

Site	Count ratio	Weight ratio	Total count	Total weight
Farrier Street	1:29	1:8	20	1114g
Love's Grove	1:28	1:13	35	1328
Rea's Timber Yard	1:11	1:3	11	912g

Table 5: ratios of Roman ceramic building material to pottery by count and weight from sites in Worcester

Medieval and later ceramic building material

No complete examples of medieval tile or brick were recovered. The majority of ceramic building material from post-Roman contexts was flat roof tile of 16th to 17th century date. A range of fabrics were found including Malvernian (ceramic building material fabric 3) but the majority of roof tiles were in fabrics 2b, 2c and 2d. All tiles with holes for pegs or nails were in fabric 2b, pegged and nibbed tiles were found in fabrics 2b and 2c, and nibbed tiles in fabrics 2b, 2c and 2d. Tiles in fabrics 2d and 2c were generally thicker (>20mm) than tiles in 2b (15mm).

The majority of the tiles were unglazed, although the more complete examples were often glazed on the sanded side, bottom half only. Peg/nail holes were both square and round but the tiles were not always pierced right through. This may indicate that the tiles were hung on pegs/nails already attached to the roof to ensure regular spacing (L Fagan pers comm) or that the tiler used the peg/nail to complete the hole during tiling. Three tiles had stamps (not illustrated).

Very few ridge tiles were found but eleven out of fourteen were in fabric 3. These Malvernian tiles were glazed and identical to those found at Deansway (Fagan forthcoming). The presence of glazed Malvernian ridge tiles used alongside presumably more local sand-tempered tiles has been noted in Worcester before (Morris 1980, 228). It also occured at Droitwich (Hurst forthcoming) and Hereford (Vince 1985).

11.4 Burnt clay

A total of 50 fragments of burnt clay weighing 2.1kg were recovered from stratified contexts on the site. Of these six (392g) were possibly fragments of a Roman loom weight or weights. Fragments of this type occured in Phases 3, 4 and 6. Another group of burnt clay (eight fragments, 1,276g) found from Phase 4 onwards are

completely or partially vitrified and may be furnace material.

11.5 Clay pipes

Only eleven fragments of clay pipe (56g) were recovered. Two bowls (unstratified) were Broseley types 2a and 2b dated to 1670-1680 (Oswald 1975). The only other bowl (CG 42) came from a Broseley type 4 pipe (1690-1720) and was stamped "IH" on the base. This could refer to one of a number of pipe makers operating in Broseley from the 1680s to the 1740s (*ibid*).

11.6 Metal objects (Appendix 12)

All iron objects were x-rayed (the plates are retained in the archive) and copper alloy and silver objects were cleaned under the supervision of Dr G Morgan (University of Leicester). The iron objects were not cleaned. All objects are catalogued in Appendix 12 (none are illustrated).

Iron objects

A total of 117 iron objects or fragments of objects were recovered. The majority of these (104) were of Roman date and consisted almost entirely of nails and hobnails. Of the 50 hobnails recovered, 49 came from one Phase 4 posthole (CG 31) and must surely represent the remains of a boot similar to those recovered from the 4th century graves on Deansway (Crummy forthcoming). Iron work was first recovered from 2nd to 3rd century contexts although the bulk of the material came from later Roman deposits or was residual in medieval layers.

Copper alloy objects

Only five copper alloy objects were recovered of Roman date. These included a small fitting and the remains of two pins. Such personal objects are almost unknown from sites in the northern part of the city although they have been found in greater numbers at Sidbury (Darlington and Evans forthcoming).

A cast cauldron foot identical to that recovered from Deansway (Crummy forthcoming) and possibly produced at the late medieval bronze foundry on the site was recovered from a Phase 8 context. The four lace ends and six pins of 16th to 17th century date are a common find in towns due to the great numbers in use and the ease with which they were lost.

Silver objects

A total of nineteen fragments of fine twisted silver wire were recovered from a 16th to 17th century context (CG 48). These may have been part of the binding on a bottle or flask.

11.7 Coins

Three coins were recovered from the excavation (Table 6).

Description	CG	Phase
1 Silver coin, fragment, 3rd/4th century	40	6
2 Cu alloy coin, 3rd/4th century	40	6
3 Cu alloy half-penny, William III	U/S	9

Table 6: The coins

11.8 Building stone and worked stone

A total of twelve fragments of stone were recovered (Appendix 13). The majority of these were Roman in date and consisted of lias fragments and part of a quern stone. Worn lias paving stones were found in some number at Deansway and comprised the greater part of the Roman building stone assemblage there (Roe forthcoming). Roe suggests that they were used inside buildings on the ground floor and were unsuitable for outside paving. All the examples from Farrier Street were worn and fragmentary. The largest piece from the site had a maximum length of 300mm, width 260mm

and thickness 50mm.

The quartz conglomerate quernstone was of a type found before at Beckford, Sidbury and Deansway. The Forest of Dean is usually considered to be the source area for this stone but it is also abundant to the west of the River Wye, where the availability of water-bourne transport would have facilitated trading (Roe forthcoming).

The medieval and later stone assemblage consisted of small fragments of millstones and building material.

11.9 Plaster and mortar

A total of fifteen fragments of abraded plaster and mortar weighing 70g were recovered. Five fragments (32g) of mortar came from a late Roman context (CG 33). Ten grammes of white plaster with a red, painted surface was recovered from a Phase 6 context (CG 40) dated to the 15th or 16th centuries. The majority of the pottery from the context (40 sherds) was late Roman and there is therefore a possibility that the painted plaster was also of this date. The rest of this small assemblage consisted of wall plaster from a layer dated to the 16th to 17th century (CG 47).

11.10 Worked bone

One bone point, circular in section but broken at both ends, was recovered from an unstratified context. This item could be of any date but it is possible that it may be the remains of a Roman bone pin. If so this would be a unique find from the northern suburb where finds of any type of personal ornament are very rare.

11.12 Glass

A very small amount of glass was recovered (five fragments of Roman vessel glass and five fragments of medieval glass) usually residual in later contexts (Appendix 14). The only post-medieval sherd was contamination of a Roman deposit.

12 Metallurgical analysis of the slags

J G McDonnell

12.1 Introduction

Ironworking slag has been recovered from many excavations undertaken in Worcester, and a total of 86kg of slag was recovered from Farrier Street. The overall evidence for ironworking in Worcester will be discussed in the report on the Deansway material (McDonnell forthcoming).

12.2 Methods

The material was classified according to the methods detailed in the report on the Deansway material (Appendix 15). The totals of each slag type are given in Table 7. The majority of the slag derived from the iron smelting process, and was either the typical iron tap slag (TAP) or the denser smelting slag (SMELT). A small amount of smithing slag (SSL) and hearth bottoms (HB) was noted, although it is possible that these slags were less distinctive smelting slags. Some lumps of probable ore were identified, which will be analysed and if the identification is confirmed they will contribute to the search for possible ore sources (McDonnell forthcoming).

TAP	SMELT	SSL	HB	HL	ORE	OTHER
62.3	12.7	0.3	0.3	0.3	1.2	9.2

Table 7: Totals for slag type (kg)

There was 8kg of large refractory crucible fragments from Phase 9 deposits. The complete crucibles would have been of the order of 250-300mm high and about 150mm in diameter, with walls 10-20mm thick. A sample was qualitatively analysed by x-ray fluorescence and the only metals detected were iron (Fe) and a small amount of manganese (Mn). This would suggest that they may have been used for melting iron,

although only small castings could have been produced. Examination of 19th century documentary evidence indicated that these crucibles were probably associated with a smithy shown on the First Edition Ordnance Survey map (Section 14).

12.3 Phase distribution of the slag.

A detailed listing by phase and context group is given in Appendices 16 and 17. Table 8 is a summary of the phase distribution. This shows that tap slag was deposited in the 1st to 2nd centuries (Phase 2, CG 2), together with a fragment of (probably) metallic iron/smithing slag. Such small amounts should be considered background activity.

The major period of iron smelting activity was in Phase 4 (3rd to 4th century) The subsequent deposits were probably residual and represent disturbance of earlier levels. The absence of significant deposits of furnace lining suggested that the smelting furnaces were not in the area excavated. The absence of large amounts of smithing debris also suggested that the workshops were not close by. Thus these deposits represent dumping of smelting slag and not the area of production.

Phase	TAP	SMELT	SSL	HB	HL	ORE	OTHER
1	-	-	-	-	-	-	-
2	0.1	-	-	-	-	-	0.3
3	-	-	-	-	0.03	-	-
4	17.5	0.4	0.1	-	0.2	1.2	0.9
5	-	-	-	-	-	-	-
6	11.3	-	0.1	-	-	-	-
7	-	-	-	-	-	-	-
8	11.9	-	-	0.3	-	-	-
9	5.2	-	-	-	-	-	8.1
U/S	16.3	12.3	0.9	-	-	-	-
Total	62.3	12.7	1.1	0.3	0.2	1.2	9.3

Table 8: Slag distribution by phase

12.4 Conclusions

The slag recovered was predominantly iron smelting slag, morphologically similar to the slags recovered from excavations at Deansway (McDonnell forthcoming). The phasing evidence indicated that iron smelting slags were first dumped in the area in the 3rd to 4th century. The presence of a very small amount of tap slag in Phase 2 (1st to 2nd century) should not be taken as significant.

13 General discussion

The Roman settlement

The Roman evidence from the excavations at Farrier Street has significantly enhanced the current understanding of the area north of the city walls. There was little evidence of activity in the 1st to 2nd centuries (Section 5: Phase 2) and, although some features were dated to the 2nd to 3rd centuries (Section 5: Phase 3), the overall impression is that the occupation was of low intensity throughout the 1st to 3rd centuries. It can be characterised as an area of agricultural settlement adjacent to domestic occupation and including agricultural activities such as crop processing, demonstrated by soil micromorphology (Section 6) and environmental evidence (Section 7).

The evidence for 3rd to 4th century activity (Section 5: Phase 4) indicated that occupation was much more intensive, and included evidence for ironworking in the area (Section 12), although there were neither ironworking hearths as at Broad Street and Deansway (Barker 1968-9, 64-83; Mundy and Dalwood forthcoming), nor primary dumps of smelting slag as at Deansway (McDonnell forthcoming). There were other undetermined industrial activities, represented by large clay-lined pits. The environmental evidence indicated that cereal chaff was used for fuel and that crop processing was carried out in this phase also (Section 7).

The overall character of the area in the Roman period was similar to that at Deansway (Dalwood *et al* forthcoming; Mundy and Dalwood forthcoming). Earlier Roman occupation at Deansway was also of rather low intensity and chracteristic of a rural settlement. Although ironworking was an important activity in the 2nd to 3rd centuries, it did not supplant agricultural activity. Domestic occupation was not intensive with scattered buildings and ironworking was carried out in areas set aside for this purpose.

The evidence from Farrier Street can also be compared with the evidence from a number of evaluations in the area north of the city wall. To the north of Farrier Street, Roman features were recorded at Love's Grove (Fig 13: HWCM 9552; Edwards 1990). Two of the evaluation trenches only produced a Roman agricultural soil, but the eastern trench contained an extensive spread of cobbling cut by pits (Eddwards 1990, fig 5).

Re-examination of the artefact assemblage from these pits show it comprises pottery of mainly 3rd and 4th century date, as well as roof tile, sheet iron fragments and nails, iron slag and animal bone. Although the cobble surface was 13m wide it was much less substantial than the cobbled road surface recorded further south at Farrier Street and Broad Street. Furthermore there was no resurfacing with slag at Love's Grove and at no other location have the surfaces of this road been truncated by pits in the Roman period. Therefore it seems more likely that this surface was a yard, although possibly close to the road.

At Rea's Timber Yard (Fig 13: HWCM 9550; Wichbold 1990) to the north of the Love's Grove site an evaluation trench revealed a V-shaped ditch aligned north to south, 2.00m wide and 0.65m deep, with a small hearth or oven cut into its upper fill (Wichbold 1990, fig 7). The Roman pottery assemblage from this site was re-examined and shown to be comprised almost entirely of late 1st to 2nd century pottery. The fill of the ditch contained a large group of pottery which was relatively unabraded and which, while containing some residual material, can be dated to the later 2nd century. Some iron slag, roof tile, fragments of animal bone and part of an iron bar were also recovered from the ditch.

Other evaluations to the east of Foregate Street produced no evidence for any Roman activity. The site on Sansome Street (Fig 14: HWCM 7551) produced no Roman features or residual Roman pottery in later features (Darlington 1988) and the excavation at St Oswald's Almshouses was similarly unproductive of Roman material (Edwards forthcoming; Fig 14: HWCM 9951). It seems likely that the eastern side of Foregate Street/The Tithing lies outside the area of Roman occupation (Fig 13).

