Roman small finds, glass and leather from excavations at the Broadgate ticket hall site, Liverpool Street (XSM10)

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1 General introduction and acknowledgements

This archive report documents the Roman accessioned ('registered') small finds, glass and leather from the archaeological excavations at the Broadgate ticket hall site, Liverpool Street, London (centre NGR 533050 181610; site code XSM10), developed by Crossrail Limited. It does not include discussion of building material or pottery vessels from the site that have also been individually accessioned for archival purposes.

Excavated by MOLA (Museum of London Archaeology) in several stages between 2011 and 2015, the site was published as two volumes in the Crossrail Archaeology Series (CAS) in 2017 (Hartle 2017; Ranieri and Telfer 2017), where a full description of the location, circumstances and key results of the excavations can be found. One volume, *Outside Roman London: roadside burials by the Walbrook stream* (Ranieri and Telfer 2017), covers the site during the Roman period and presents text, illustrations and plans describing its development. The second volume, *The New Churchyard: from Moorfields marsh to Bethlem burial ground, Brokers Row and Liverpool Street* (Hartle 2017), covers the development of the site from the 11th century to the present day; the area of the site included the municipal, non-parochial burial ground, the 'New Churchyard' (1569–1739). This text relating to the Roman artefacts was too large for inclusion in full and should be read in conjunction with that volume. This text employs the same conventions as used in that book (ibid, 1–5). As in that volume, the Broadgate ticket hall site, Liverpool Street, is referred to here as 'the site'. An excavation carried out in 1985–6 immediately to the north of the ticket hall by the Department of Urban Archaeology (DUA) is referred to by its site code, LSS85 (ibid, 2, fig 2). In addition, the archaeological fieldwork carried out across the northern span of Finsbury Circus immediately to the west of Broadgate/Liverpool Street and published as the upper Walbrook valley cemetery site (Harward et al 2015, 1–4) is referred to here as 'Finsbury Circus'; it forms part of what is broadly known as Roman London's northern cemetery.

Site codes are given for MOLA excavations unless specified otherwise. It should be noted also that in the column headings to the summary tables that accompany the text below, land-use codes are defined in the CAS volume (Ranieri and Telfer 2017), context numbers appear within square brackets, for example [1], and finds accession numbers appear within angled brackets, for example <1>. Only selected items are illustrated.

The total assemblage discussed here comprises 455 individually accessioned Roman small finds, 81 sherds of Roman vessel glass and 51 leather shoes (Table 1; Table 2). This includes all finds that are intrinsically dated to the Roman period (including those in post-Roman contexts) and undatable finds that are not demonstrably intrusive from period 3 to period 5 phase 2. While the number of finds assigned to each site period varies significantly (Table 1), this is principally a result of the different length of each period, and the volume of deposit accumulated/excavated for each, rather than differences in the intensity of finds deposition.

The site lies within the upper Walbrook valley and, due to the waterlogged character of elements of the stratigraphic sequence, the finds were generally well preserved and some areas of the site produced waterlogged organic finds. These were found throughout the stratigraphic sequence, not just in the earliest deposits as is the case on some sites in London (Table 9). The major periods of Roman activity on the site, period 4 phase 1 to period 5 phase 2, probably spanned around 280 years, *c* AD 120–410+. The result of the combined rate of finds deposition/recovery during this period seems to vary only modestly with the main phases of depositional activity coinciding with major landscaping events in period 4 phase 1 and period 5 phase 1 and with the use of the cemetery in period 4 phase 2.

An overview of the small finds assemblage and some general comments are provided in the introductory section (Chapter 2.1), which can be read alongside the discussion in the main site monograph (Ranieri and Telfer 2017). This is followed in Chapter 2.2 by short summaries of each element of the small finds assemblage classified by function, and discussion of the glass in Chapter 3 and the leather in Chapter 4. As the finds are discussed in their stratigraphic context within the main site monograph, the periodisation and provenance of finds is only considered in detail below where it is thought to be noteworthy or supports a specific line of argument. However, full details linking individual identifiable finds to the stratigraphic archive are provided in a more systematic fashion in summary tables (Table 2; Table 5; Table 8; Table 9). An MS Excel spreadsheet of the diagnostic Roman finds from the excavation with full archival details and catalogue entries is also being lodged with the Archaeological Data Service (https://archaeologydataservice.ac.uk).