The Roman road identified at Farrier Street and Broad Street (Barker 1968-9, 63-98) is interpreted as the main road north of the Roman small town in the direction of Greensforge, although its precise route remains to be confirmed (Burnham and Wacher 1990, fig 74). The route of this road north of Farrier Street is unknown (Fig 13) and conjecture at present is based on negative evidence. It seems likely that the road passed to the east of the Love's Grove site.

The evidence from Farrier Street and other sites in this area is important because of the previous lack of evidence from the Roman settlement, although its identification as a Roman small town of primarily industrial function is well established (Burnham and Wacher 1990, 242). Although the excavations at Farrier Street were not extensive, they have improved the previous poor understanding of Roman occupation of this area, and have modified the understanding of the settlement as a whole. There is some evidence that their may be a Roman cemetery in the area, although this is based on two human bones from Roman deposits (Section 8).

The study of the finds assemblages, particularly the ceramics, indicated that in the earlier Roman period occupation to the north of the town was not continuous and it is possible that there were two foci of settlement in the area, one near the present cathedral and another to the north around Brittania Square. By the 4th century, however, both Farrier Street and Love's Grove had more intensive occupation while the Rea's Timber Yard site has provided very little artefactual evidence for occupation in this period.

The excavations in this area have demonstrated the good preservation of Roman deposits in comparison with deposits in the area south of the city wall, where there was intensive pit digging in the medieval and post-medieval periods. When the area was developed in the mid-18th century the Roman deposits were buried beneath 0.40m of soil accumulation.

The medieval suburb

Evidence for medieval activity was limited mainly to pottery, mostly as residual material in later deposits, but also trampled into soil layers (Section 6). No late Saxon pottery was recovered, but there were a total of eight sherds of 12th to mid-13th century (Phase 6) pottery and twelve sherds of mid-13th to mid-16th century vessels (Section 9). The general paucity of medieval material reflects the fact that the area was *c* 100m west of the frontage onto the main road north out of the town, and although the area apparantly lay within the property boundaries of the medieval suburb it was too distant from houses to be used for the regular disposal of domestic rubbish.

The evaluation trenches excavated elsewhere in the area showed a clear dichotomy. The sites at Love's Grove and Rea's Timber Yard (Fig 14: HWCM 9550, 9552) produced no medieval features and little medieval pottery (Edwards 1990; Wichbold 1990). This was undoubtedly because these areas lay outside the limits of the planned medieval suburb. Small quantities of medieval pottery might be expected in this area as the result of manuring operations.

In contrast, sites within the planned medieval suburb, at Sansome Street and St Oswald's Almshouses, have produced evidence of medieval urban occupation (Fig 14: HWCM 7551; 9931). The site at Sansome Street (Darlington 1988) revealed a pit and a ditch dated to the 12th to 13th centuries. At St Oswald's Almshouses there was a medieval cemetery and part of a substantial range of stone buildings of the medieval hospital (Edwards forthcoming). Apart from these two sites very little archaeological work has been carried out in the area of the northern suburb, and in particular various industries documented from this area remain to be located, such as the tileries (Section 10).

Post-medieval development

The archaeological evidence shows that the activity on the site in the mid-16th to 17th centuries was the digging of large pits, probably for the extraction of gravel. The only other significant feature was a linear ditch, which cannot be identified as a post-medieval property boundary in any of the later cartographic sources. The finds from this ditch date it to the late 16th or 17th centuries and it is tempting to relate this feature to the Civil War defences of Worcester. The map of the defences in 1651 (*VCH Worcs IV*, facing 377) shows a number of artillery bastions projecting north from the city wall to the south of The Butts, and it is possible that this ditch served a defensive function.

The cartographic sources referred to above (Section 2) show that the Farrier Street site was defined by a number of property boundaries by the mid-18th century (Fig 14). The roadways to west and east have the appearance of fieldpaths and may represent features of the medieval landscape. Although these maps show a group of buildings on the site, it is difficult to identify these with the recorded foundations, and it seems more

likely that these are related to the buildings recorded in Young's map of 1779 (Fig 15).

14 The effect of the driven piles on the archaeological deposits

The evaluation demonstrated that the Roman deposits at Farrier Street were both extensive and of national importance (Darlington 1989). Subsequently the development design was modified to ensure that the Roman deposits would be preserved *in situ*, and that those that could not be preserved were recorded. Attention was paid to the design of below ground works and only one small area, forming the base of a lift shaft, required excavation (Fig 1: Trench C). This enabled more detailed evidence for Roman and later occupation to be recorded, and the effects of driven piles on archaeological deposits to be assessed.

Driven piles were used to form part of the foundations. The effect of piling was clear during the course of the excavation, when the distortion caused by the piles driving through the archaeological deposits was obvious, the distortion being up to 0.30m on either side of the pile and over 0.30m vertically (Fig 6; Plate 1).

During analysis medieval and post-medieval pottery was recovered from Roman deposits sealed beneath a thick layer of post-Roman soil (CG 40). It was thought that the piling operation had transported this material from later into earlier deposits (Buteux above). The presence of intrusive material was also indicated in the animal bone and botanical assemblages (Section 7 and 8). It was possible to identify intrusive pottery in Roman deposits with some certainty, although the mixing of Roman deposits may have caused errors in the phasing of the site. The piling did not seem to affect the soil micromorphology beyond the area of the pile itself (Section 6).

The western part of the site was not piled and the new building only occupied the eastern part of the site (Fig 16). In this area the disturbance to unexcavated deposits can be estimated. The stratigraphy in Trench C (Fig 6) showed that apart from the area of the pile itself (*c* 0.10m^2) a further area adjacent to the pile was disturbed (total area *c* 0.60m^2. A total of 115 pilecaps were shown on the architect's plan (Fig 16), and the total area of disturbance from piling can be estimated as 70m^2. The ground plan of the new building is *c* 2,300m^2 and therefore approximately 3% of this area was disturbed.

The deposits in the western part of the site, including the areas adjacent to the Roman road and the road itself, were sealed beneath new carpark surfaces, and the overall disturbance from piling was *c* 1.8%. A further area of *c* 120m^2 was excavated or salvage recorded (*c* 3% of total area) and therefore it can be estimated that 94% of the total area remains undisturbed by either archaeological excavation or piling and other construction work.

However it should be noted that the extent of the disturbance caused by piling was greater than was anticipated before construction began. The evidence derived from the excavation will inform future discussions with developers over foundation design on sites of archaeological importance.

15 Conclusions

Although the small scale of the excavation precluded very detailed interpretation, it provided important new evidence for the extent and nature of the Roman town, as well as largely negative evidence for medieval activity in the area west of the Foregate suburb. The excavation also provided information about the effect of driven piles on archaeological deposits that has important implications.

The excavations indicated that previous plans of the extent of the Roman settlement should now be modified (Barker 1968-9, fig 2; Burnham and Wacher 1990, fig 74). The

previous understanding of the nature of the Roman settlement north of the city walls was probably the result of a bias caused by the concentration of redevelopment and consequently archaeological fieldwork inside the city walls. Consideration of the evidence from the Farrier Street site, together with that from other recent fieldwork, shows that that there is continuous Roman occupation from the area south of the Cathedral at least as far north as Britannia Square, an area of *c* 1500 x *c* 300m (Fig 13). The intensity of occupation within this area varies over time and a complex process of settlement expansion/regression or settlement shift may have occured.

The varied character of the Roman occupation in the area north of the city walls has demonstrated the potential for future fieldwork. The excavations indicated that ironworking, crop processing and domestic occupation were all prevalent, and it is possible that structural evidence in the form of furnaces, corn drying ovens and buildings will be discovered in the future.

The ironworking industry at Broad Street and Farrier Street was dated to the 3rd-4th centuries, in contrast to the 2nd-3rd century ironworking at Deansway (Mundy and Dalwood forthcoming), but the reasons for this apparant change in location are unclear. There is certainly no evidence that the settlement grew in this period leading to the industrial activity being displaced to the edge of the town. The full understanding of the development of the ironworking industry throughout the Roman period should remain an important research objective in Worcester.

Roman deposits in this area are particularly significant relative to Roman deposits within the city walls, as their integrity is less affected by medieval pit digging. These deposits are particularly important for elucidating the development of the Roman small town in the 3rd to 4th centuries, and the recovery of primary deposits of this date would be important in national as well as local terms (Evans forthcoming).

The evidence for medieval occupation from Farrier Street was largely negative. There is very little archaeological evidence to date from the medieval suburb, but the recent work at St Oswald's Almshouses (Edwards forthcoming) and Sansome Street (Darlington 1988) demonstrates that areas near the Foregate Street frontages are of high archaeological potential.

16 Acknowledgements

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The post-excavation analysis and report editing was co-ordinated by V A Buteux and C H Dalwood. A number of specialists contributed to the report, including R I Macphail, J G McDonnell, S Pinter-Bellows, C de Rouffignac and H A White. Additional help was received from L Moffett, who advised on botanical remains. Stirling University carried out soil impregnation and thin section manufacture.

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18 Abbreviations

Numbers prefixed with 'HWCM' are the primary reference numbers used by the Hereford and Worcester County Sites and Monuments Record.

HWCC - Hereford and Worcester County Council

HWRO - Hereford and Worcester Record Office

Appendix 1 The archive

The archive consists of:

278	Context records AS1
20	Fieldwork progress records AS2
11	Photographic records AS3
11	Matrix sheets AS7
70	Context finds sheets AS8
18	Scale drawings
23	Boxes of finds

All primary records and finds are kept at:

Worcester City Museum and Art Gallery
Foregate Street
Worcester WR1 1DT

Tel Worcester (0905) 25371

A security copy of the archive has been placed at:

Hereford and Worcester County Museum
Hartlebury Castle
Hartlebury
Near Kidderminster
Worcestershire DY11 7XZ

Tel Hartlebury (0299) 250416

Appendix 2 Soil micromorphological descriptions and preliminary interpretations

Identified by R I Macphail

Thin section 2E (Fig 6; CG 37)

Structure: massive.

Porosity: 25%; dominant medium to coarse vughs.

Mineral: C:F, 55:45.

Mineral, coarse: common rounded gravel of fine sandstone, with burned daub, shale and slag; poorly sorted dominant coarse sand to silt size quartz, quartzite and sandstone.

Mineral, fine: Lower half of slide heterogeneous; (a) dominant dark brown, heavily speckled (PPL), very low birefringence, golden brown (OIL); (b) common brown, dotted and speckled (PPL), very low birefringence, reddish and brown (OIL) (includes reddened silty clays [burned]). Upper half of slide is homogeneous; (c) dominant dark brown, heavily speckled (PPL), very low birefringence, golden brown (OIL).

Organic, coarse: abundant coarse to fine charcoal, especially associated with fine fabric (b). Abundant coarse to fine bone fragments and probable human and possible dog coprolites. UV: bright white fluorescent human? dog coprolite. Weakly fluorescent sand size rounded silty clay, with fluorescent halo. Weakly fluorescent "ashey" compound. Abundant fine bone/coprolitic fragments.

Organic, fine: (a) very abundant charcoal, charred and humifying organic matter. Few phytoliths. (b) Very abundant charcoal and charred material, with abundant phytoliths. (c) as (a).

Groundmass: all porphyritic, speckled b-fabrics.

Pedofeatures, excrements: total biological fabric in upper half of slide, only partially reworked in the lower half. Very abundant fine organo-mineral, probable Enchytraeid excrements reworking probable main earthworm worked fabric.
Interpretation: Roman debris (mainly burned) deposits containing coarse charcoal, burned daub, gravel, bone and probable human as well as dog coprolitic remains (rare herbivore input), slag of various kinds and possibly associated wood charcoal and phytolith-rich (decalcified) ash debris, are increasingly biologically homogenised upwards.

Thin section 2D (Fig 6; CG 37/49)

Structure: massive, with few fine subangular blocky.

Porosity: 25-30%, Dominant medium open vughs and coarse chambers; very few channels.

Mineral: C:F, 55:45.

Mineral, coarse: as 2E, but with frequent large stone size various slag.

Mineral, fine: homogeneous, (d) dominant pale brown, speckled (PPL), very low birefringence, pale brown (OIL).

Organic, coarse: many fine charcoal (UV: many fine bone/coprolitic fragments).

Organic, fine: very abundant fine charcoal/charred and humifying organic matter; ocassional phytoliths.

Groundmass: porphyric, speckled b-fabric.

Pedofeatures, excrements: total biological fabric, with very abundant, probable Enchytraeid excrements (reworking of earthworm fabric).

Interpretation: Biological homogenisation of Roman debris, which possibly contains decreasing amounts of coprolitic material, but here large slag remains do occur.

Thin section 2C (Fig 6; CG 40)

Structure: massive, with underlying poorly formed coarse subangular blocky.

Porosity: variable, 15-30% (open areas of Enchytraeid activity); spongey in places with medium to coarse vughs and chambers.

Mineral: C:F, 50:50.

Mineral, coarse: as 2E, with common stone size slag, silty daub and fine sandstone.

Mineral, fine: homogeneous; (e) dominant dark yellowish brown, finely speckled (PPL), very low birefringence, pale brown (OIL).

Organic, coarse: occasional coarse wood charcoal (UV: few to many fine coprolitic/bone fragments, becoming more numerous upwards with some very coarse fragments).

Organic, fine: very abundant fine charcoal/charred and humifying organic matter.

Groundmass: as 2E.

Pedofeatures, excrements: as 2D.

Interpretation: as 2D.

Thin section 2B (Fig 6; CG 40)

Structure: weakly massive, with underlying coarse prismatic structure.

Porosity: as 2C.

Mineral: C:F, 50:50.

Mineral, coarse: as 2C.

Mineral, fine: mainly homogeneous; (f) dominant dark yellowish brown, heavily speckled (PPL), very low birefringence, dark brown (OIL); occasional small patches of fabric; (i) especially integrating into the main soil near the top of the slide (originally silty with micas, but fine charcoal, bone etc: ash residue mix).

Organic, coarse: occasional to many fine and coarse charcoal (UV: few to many coprolitic/bone; also less fluorescent burned bone; some coprolitic fragments are groups of phytoliths [also below]).

Organic, fine: very abundant fine charcoal and charred material, with increasing amounts of humifying organic matter; occasional phytoliths, except for (b) where there are many.

Groundmass: as 2C.

Pedofeatures, excrements: generally total biological fabric, but small areas and fabric (b) not fully integrated into soil near the top of the slide. Enchytraeid reworking as below.

Interpretation: this thin section contains much residual fine and coarse Roman? material, including high amounts of fine charcoal, which have been strongly biologically homogenised. Additionally, silty (alluvial?) ash residue material still occurs that could possibly relate to later dumping of domestic waste.

Thin section 2A (Fig 6; CG 40/48)

Structure: massive, with poorly formed coarse prisms.

Porosity: 20-30%, dominant coarse to medium vughs and chambers.

Mineral: C:F, 60:40.

Mineral, coarse: as 2B.

Mineral, fine: homogeneous, (g) dominant dark yellowish brown, heavily speckled (PPL), low birefringence, dark brown (OIL).

Organic, coarse: occasional to many charcoal; rare spore case of vesicular arbuscular mycorrihizae. Occasional *in situ* root fragments. UV: occasional bone/coprolite, decreasing to rare upwards.

Organcic, fine: generally very abundant fine charcoal and charred/humified organic matter, producing very dark fabric; occasional patches, like fabric (i) (charred silty), which are less dark and contain less fine charcoal. These contain many phytoliths and at high power residual ash crystalls are present (probably from wood).

Groundmass: generally porphyric, speckled b-fabric.

Pedofeatures, excrements: near total biological fabric, but not total excremental fabric (patches of unhomogenised ash residue material); very abundant reworking of earthworm fabrics (mammilated material preserved within porous slag) by Enchytraeids (very abundant excrements).

Interpretation: There still seems to be material that has not been biologically homogenised, that is relic of silty

anthropogenic (ash residue) soil. Coarse anthropogenic materials are still common, but coprolitic residual material may be less. Soil formation activities are also reprezented by intact roots and by prismatic soil structure formation.

Thin section 3A (Fig 6; CG 40/48)

Structure: massive, with patches of spongey microstructure.

Porosity: generally 10%, with areas of 20-30%.

Mineral: C:F, 65:35.

Mineral, coarse: as 2B, but perhaps more poorly sorted with almost dominant amount of small stone and gravel-size slag, burned silty daub?, pottery, sandstone, siltstone etc.

Mineral, fine: (h) dominant dark yellowish brown, highly speckled (PPL), very low birefringence, dark brown (OIL); few patches of (i); like (b), yellowish brown, lighly speckled (PPL), moderate birefringence, brown (OIL).

Organic, coarse: occasional to many wood charcoal. UV: rare to occasional bone/coprolite.

Organic, fine: (h) very abundant fine charcoal and charred, and humified organic matter; occasional phytoliths. (i) occasional charred?, many to abundant humified and "browned" organic fragments; many phytoliths (micas also).

Groundmass: both (h) and (i) porphyric, speckled b-fabric.

Pedofeatures, excrements: total biological fabric with earthworms compacting the soil and mixing-in fabric (i) in to fabric (h). Occasional Enchytraeid excrements.

Interpretation: In some ways this soil is like 2A. It is less affected by Enchytraeid activity, and is more compact, the last a possible effect of piling. Again silty soil occurs, and seems to have been brought in by earthworm activity. This silty soil seems to be of possible alluvial origin, with little anthropogenic additions.

Appendix 3 List of plant remains from Roman samples Identified by C de Rouffignac

	Phase 2			Phase 3	Phase 4											
	1185	1194	1206	1183	1160	1162	1165	1167	1169	1173	1176	1190	1192	1202	1208	
CEREAL SEEDS																CEREAL SEEDS
Triticum spelta	2	2	-	2	1	-	-	-	-	5	1	-	-	1	-	Triticum spelta
T spelta glume bases	130	1	-	50	7	3	-	-	17	>200	>100	15	2	25	30	T spelta glume bases
T spelta rachis frags	20	2	1	1	-	-	-	-	-	30	3	-	-	5	50	T spelta rachis frags
Hordeum sp	-	-	-	4	1	-	-	-	-	2	-	-	-	1	-	Hordeum sp
Hordeum sp rachis frags	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	Hordeum sp rachis frags
Hordeum vulgare	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	Hordeum vulgare
Avena sp	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	Avena sp
Wheat/rye	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	Wheat/rye
Cereal node	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	Cereal node
Cereal indet	>50	13	4	38	2	1	-	7	-	>100	>50	4	1	38	15	Cereal indet
CAPRIFOLIACEAE																CAPRIFOLIACEAE
Sambucus nigra	-	3	-	-	-	-	-	-	-	-	-	2	-	-	-	Sambucus nigra
CHENOPODIACEAE																CHENOPODIACEAE
Chenopodium album	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	Chenopodium album
Chenopodium sp	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Chenopodium sp
CORYLACEAE																CORYLACEAE
Corylus sp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Corylus sp
GRAMINAE																GRAMINAE
Graminae (large)	-	-	-	-	-	-	-	1	-	-	2	-	-	-	-	Graminae (large)
Graminae (small)	-	-	-	-	-	-	-	1	-	-	7	-	-	3	-	Graminae (small)
Graminae	12	-	2	-	-	-	-	-	2	8	-	2	-	-	6	Graminae
LEGUMINOSAE																LEGUMINOSAE
Trifolium repens	-	-	-	-	-	-	-	1	1	-	1	-	-	1	-	Trifolium repens
Vicia sp	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	Vicia sp
Vicia/Lathyrus sp	4	-	-	-	-	-	-	1	-	2	-	-	-	1	-	Vicia/Lathyrus sp
Leguminosae	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	Leguminosae
POLYGONACEAE																POLYGONACEAE
Rumex acetosa	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	Rumex acetosa
Rumex acetosella	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Rumex acetosella
RUBIACEAE																RUBIACEAE
Galium sp	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	Galium sp
OTHER SEEDS																OTHER SEEDS
Indet seeds	2	-	-	-	1	-	-	-	6	8	4	2	-	4	-	Indet seeds

Appendix 4 Habitats of plants recovered from samples

Identified by C de Rouffignac

Cerealae

Triticum spelta (spelt) - cultivar, mainly found from Roman sites
Hordeum sp (barley) - cultivar
Avena sp (rye) - cultivar

Caprifoliaceae

Sambucus nigra (elder) - scrub and disturbed ground

Chenopodiaceae

Chenopodium album (fat hen) - nitrophile; cultivated and disturbed ground
Chenopodium sp (goosefoot type) - various habitats, usually disturbed ground

Corylaceae

Corylus sp (hazel) - woodland and scrub, often collected for eating

Graminae

Graminae (grasses) - various habitats, often disturbed ground

Leguminosae

Trifolium repens (white clover) - nitrophile; cultivar or weed of cultivated crops
Vicia sp (vetch type) - nitrophile, also common as a cultivar
Vicia/Lathyrus sp (pea/vetch) - nitrophile, often cultivated

Polygonaceae

Rumex acetosa (common sorrel) - found in grassland and woods
Rumex acetosella (sheep's sorrel) - dry, bare places and disturbed ground

Rubiaceae
Galium sp (bedstraw type) - a common weed of autumn sown crops

Appendix 5 Comments on plant remains from all samples

C de Rouffignac

Phase 2: Roman, 1st to 2nd century

CG 2 Soil layer (217)	Few fragments of charcoal; no seeds or chaff
CG 7 Fill of pit (1185)	Large quantity of carbonised chaff and seeds, including cereals and weeds. Ratio chaff to cereal seeds: 3:1.
CG 8 Fill of linear feature (1206)	Only a few seeds and a fragment of Corylus avellana (hazel) nut
CG 11 Fill of pit (1194)	Uncharred seeds of Sambucus nigra (elder). Some charred seeds and chaff

Phase 3: Roman 2nd to 3rd century

CG 3 Burnt layer (112)	Few charred seeds and some charcoal
CG 3 Burnt layer (164)	Cereal seeds, other seeds, chaff and charcoal in abundance
CG 12 Fill of pit (1183)	Considerable charred plant remains, including Triticum spelta chaff and seeds. Chaff: cereal seed ratio: 1.2:1

Phase 4: Roman 3rd to 4th century

CG 10 Fill of pit (1190)	Very few remains; two uncharred seeds of Sambucus nigra (elder)
CG 11 Fill of pit (1192)	Only a very few carbonised remains
CG 13 Fill of pit (1204)	Mostly chaff, just a few seeds. Chaff: cereal seed ratio: 10:1. Two seeds of Hordeum sp, one of which had sprouted
CG 18 Fill (311)	Few seeds, also chaff and charcoal
CG 20 [155] Fill	Chaff and charcoal, no seeds
CG 20 154 Fill	Chaff and charcoal
CG 21 Fill of pit (113)	Very few cereal seeds and some charcoal
CG 22 Fill of pit (111)	Decayed wood fragments and charcoal
CG 23 fill of pit (119)	Some cereal seeds, chaff and charcoal
CG 24 Fill of it (120)	Very few cereal seeds with some charcoal
CG 25 Fill of pit (1173)	Many charred plant remains, including seeds and chaff ofHordeum sp (barley) and Triticum spelta (spelt wheat) andseveral weed species. Chaff:cereal seed ratio: >2:1. Many of the indeterminate cereal seeds were warped and popped; two of the Hordeum sp (barley) seeds had sprouted
CG 27 Fill of posthole (1165)	Single charred seed of Galium sp (bedstraw) and some charcoal
CG 27 Fill of pit (1208)	Chaff and cereal seeds, together with over 100 small bone fragments. Ratio chaff: cereal seeds: 2:1
CG 30 Fill of pit (1176)	Large quantity of charred remains recovered, including >50 cereal seeds, >100 Triticum spelta chaff fragments; chaff:cereal seed ratio: >2:1
CG 31 Layer in pit (1167)	Mostly of unidentifiable charcoal fragments, few non-cerealseeds
CG 31 Layer in pit (1169)	Some chaff and a few weed seeds
CG 33 Fill of pit (1202)	Charred plant remains including Triticum spelta chaff and weed seeds. Ratio of chaff: cereal seeds: 1:1
CG 34 Fill of gully (1160)	Few charred plant remains
CG 37 Layer (1162)	Exceptionally small (only 0.5 litres) sample, minimal amount of material

	recovered, including few charred plant remains
CG 50 fill of ditch (115)	No seeds recovered, only a little charcoal

Phase 5 and 6: post-Roman/medieval, 4th to 11th century

CG 40 Dark earth (1151, 1152, 1153)	No charred plant remains or charcoal was collected.