Grateful acknowledgement is made to Crossrail Limited who funded the excavation work and preparation of this report, and in particular to Jay Carver, lead archaeologist at Crossrail Limited. Special thanks are due to the MOLA fieldwork team, led by Alison Telfer, with fellow project officers Andy Dakin and Greg Laban, and to the many site supervisors and numerous archaeologists who worked on the site.

The final analyses of the accessioned small finds, glass and leather outlined below were undertaken by Michael Marshall. Angela Wardle contributed to the original assessment of the assemblage and also provided valuable advice on a number of issues, particularly relating to glass and the distribution of hipposandals in Roman London (for previous work by Wardle on this topic: Harward et al 2015, 84). Rachel S Cubitt, who worked together with the present writer on the post-medieval finds from the site, also assisted in preparing the Roman finds for publication, contributing points to several catalogue entries and helping to organise the illustrations. Owen Humphreys shared a number of valuable observations about the iron tools from the site which he examined as part of his PhD research while post-excavation analysis was ongoing. At the assessment stage Cubitt and Marshall undertook a basic quantification of the iron nails from the site by weight, count and condition that is included in the site archive (site total 3587 fragments; number of hobnails given in Table 10). There was limited variation in the Roman nail assemblage, none came from Roman burials, and as the post-excavation assessment determined that they had very modest analytical potential no detailed analysis of the Roman nails was undertaken.

The principal finds processors for the site were Graham Kenlin, Sarah Matthews and Riley Thorne; the main conservator was Elizabeth Goodman; the photographs were taken by Andy Chopping and Maggie Cox; and the illustrators were Faith Vardy and Hannah Faux.

2 Roman small finds

2.1 Introduction and overview

A total of 455 accessioned Roman small finds are quantified by material and period in Table 2. Of these, 245 small finds are assigned to a functional group (1–14). These groups are derived from functional categories defined by Crummy (1983). By including metal- and wood-working offcuts/waste this figure rises to 321. The assemblage is quantified and discussed in these terms below and the totals are summarised in Table 3. These same figures are expressed as percentages of period totals in Table 4. (Summary details of individual small finds are given in Table 5.) These summary totals are inevitably overly simplistic and do not reflect the complex, nuanced or multiple uses to which artefacts were put, nor the considerable ambiguity that remains over the precise function of many classes of Roman finds. Nonetheless, functional categories provide a helpful framework within which to characterise an assemblage and to structure discussion.

Although metalwork was fairly well preserved overall, a substantial proportion of the assemblage was made up either of waste or of fragmentary pieces of sheet, bar, small unidentifiable object fragments, irreparably corroded lumps or objects that are relatively undiagnostic, such as small fragments of chain or simple ring fittings. This material is described in the MS Excel archive catalogue but is not discussed further in any detail within this report.

As is the case with most Roman assemblages from London, 'dress accessories' and 'fixtures and fittings' form the two largest categories. As such the assemblage is not dramatically different from assemblages found in the intramural area, unsurprising given that many of the finds probably represent rubbish produced by those dwelling within the town. The present assemblage, however, does have some other distinctive characteristics, particularly the strong representation of writing equipment, tools and transport equipment.

While the presence of these finds should be considered a real and important feature of the assemblage, some care is needed in placing them in context. Similar patterns have been observed in many other assemblages recorded from along the line of the Walbrook valley where waterlogging ensures good preservation of organics and metalwork. For example, iron tools, hipposandals, styli and wooden writing tablets are all probably significantly under-represented in drier areas of the town where they have not survived or are less easily identifiable. The peculiar character of deposition in the valley, which probably featured (to varying extents) dumping on marginal land, concerted programmes of land raising and votive deposition, further complicates the matter. The marginal and eventually extramural location of the Broadgate ticket hall site, Liverpool Street, together with the absence of buildings, all point to the fact that some elements of the finds assemblage must have been deposited at some distance from their original point of use, probably within the Roman town, although a group of finds such as hipposandals and transport equipment can be directly related to the traffic along the road.