Phase 8: Post-medieval mid-16th to 17th century

Fill of pit (110)	Some charcoal, no seeds
Layer (159)	Few fragments of charcoal; no seeds or chaff

Phase 9: Post-medieval, 18th to 20th century

Layer (181)	Little charcoal, no seeds

Appendix 6 List of animal species, by number and phase group

Identified by S Pinter-Bellows

Species	Roman (Phases 2-4)	Medieval (Phases 5-7)	Post-medieval (Phases 8-9)
Horse (*Equus caballus*)	1	-	11
Cow (*Bos taurus*)	21	9	67
Pig (*Sus scrofa*)	1	6	17
Sheep (*Ovis aries*)	-	-	5
Goat (*Capra hircus*)	-	-	-
Sheep/goat	8	1	22
Small artiodactyl	10	5	24
Large artiodactyl	3	-	3
Domestic fowl (*Gallus* sp)	-	-	3
Dog (*Canis familiaris*)	2	3	4
Cat (*Felis domestica*)	-	-	3
Small mammal	2	-	-
Large mammal	18	11	134
Human (*Homo sapiens*)	2	-	-
Frog (*Rana temporaria*)	-	-	1
Unidentified bird	-	-	1
Unidentified mammal	49	17	133
Total	117	52	428

Appendix 7 Species/anatomy distribution for main species of animals

Identified by S Pinter-Bellows

	Roman (Phase 2-4)				Medieval (Phases 5-7)				Post-medieval (Phases 8-9)			
	Horse	Cow	Pig	Caprid	Horse	Cow	Pig	Caprid	Horse	Cow	Pig	Caprid
Skull	-	1	-	-	-	-	2	-	-	0	2	-
Horn core	na	8	na	-	na	0	na	-	na	5	na	-
Maxilla	-	-	-	-	-	-	-	-	-	3	-	-
Mandible	-	-	-	-	-	-	-	-	-	2	3	-
Atlas	-	-	-	-	-	-	-	-	-	1	1	-
Axis	-	-	-	-	-	-	-	-	-	-	-	-
Scapula	-	2	1	-	-	-	-	-	-	-	-	1
Humerus	-	-	-	2	-	-	-	1	-	1	-	3
Radius	-	-	-	-	-	1	-	-	-	3	1	2
Ulna	-	-	-	1	-	1	-	-	-	-	4	-
Innominate	-	-	-	-	-	-	-	-	-	4	-	1
Femur	-	-	-	-	-	-	-	-	-	3	3	1
Patella	-	-	-	1	-	-	-	-	-	1	-	-
Tibia	-	-	-	1	-	-	-	0	2	5	1	5
Fibula	na	na	-	na	na	na	-	na	na	na	-	na
Sacrum	-	-	-	-	-	-	-	-	-	-	-	-
Carpals	-	-	-	-	-	-	-	-	-	2	-	-
Astragalus	-	-	-	-	-	-	-	-	2	1	1	-
Calcaneus	-	1	-	-	-	-	-	-	1	3	-	-
Other tarsal	-	-	-	-	-	-	-	-	-	1	-	-
Metacarpal	-	2	-	-	-	-	1	-	-	6	1	2
Metatarsal	-	2	-	-	-	1	-	-	-	3	-	5
Unident metapodial	1	-	-	-	-	1	-	-	1	1	-	-
First phalange	-	-	-	-	-	1	-	-	1	8	-	-
Second phalange	-	-	-	-	-	-	-	-	-	1	-	-
Third phalange	-	1	-	-	-	-	-	-	-	3	-	-
Maxillary teeth	-	1	-	-	-	1	1	-	1	3	1	4
Mandibular teeth	-	1	-	1	-	1	2	-	3	6	-	3
Total	1	21	1	8	0	9	6	1	11	67	17	27
Percentage	3%	68%	3%	26%	0	56%	38%	6%	9%	55%	14%	22%

Appendix 8 Measurements of animal bones

Identified by S Pinter-Bellows

Roman (Phase 2-4)

Cow	Metacarpal					
		Bd	50.9mm			
	Third phalanx					
		DLS	63.8mm	Ld	46.3mm	
Sheep	Humerus					
		Bd	28.2mm	BT	27.0mm	HTC 13.4mm
	Tibia					
		Bd	27.1mm			
Dog	Humerus					
		Bd	28.2mm			

Medieval (Phases 5-7)

Cow	Metatarsal					
		Bp	45.8mm			
Dog	Humerus					
		Bp	36.4mm			

Post-medieval (Phases 8-9)

Horse	First phalanx							
		GL	92.2mm	Bp	59.7mm	BFp	54.0mm SD	37.0mm
		Bd	51.8		BFd	44.0mm		
	Astragalus							
		GL	55.8mm	GB	61.7mm	BFd	54.3mm LmT	38.0mm
	Tibia							
		Bd	77.2mm	Db	46.1mm			
Cow	First phalanx							
		Glpe	61.8mm	Bp	32.1mm	SD	27.2mm Bd	18.0mm
			62.0mm		31.2mm		27.2mm	
			55.0mm		29.0mm		24.0mm	28.0mm
			54.0mm		28.1mm		25.8mm	
			57.4mm		28.0mm		21.1mm	26.1mm
					29.1mm		25.4mm	29.6mm
	Astragalus							
		GL1	56.6mm	GLm	52.6mm	Dl	31.1mm Dm	27.1mm
		Bd	35.2mm					
	Femur							
		Bd	84.9mm					

Appendix 9 HWCC pottery fabric type series

Fabric 3 Malvernian metamorphic

Manufacture Handmade.

Firing Hard; usually black/dark grey throughout, less commonly with a layer or patch(es) of orange-red/brown colour. Munsell colour range: N3 very dark grey to 7.5YR 6/8 reddish yellow.

Texture Coarse to medium grained, may be slightly rough to the touch where inclusions protrude through the surface.

Surface May be wiped or burnished.

Inclusions Angular fragments of metamorphic rock - usually less than 1mm to 3mm in size, but larger fragments (up to 8-10mm) are also found.

Source Malvern Hills (Peacock 1968, 414-2)

Fabric 12 Severn Valley ware

Manufacture Wheelthrown

Hardness Soft to hard

Colour Usually reddish orange (2.5YR 5/8) but may be brown (5YR 6/6) and sometimes with reduced grey (10R 6/1) core

Surface Outer surface often highly burnished. Simple treatment impressed groove and cordon decoration

Inclusions Fine fabric containing occasional limestone fragments, clay pellets or iron ore

Source Severn Basin (Webster 1976, 18-46)

Fabric 12.1 Reduced Severn Valley ware

As for fabric 12 except that reduction produces a grey finish

Fabric 12.2 Severn Valley ware variant

As for fabric 12 but with sparse elongated voids usually appearing as black or dark grey streaks in fracture

Fabric 12.3 Reduced Severn Valley ware variant

As for 12.2 except that reduction produces a grey Manufacture

Fabric 14 Fine sandy grey ware

Manufacture Wheelthrown

Hardness Hard

Colour Grey (2.5YR 5/2-N4/0)

Surface treatment Outer surface may be burnished

Inclusions Moderate angular and subangular quartz grains up to c 0.1mm in size; sometimes micaceous.

Source Probably local

Fabric 15 Coarse sandy grey ware

Manufacture Wheelthrown

Hardness Soft to hard

Colour Light to dark grey (5YR 7/1-5YR 5/1)

Surface treatment Outer surface may be burnished

Inclusions Abundant rounded quartz grains up to c 3.0mm in size

Source Possibly local

Fabric 19 Wheelthrown Malvernian ware

Manufacture Wheelthrown

Hardness Hard

Colour Grey in colour (5YR 5/1) with occasional oxidized, orange examples (5YR 4/6)

Surface treatment None represented

Inclusions Moderate to abundant, angular Malvernian rock fragments up to c 3.0mm in size

Source Malvern Hills area (Peacock 1965-7, 418-28)

Fabric 22 Black Burnished ware, type 1 (BB1)

Manufacture Handmade

Hardness Hard

Colour Reduced dark grey or black throughout (5YR/1)

Surface treatment Highly burnished zones on outer surface, smoothed or burnished on visible inner surfaces

Inclusions Abundant subangular quartz grains up to c 1.0mm but only rarely exceeding c 0.5mm. Some sparse white inclusions up to c 1.5mm, and occasional pieces of shale

Source Dorset (Williams 1977, 163-220)

Fabric 29 Oxfordshire red and brown colour coated ware

Manufacture Wheelthrown

Hardness Generally hard

Colour Pale orange (5YR 7/6) to red orange (2.5YR 6/8)

Surface treatment Orange (2.5YR 6/8) or dark brown (5YR 4/2) slip

Inclusions Sandy fabric with sparse small black and red inclusions, and occasional lumps of chalk up to c 5.0mm. Often micaceous

Source Oxfordshire (Young 1977, 123)

Fabric 30 Oxfordshire white colour coated ware (Young 1977, 117-22)

Manufacture Wheelthrown

Hardness Generally hard

Colour Pale orange (5YR 7/6) to red orange (2.5YR 6/8)

Surface treatment White or off-white (7.5YR 8/2-7.5YR 8/4) slip

Inclusions Sandy fabric with sparse small black and red inclusions and occasional lumps of chalk up to c 5.0mm. Often micaceous

Source Oxfordshire (Young 1977, 117)

Fabric 32 Mancetter/Hartshill *mortarium*

Manufacture Wheelthrown

Hardness Hard

Colour White (10YR 8/1)

Surface treatment Outer surface may have a thin yellow (10YR 8/3)

wash. Trituration grits are black, grey or rust brown opaque refired pottery fragments.

Inclusions Occasional large quartz grains (up to c 2.0mm), and refired pottery fragments. The latter also used as trituration grits

Source Mancetter/Hartshill, Warwickshire (Hartley 1973, 143-47)

Fabric 33 Oxfordshire white *mortarium*

Manufacture Wheelthrown

Hardness Hard

Colour White (10YR 8/3)

Surface treatment Outer surface may have a thin yellow wash (10YR 8/4). Trituration grits are rounded white and pink quartz

Inclusions Moderate black and red quartz

Source Oxfordshire (Young 1977, 56)

Fabric 41 Miscellaneous white wares

Fabric 42 General category for *amphora*

Fabric 43 General category for samian

Fabric 44 Rhenish Ware

Manufacture Wheelthrown

Hardness Hard

Colour Oxidized red-orange (5YR 7/6), or laminated red and grey (7.5YR 7/7)

Surface treatment Very fine dark brown or black glossy colour coat (7.5YR 3/2), which may have a metallic sheen

Inclusions None represented

Source Trier, Central Gaul (Greene 1978, 18-19)

Fabric 55 Worcester-type unglazed ware

Manufacture Handmade; later examples wheelthrown

Hardness Hard

Colour Usually reduced dark grey (N2.5/0) throughout

Surface treatment Occasional rouletting or combed line decoration

Inclusions Abundant medium quartz

Source Probably Worcester (Morris 1980, 224)

Fabric 64.1 Worcester-type sandy glazed ware

Manufacture Wheelthrown

Hardness Hard to very hard

Colour Oxidized orange-red (5YR 5/6) but often with reduced grey (N4/0) surfaces

Surface treatment Impressed decoration frequent; normally green (reduced iron) glazed

Inclusions Abundant medium-coarse quartz

Source Probably Worcester (Morris 1980, 225)

Fabric 64.2 Glazed buff sandy ware

Manufacture Wheelthrown

Hardness Hard

Colour Usually off-white or buff (10YR 7/6) often with grey core

Surface treatment Often has pinkish orange (7.5YR 6/6) wash; applied strip or stabbing decoration frequent; speckled green (copper coloured) glaze

Inclusions Abundant medium to coarse quartz; occasional large red sandstone inclusions

Source Possibly Staffordshire, Warwickshire

Fabric 64.3 Green glazed white ware

Manufacture Wheelthrown

Hardness Hard

Colour White (10YR 8/1) throughout

Surface treatment Mottled (copper) green speckled yellow glaze

Inclusions Abundant, medium, well-sorted quartz; occasional iron-rich (usually <1.0mm) speckles

Source Unknown, but probably a coal measures area

Fabric 69 Oxidized glazed Malvernian ware

Manufacture Wheelthrown

Hardness Hard

Colour Usually orange (5YR 5/8)

Surface treatment Copper speckled orange glaze generally applied

Inclusions Sparse to moderate Malvernian rock fragments; moderate medium quartz

Source Malvern Hills area (Vince 1977, 269-70)

Fabric 70 Southern white ware

Manufacture Wheelthrown

Hardness Hard

Colour White to off-white (10YR 8/3)

Surface treatment Overall bright green glaze

Inclusions Moderate, usually well-sorted, fine (<0.1mm) quartz

Source Hampshire area

Fabric 75 North Devon gravel tempered ware

Manufacture Wheelthrown

Hardness Very hard

Colour Brown (7.5 YR 6/4) to grey (10YR 5/1)

Surface treatment Overall blotchy green/yellow glaze

Inclusions Abundant coarse (usually <3.0mm) quartz

Source North Devon (Grant 1983)

Fabric 77 Midlands yellow ware

Manufacture Wheelthrown

Hardness Hard

Colour Pale buff (2.5Y 8/2)

Surface treatment Bright yellow glaze usually applied overall

Inclusions Sparse fine quartz

Source Midlands

Fabric 78 General category, Post-medieval red wares

Manufacture Wheelthrown or press moulded

Hardness Hard or very hard

Colour Red or purplish throughout.Surface treatment Usually red slipped internally and externally; overall black glaze. Sometimes slip decorated

Inclusions Moderate medium quartz

Source Probably Midlands

Fabric 81 General category for stonewares

Fabric 82 General category for tin glazed ware

Fabric 91 General category for post-medieval buffwares

Fabric 98 Unidentified Roman wares

Fabric 99 Unidentified medieval wares

Fabric 101 Unidentified modern wares

Appendix 10 Catalogue of medieval floor tiles (not illustrated)

Identified by H A White

1 Fragment, two-colour design, honey coloured glaze. *Fleur-de-lis* design, set diagonally (context 1100).

2 Fragment, yellow (pale), cut diagonally. Similar glaze and colour to cat no 1 (CG 48).

3 Fragment, dark brown, heavily glazed on side and rear (where finger prints remain), sulphur yellow in parts on sides. Slight bevel. 32mm thick (context 1121).

4 Fragment, dark brown, highly fired. Flat edge, 30mm thick (context 1121).

5 Fragment, completely worn surface, very slight bevel. Much glaze on side and reverse (CG 48).

6 Fragment, poor quality brown glaze, sanded on reverse. Cut diagonally, then glazed afterwards (CG 38).

7 Joining fragments (2), extremely dark thick green-brown glaze (unworn?). The tile was cut into nine fragments (two here) prior to being glazed. Size range *c* 125mm, sanded on reverse (CG 38).

8 Fragment large, 38mm thick, unglazed tile (CG 47).

9 Fragment dark brown glaze, unworn. Possibly a waster; two large accretions present on side, and evidence that the tile was badly split before breaking, as glaze through depth of tile. Good quality clay, small clay inclusions and small white grits. Bedded in coarse sand (CG 47).

Appendix 11 HWCC tile and brick fabric series

Fabric 2a Common Sandy Type

Colour Usually red or orange throughout

Inclusions Moderate to abundant, variably sorted quartz (<1mm)

Form Both brick and tile

Hardness Usually hard

Fabric 2b

As above except that coarser inclusions are present (>1mm)

Fabric 2c

As above except for moderate clay pellet/grog inclusions

Fabric 2d

Colour Red throughout with pale buff banding usually evident

Inclusions Sparse to moderate, medium (0.5-1.5mm) quartz.

Form Roman and later roofing tile.

Hardness Hard, dense fabric

Fabric 2e

Colour Pale buff, sometimes with off-white laminations

Inclusions Abundant, well-sorted, medium (0.1-0.5mm) quartz

Form Roman roofing tiles

Hardness Hard, dense fabric

Fabric 3 Malvernian

Colour Usually oxidised orange/buff throughout, patchy copper green glaze

Inclusions Sparse Malvernian rock inclusions (usually <5mm); moderate medium (0.1-0.5mm) quartz

Form Ridge and flat roof tile

Hardness Hard

Fabric 10 Unidentified fabrics

Appendix 12 catalogue of metal objects

Identified by V A Buteux

	Description	Count	CG	Phase	Date
Silver					
1	Twisted wire fragments, binding?	19	48	8	Post-medieval
Cu alloy					
2	Frag rectangular sectioned bar, 2mm wide, 1.5mm thick	1	11	4	Roman
3	Small fitting, 15mm long, part of toilet set/box fitting	1	22	4	Roman
4	Unident frag	1	25	4	Roman
5	Frag pin, 1mm diam	1	7	2	Roman
6	Pin shaft, 1mm diam	1	7	2	Roman
7	Cauldron foot, cast	1	47	8	medieval
8	Pin, 40mm long, spiral-wound globular head	1	0	9	16th-17th
9	Pin, 30mm long, spiral-wound globular head	3	48	8	16th-17th
10	Pin, 40mm long, spiral-wound globular head	1	48	8	16th-17th
11	Pin, 30mm long, spiral-wound globular head	1	47	8	16th-17th
12	Lace end (?)	2	48	8	16th-17th
13	Lace end	1	0	8	16th-17th
14	Lace end	1	47	8	16th-17th
15	Strip of sheet metal,35mm long,	1	48	8	?
16	Frag of small bar, 1.5-3mm wide semi-circular section, 18mm long, 4mm thick	1	48	8	?
Iron					
17	Nail	1	7	2	Roman
18	Hobnail	1	7	2	Roman
19	Unident object	3	7	2	Roman
20	Unident object	1	13	4	Roman
21	Nail	1	19	4	Roman
22	Nail shaft	1	19	4	Roman
23	Tack	1	22	4	Roman
24	Knife tang and part blade, X-ray shows treated edge, (?)hardened	1	22	4	Roman
25	Unident object	1	24	4	Roman
26	Nail	1	25	4	Roman
27	Nail shaft	1	30	4	Roman
28	Hobnails	30	31	4	Roman
29	Hobnail shafts	14	31	4	Roman
30	Hobnail heads	5	31	4	Roman

31	Unident object	1	33	4	Roman
32	Tacks	6	34	4	Roman
33	Nail shaft	1	37	4	Roman
34	Tacks	12	40	6	Roman
35	Nail/tack heads	6	40	6	Roman
36	Nails	8	40	6	Roman
37	Nail shafts	2	40	6	Roman
38	Rod, 55mm long, 6mm diam	1	40	6	Roman?
39	Frag sheet metal	1	40	6	Roman?
40	Frags spirally twisted rod, one with pointed end	4	40	6	Roman?
41	Nails	3	47	8	?
42	Folded frag sheet metal	1	47	8	?
43	Nail	1	48	8	?
44	Frag unident (?)tool	1	48	8	?
45	Frag of curved strip, 100mm long, cleaned	1	48	8	?
46	Nail	1	0	9	medieval?
47	Nail frags	3	0	9	?
48	Bar, 60mm long	1	0	9	?
49	Oval patten sole	1	0	9	18th
Lead					
50	Window cames	2	0	9	post-medieval

Appendix 13 Catalogue of stone artefacts and building stone

Identified by C H Dalwood

	form	count	weight	CG	Phase	date
Lias						
1	?paving	1	32g	22	4	Roman
2	?paving	1	4100g	24	4	Roman
3	?paving	1	84g	47	8	Roman?
4	?paving	2	740g	47	8	Roman?
5	?paving	1	128g	47	8	Roman?
6	?paving	1	308g	47	8	Roman?
Sandstone						
7	?millstone	1	332g	40	6	medieval
8	building material	1	260g	0	9	Post-medieval
9	millstone	1	320g	47	8	Post-medieval
Limestone						
10	building material	1	10g	48	8	Post-medieval
Quartz conglomerate						
11	quern	1	3520g	19	4	Roman

Appendix 14 Catalogue of glass fragments

Identified by V A Buteux

	Description	count	weight	CG	Phase	date
1	Vessel, pale yellow	1	<0.5	8	2	Roman
2	Vessel, pale green	1	<0.5	31	4	Roman
3	Vessel, pale green	1	2	34	4	Roman
4	Vessel, turquoise	2	30	47	8	Roman
5	Window, decayed	4	4	48	8	Medieval
6	Vessel?, decayed	1	4	48	8	Medieval?
7	Bottle body sherd	1	38	23	4	Post-medieval

Appendix 15 Classification of slags and related material

J G McDonnell

Diagnostic slags

Tap Smelting Slag (TAP). Silicate slag generated by the smelting process, ie the extraction of the metal from the ore. It is characterised by its ropy, flowed, morphology caused by the freezing of the slag in viscous flow. In general tap slag occurs as irregularly shaped pieces ranging in size from a few millimetres to 100mm maximum length.

It is generally assumed that the slag is run out of the furnace either in channels or into small pits in front of the furnace. It is probable that most large pieces are broken up, thus losing the overall shape. However in two cases further characteristic shapes may be formed. These are tap slag plates and tap runners or flows. The plates are rare and are probably accidental, since they are usually quite thin. If the slag is run into deep pits they form slag cakes.

There were some examples of the second morphologically distinct form of tap slag, the slag flows or runners, ie complete runs of tap slag. These were formed either during the tapping of the furnace or possibly by accidental breakouts of slag due to fracturing of the furnace wall. Tap slag was the predominant type of smelting slag in the Deansway material.

Smelting Slag (SMELT). There was one other type of smelting slag that occurred less regularly and was therefore grouped under the general heading of SMELT. This was originally described as "dense tap slag". It was clearly derived from the smelting process, since it was fine grained, and had an overall high "apparent density", ie it lacked air bubbles and non-slag inclusions. The colour, fracture etc was typical of tap slags but the pieces were larger than the average lump of tap slag (ie was fist-sized or bigger) and lacked the ropey morphology.

Smithing Slag (SSL). Randomly shaped pieces of silicate slag generated by the smithing process. A few pieces of SSL were stained by copper alloy, indicative of joint use of a hearth for ferrous and non-ferrous working.

Hearth Bottom (HB). A plano-convex accumulation of silicate slag formed in the smithing hearth.

Ore. Lumps of possible iron ore or partially reduced iron ore. Confirmation by chemical/mineralogical analysis is required for these identifications.

Non-diagnostic slags and residues

Hearth Lining (HL). The clay lining of an industrial hearth, furnace or kiln that has a vitrified or slag-attacked face. Also included within this group were pieces of slag attacked tile or similar material. In some cases the hearth lining was stained with copper alloy indicative of its use in non-ferrous working.

Other Material (Other). This normally comprises fragments of metallic iron, fuel, or ferruginous stone/concretion (not 'iron ore').

Appendix 16 Tabulation of slag by phase

Identified by J G McDonnell

Phase	CG	TAP	SMELT	SSL	HB	HL	ORE
Phase 2	2	134					
Total Phase 2		134					
Phase 3	12					26	
Total Phase 3						26	
Phase 4	10			97			
	13	574					
	22	750				85	
	19	120					
	22	750				85	
	23	20					
	24	1052					
	25	644					927
	26	15					
	27	47					17
	28	195					
	30	9396	370			101	266
	33	40					
	34	1690					
	37	256				68	
	50	2652					
Total Phase 4		17451	370	97	0	254	1210
Phase 6	40	11321		83			
Total Phase 6		11321	0	83	0	0	0
Phase 8	46	14					
	47	7476			290		
	48	4411					
Total Phase 8		11901	0	0	290	0	0
Phase 9	49	5159					
Total Phase 9		5159	0	0	0	0	0
Unstrat		16328	12371	95	0	0	0
Grand total		62294	12721	275	290	280	1210

Appendix 17 Tabulation of slag-related material (OTHER)

Identified by J G McDonnell

Phase	CG	OTHER	OTHER TYPE
Phase 2	2	292	ssl or fe
Total Phase 2		292	
Phase 4	22	52	fe
	25	19	stone?
	30	280	bloom?
	30	529	ferugineous concretion
Total Phase 4		880	
Phase 9	1211	8063	crucible
Total Phase 9		8063	
Grand total		9235	