The amount of writing equipment, as a percentage of the entire identified assemblage assigned to functional category, is much higher than at most dry sites, but is not dissimilar to that recorded from the intramural upper Walbrook assemblage at 8–10 Moorgate, City of London (MOQ10), a short distance to the south, where there were similar preservation conditions and where the main focus of activity and finds deposition is again of 2nd- to 4th-century AD date (Pitt and Telfer in prep). It would be imprudent to assess variation in literacy rates based purely upon gross quantities of writing equipment when this is so highly

dependent on preservation and on forms of deposition (Tomlin 2016; Marshall and Wardle in prep), but a wider comparative survey focusing only on waterlogged sites in the future may be more informative.

The tools are of varied character, relating to a variety of crafts including metal-, wood- and textile or leather working. They are widely distributed both across the site and through its stratigraphic sequence, and do not obviously indicate a concentration of craft activity around a single local workshop or at any specific point in the site's history. Given the lack of excavated building of any kind, any workshops in the vicinity must have sat outside the site outline, and it is equally or more probable that the finds originated from one or more sources within the town. Regardless, the quantity of metalworking tools and waste in particular is still worthy of some note in terms of the economy of Roman London more generally, and an ongoing PhD project on the distribution of iron tools across Roman London by Owen Humphreys may help to clarify their precise topographic significance.

The large assemblage of hipposandals, on the other hand, has an obvious local stratigraphic context and, along with several terrets which derive from vehicles, can be directly related to traffic along the road. Much of this transport equipment comes from road-related contexts such as metalled road surfaces, wheel ruts, road make-up layers and roadside ditches. This assemblage attests to animals travelling along the extramural road, varying considerably in size and perhaps species (horses certainly but also possibly oxen, donkeys or mules), with at least some of them pulling wheeled vehicles. This assemblage forms part of the wider concentration in the distribution pattern of these objects previously commented on by Wardle, and may also be associated with the large amounts of horse (*Equus caballus*) remains found in the northern extramural area (Harward et al 2015; Ranieri and Telfer 2017, 77–81). While the area has also produced a moderate amount of leather footwear and hobnails, some from roadside ditches, it is less clear whether any of this material can be associated with pedestrian traffic or whether this is simply domestic waste. The absence of hobnails from the road surface is worth noting but may be a reflection of their small size and the way the road surface was excavated (principally with mattocks and shovels), rather than an indication that no hobnails were shed by pedestrian traffic.

Another major element of *in situ* activity within the site sequence is the Roman cemetery. Only one object, iron wrist ring <1142>, can be formally identified as a grave good, having been found on the right wrist of a decapitated adult male inhumation burial, aged 26–35 years with a radiocarbon modelled date *cal AD 125–225* (Ranieri and Telfer 2017, 5, 201–9, fig 127 (Bu6)). This find, though unusual, can almost certainly be linked to related finds found on adjacent extramural cemetery sites in the form of iron leg/ankle rings (Harward et al 2015, 95–6, 144 (Bu30/1), 148 (Bu73/1)). This iron ring burial tradition appears to have been a distinctive feature of the upper Walbrook cemetery at Finsbury Circus and has only been noted at one other cemetery in Roman Britain, at Driffield Terrace, York (Yorkshire) (Cool 2015, 2–6). The wider significance of the burial and of the related finds is discussed further below (2.2, functional group 1) and in the main site monograph where the osteological analysis and radiocarbon dates are presented in greater detail (Ranieri and Telfer 2017, 87–99).

No other small finds, glass or shoes were found in clear/close association with burials.