Figure 1

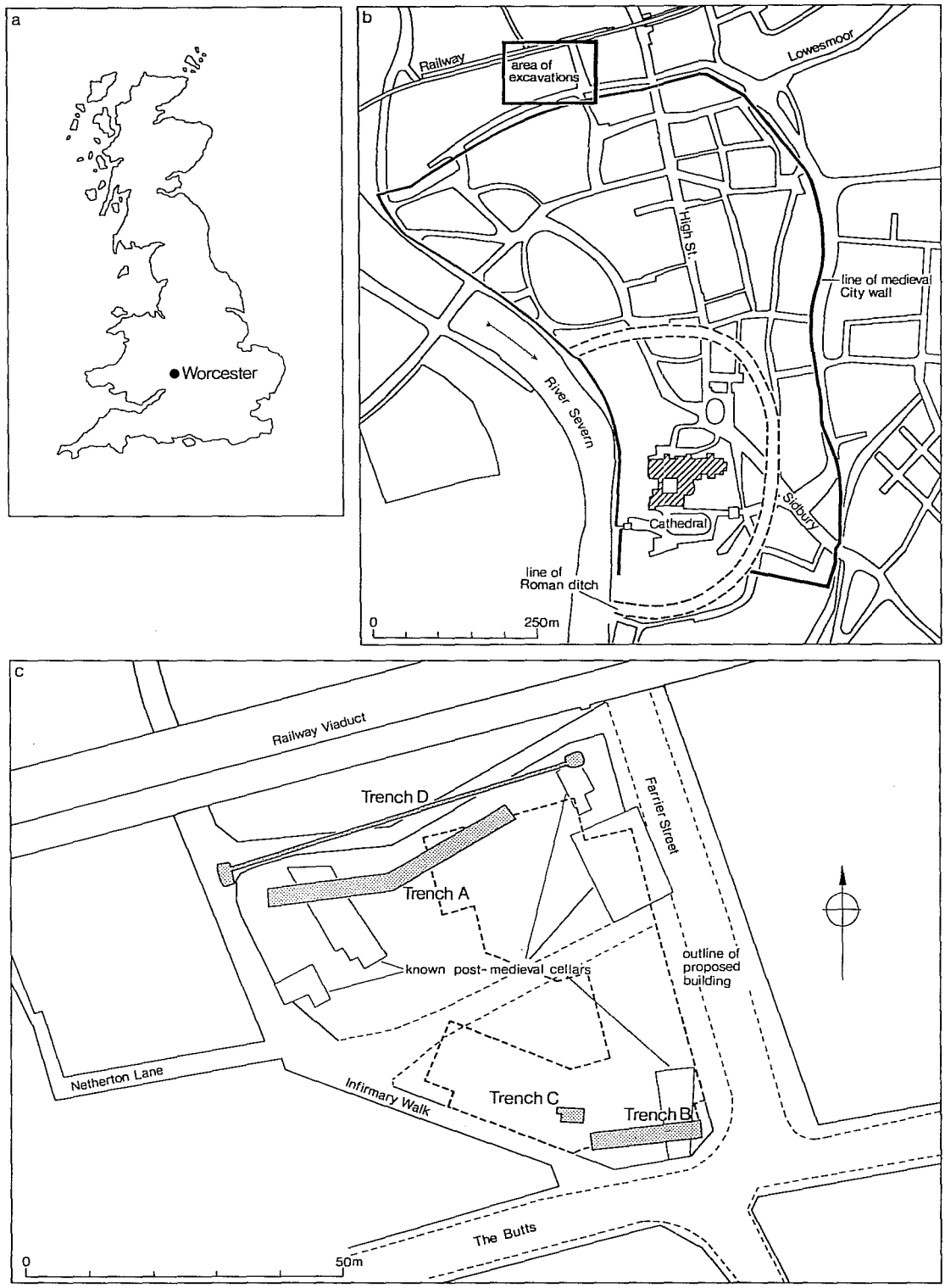

a
Worcester
b
Railway
area of excavations
Lowesmoor
High St.
line of medieval City wall
River Severn
Cathedral
Sidbury
line of Roman ditch
0
250m
c
Railway Viaduct
Trench D
Farrier Street
Trench A
known post-medieval cellars
outline of proposed building
Netherton Lane
Infirmary Walk
Trench C
Trench B
The Butts
0
50m

Figure 2

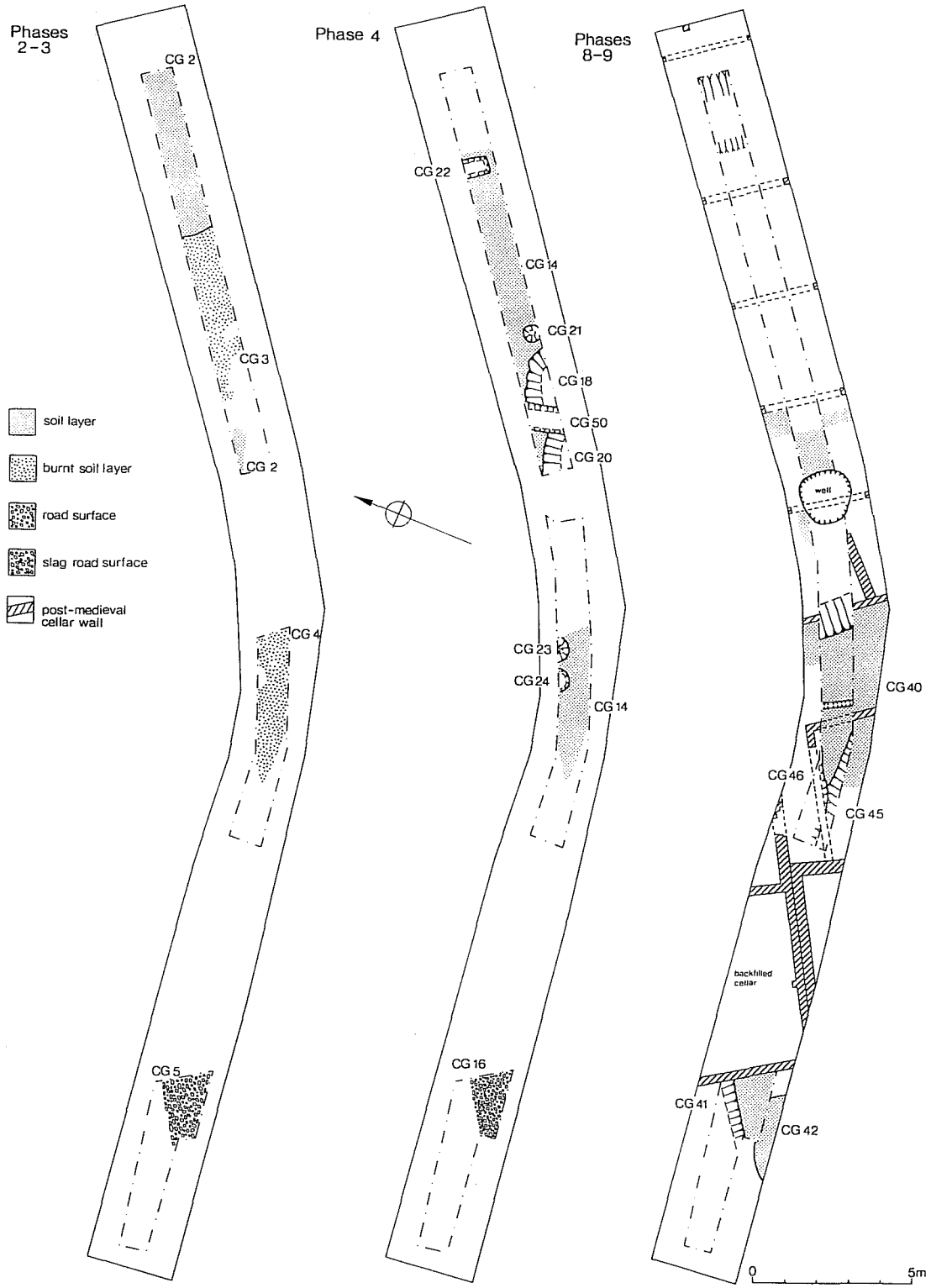
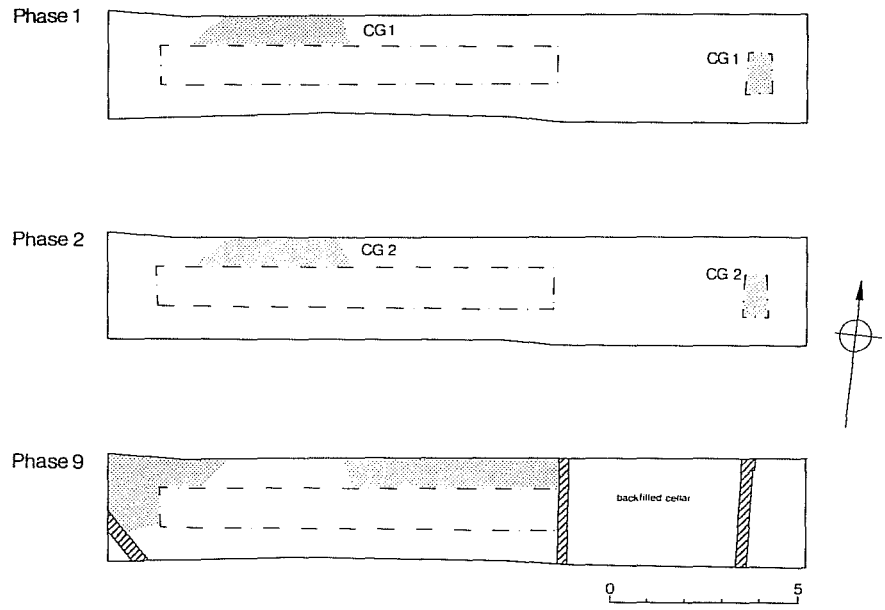

Phases 2–3
Phase 4
Phases 8–9
CG 2
CG 3
CG 2
CG 4
CG 5
CG 22
CG 14
CG 21
CG 18
CG 50
CG 20
CG 23
CG 24
CG 14
CG 16
well
CG 40
CG 46
CG 45
backfilled cellar
CG 41
CG 42
soil layer
burnt soil layer
road surface
slag road surface
post-medieval cellar wall
0
5m

Figure 3



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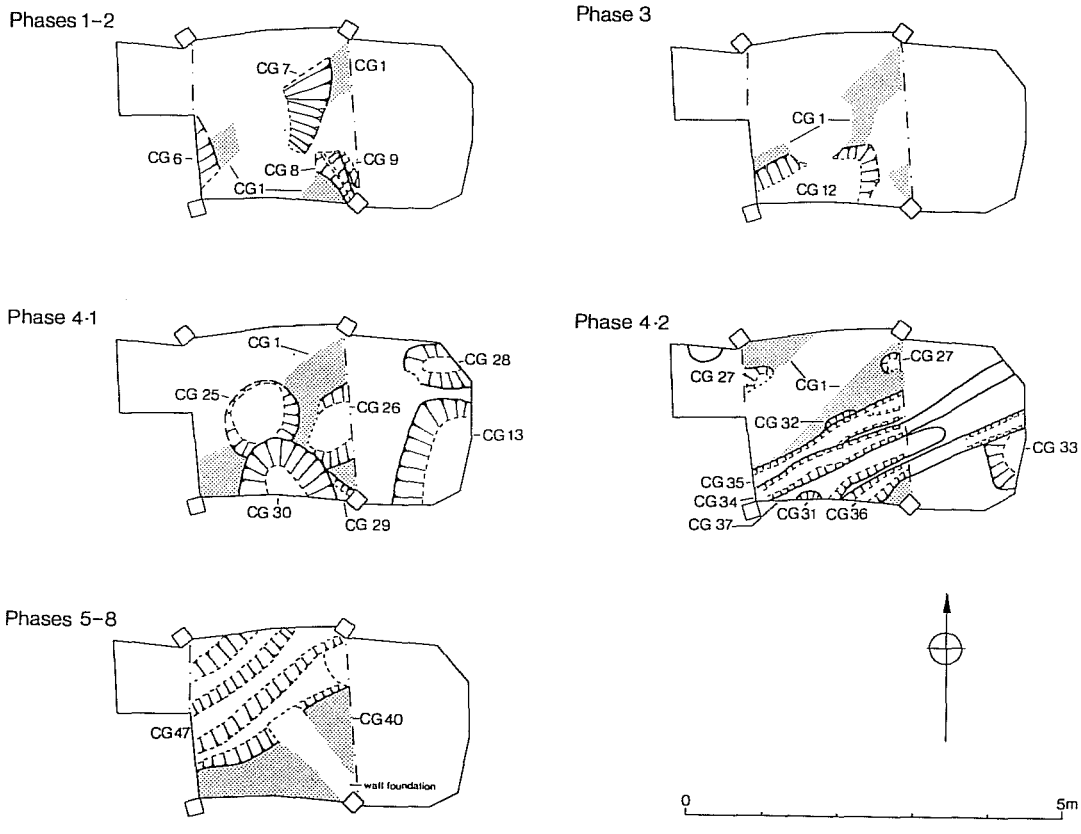


Figure 5

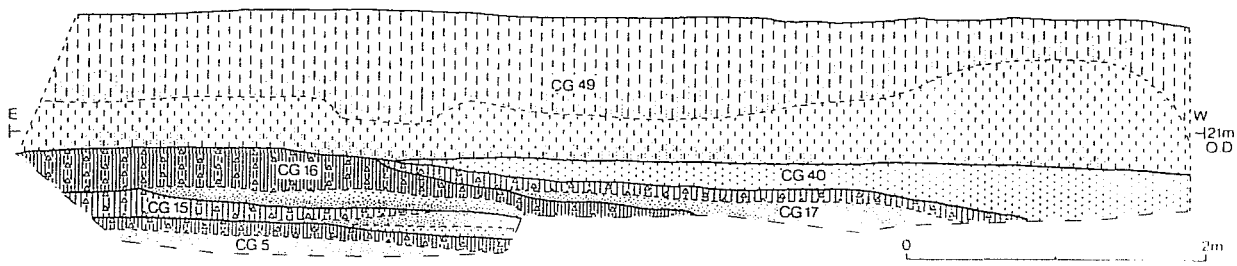


Figure 6

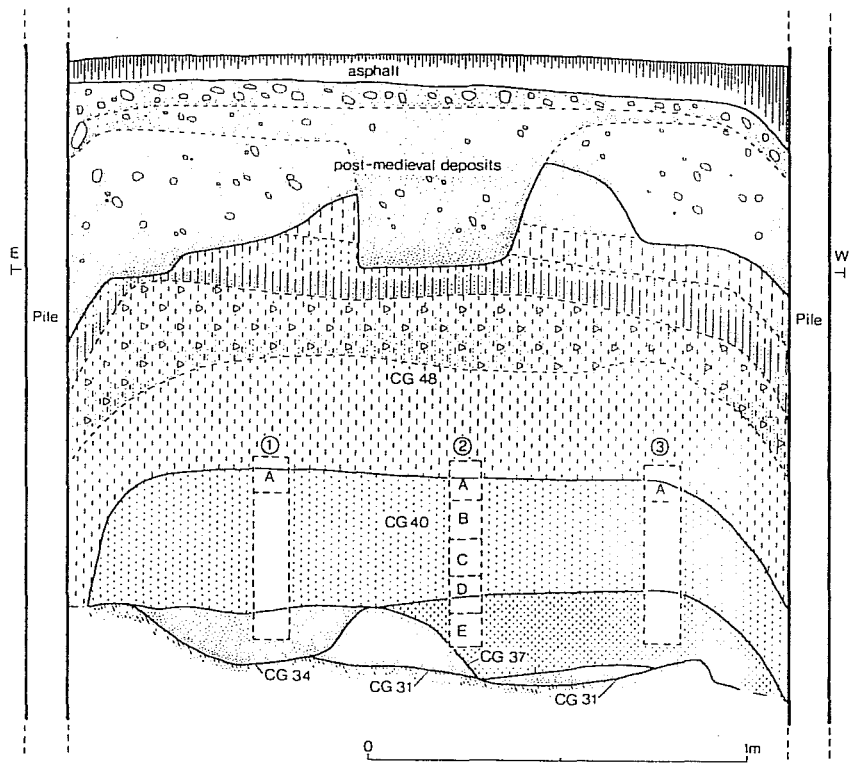


Figure 7

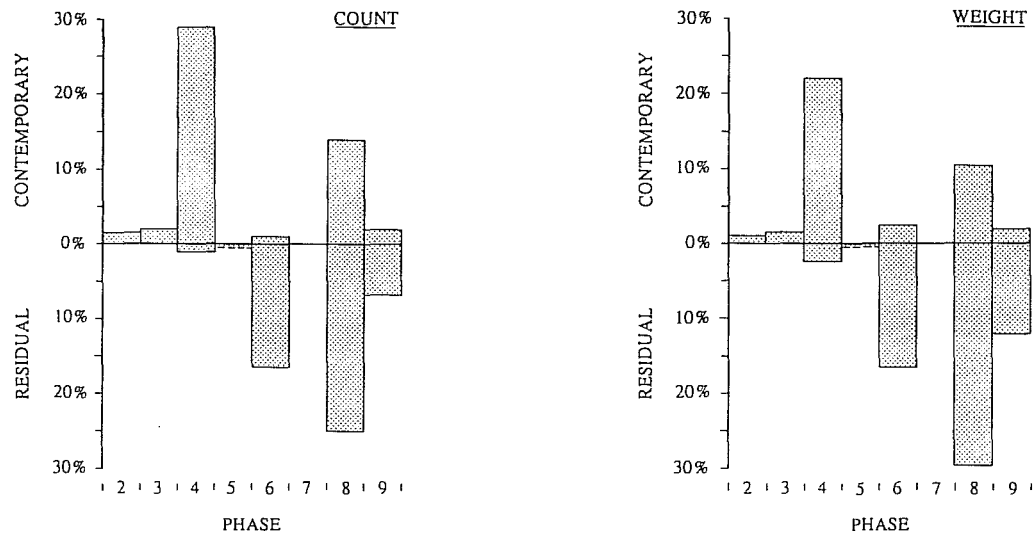


Figure 8

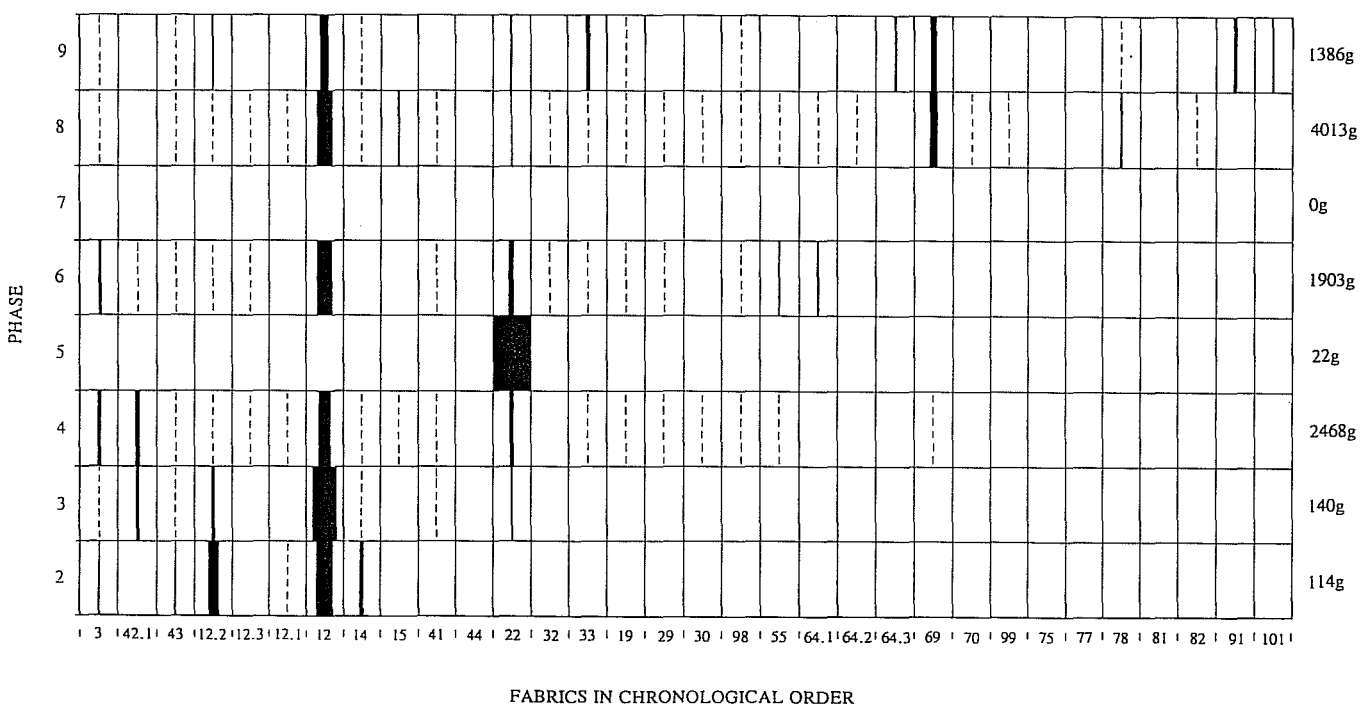
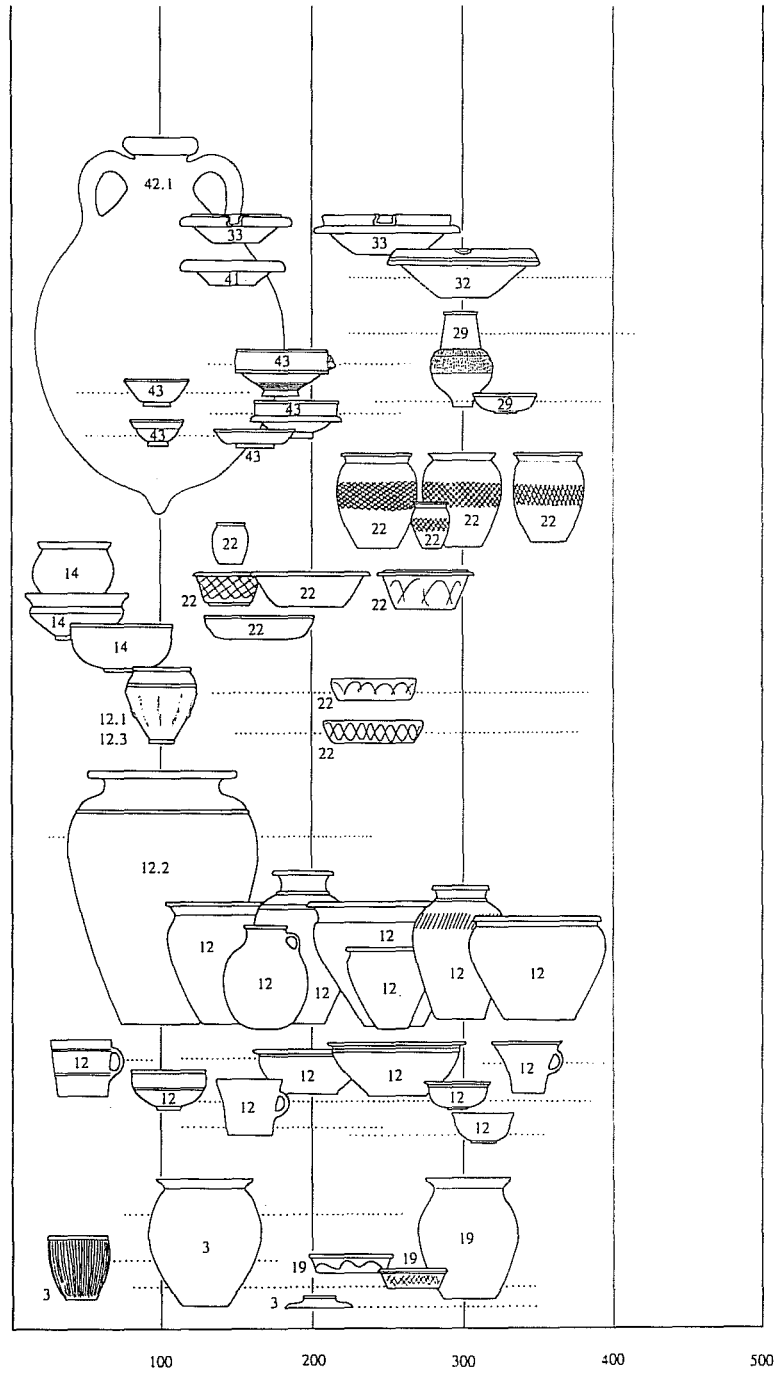


Figure 9


42.1
33
41
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32
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43
29
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22
22
22
22
14
14
14
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22
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12.1
12.3
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12.2
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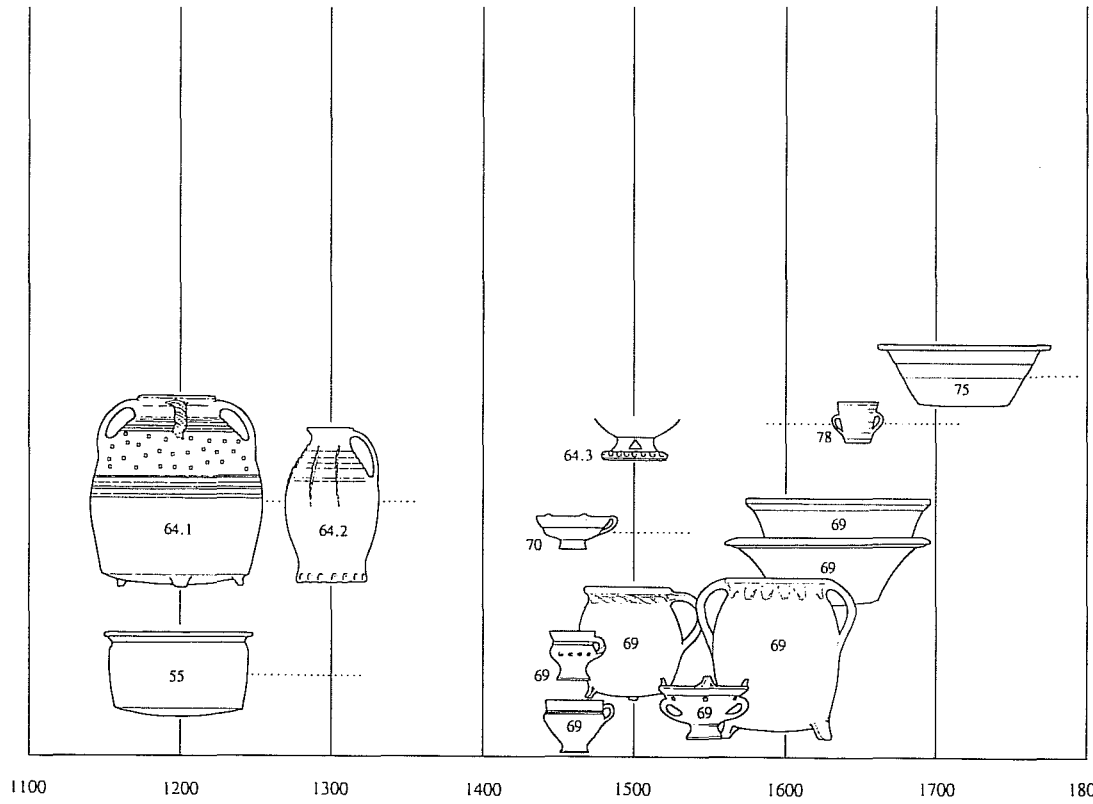
12
3
19
19
19
3
3
100
200
300
400
500

Figure 10


64.1
64.2
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64.3
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75
69
69
69
69
69
69
69
1100
1200
1300
1400
1500
1600
1700
1800

Figure 11

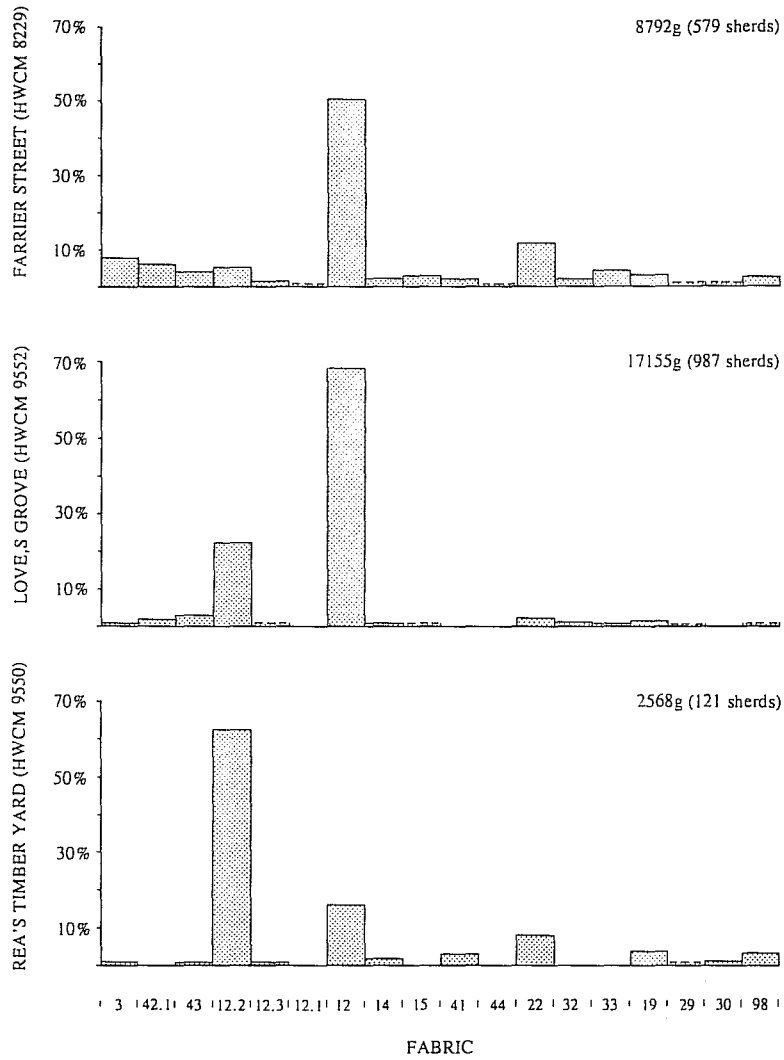
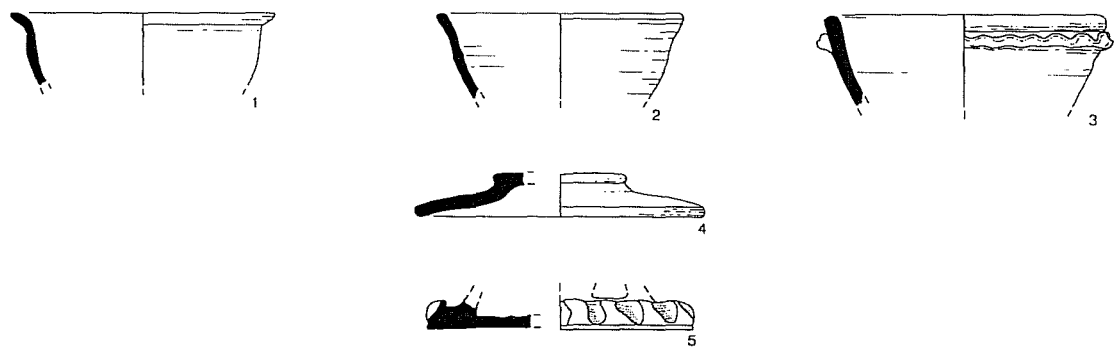


Figure 12



1 Fabric 12, bowl, HWCM 8229, CG 40, phase 6;
2 Fabric 12, bowl, HWCM 8229, CG 20, phase 4;
3 Fabric 12, HWCM 9552, context 13, Roman 3rd century;
4 Fabric 3, lid, HWCM 8229, CG 13, phase 4;
5 Fabric 64.3, chaffing dish, HWCM 8229, context 1121, phase 9.

Figure 13

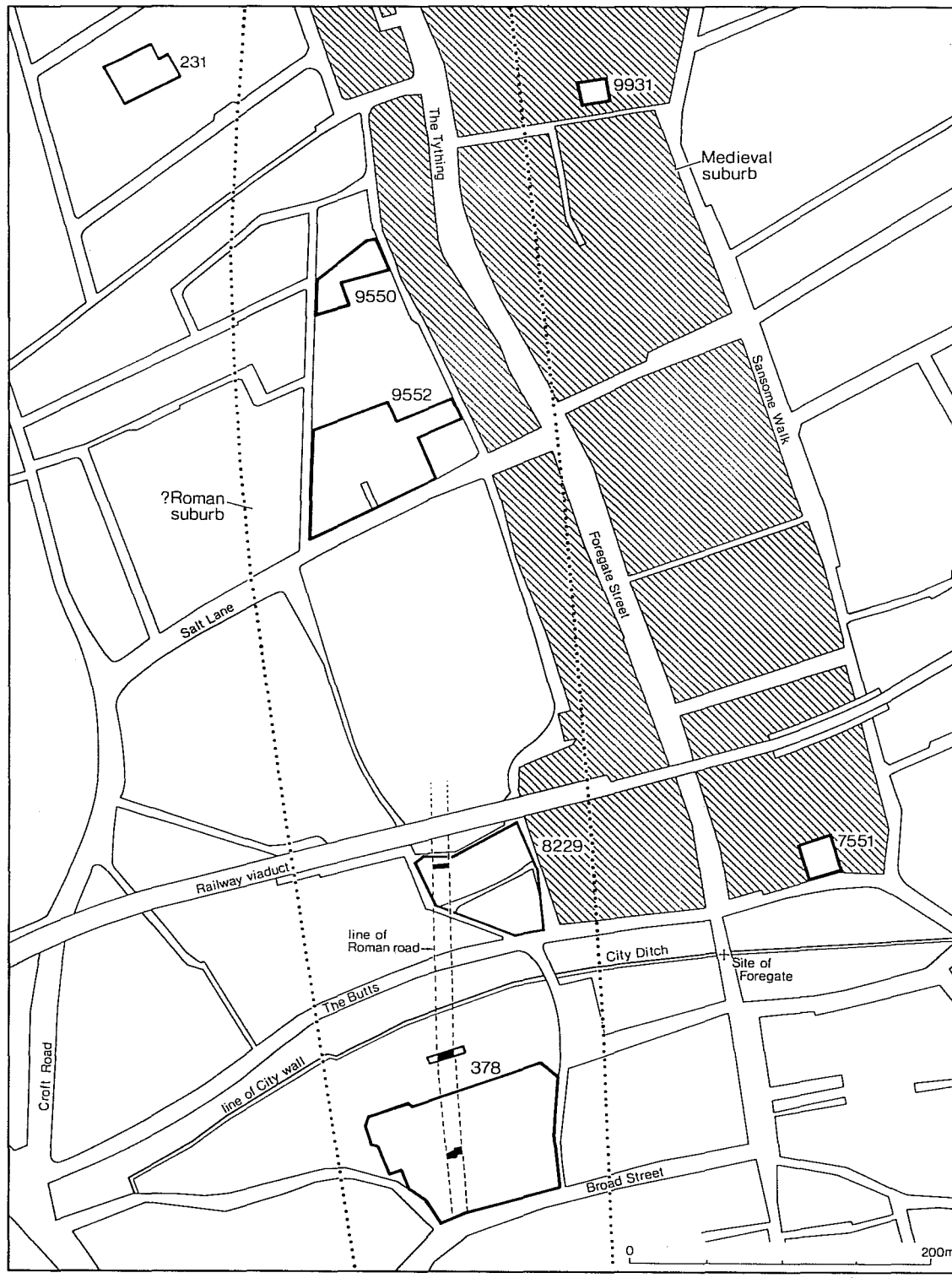
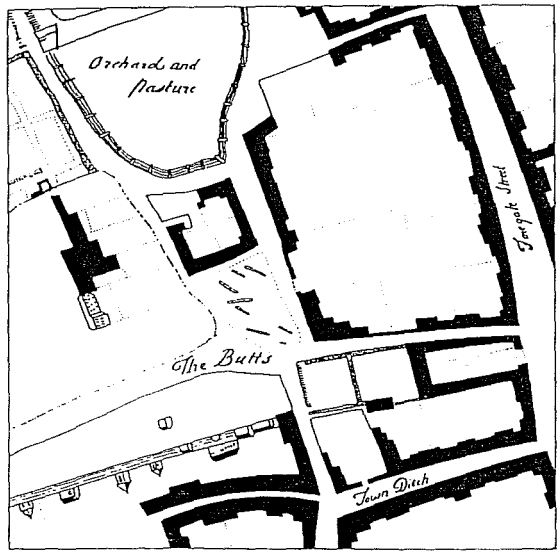
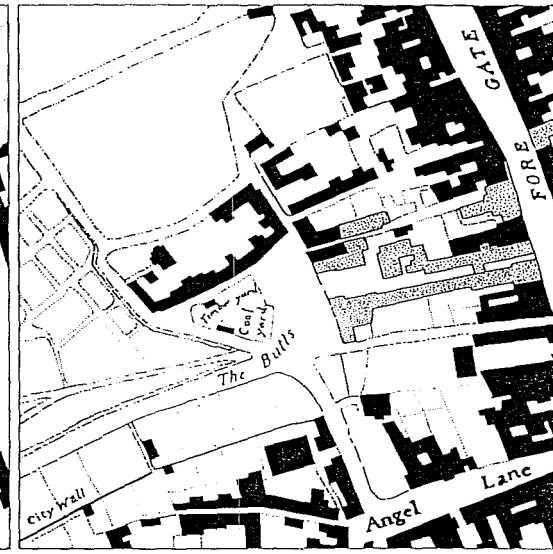

231
9931
The Tything
Medieval suburb
9550
9552
Sansome Walk
?Roman suburb
Foregate Street
Salt Lane
8229
7551
Railway viaduct
line of Roman road
City Ditch
Site of Foregate
The Butts
Croft Road
378
line of City wall
Broad Street
0
200m

Figure 14



after Broad, 1768

Figure 15



after Young, 1779

Figure 1