Non-ceramic grave goods were found in association with several inhumation burials found during earlier excavations at Finsbury Circus, the area to the west of the stream. For example, a 2nd-century AD inhumation found with a copper-alloy circular mirror plate fragment had been partially disturbed by water (Harward et al 2015, 144 (Bu29), fig 107). Copper-alloy mirrors are represented in the Broadgate ticket hall site, Liverpool Street,

assemblage by two small rectangular mirror fragments, <1342> and <2821>, from period 5 phase 1 (below, 2.2, functional group 2).

Other notable non-ceramic grave goods from the earlier excavations in the area include a jet ?pommel, two penannular copper-alloy bracelets, a plain copper-alloy ring and a necklace of blue beads associated with a late Roman adult female inhumation (Harward et al 2015, 140–1 (Bu16), fig 102) and a copper-alloy snake-headed bracelet associated with a late Roman unsexed adolescent inhumation (ibid, 143 (Bu38), fig 106). We have already noted that dress accessories are also very well represented in the Broadgate ticket hall site, Liverpool Street, assemblage (Table 3), but that this is not atypical for the town and it is difficult to say for certain that any given find derives from a burial.

Also from Finsbury Circus was a copper-alloy bell from a late Roman double inhumation of an adult and a child (Harward et al 2015, 151–2 (Bu110 and Bu111), fig 121.3). The bell seems to have been closely associated with the child, perhaps representing a *crepundia* used in life or an apotropaic charm. This association between bells and children is recurrent and has been noted in an ongoing survey of bells from Roman Britain (H Eckardt, pers comm). The present excavations produced a copper-alloy bell of very similar truncated cone form. Example <2891> comes from a period 5 phase 2 deposit (unclassified objects, below, 2.2) and it is possible that it derives from a disturbed child's burial of earlier Roman date. A second bell, <467>, of somewhat similar type from the site was found in a post-medieval context and is thought to be of post-Roman date. The general range of dress accessories found in the burials to the west (bracelets, beads, finger rings) can be paralleled in the present assemblage, but none are precisely the same and in both areas most of the dress accessories cannot be directly linked to burials and might therefore include rubbish, casual losses and offerings which could not easily be distinguished from former grave goods (Wardle 2015, 159–62).

Superficially then the small Broadgate ticket hall site, Liverpool Street, sample presents a somewhat different picture than that recorded for the larger sample of burials from the adjacent areas on the west banks, where a more diverse range of ceramic and other grave goods were recovered, and there was evidence for coffins and shoes in burials (Harward et al 2015, 86–106). However, the iron ring is a very important point of connection. Furthermore, it should be noted that the larger numbers of burials in the area to the west also continue into the late Roman period, in contrast with the 2nd-century AD focus of funerary activity here. As many of the grave goods from the area to the west are of 3rd- or 4th-century AD date, the burial arrangements may not have been as markedly different as they initially appear and need not indicate a difference in status between two contemporary populations. At the Broadgate ticket hall site, Liverpool Street, cemetery it is also possible that some finds derive from disturbed burials; small finds, glass and leather were occasionally found in the same contexts as semi-complete pottery vessels and disarticulated human remains, especially in roadside ditch fills and in deposits that had been laid down by water and perhaps eroded from burials near to the Walbrook (Ranieri and Telfer 2017, 22–5).

Another curious feature of the finds assemblage, not noted in relation to the earlier excavations, might be more speculatively suggested to link to activity within the cemetery. Bone counters, and reworked pottery discs of types that are also often interpreted as counters, are very well represented in the site assemblage by a total of 13 examples. The counter assemblage is heavily concentrated in period 4 deposits within Open Area 5 and Open Area 6 and, in particular, accounts for a very substantial portion of the period 4 phase 2 finds assemblage, that is contemporary with the main phase of funerary activity. Two glass discs from the site, which are discussed with toilet equipment (below, 2.2, functional group 2) on

the basis that they could be improvised palettes, might be argued to indicate similar activity, although they differ somewhat in size and in their date of deposition (period 5 phase 1) as well as in their material.

Given the diversity of these counters or disc-shaped objects it seems unlikely that they represent a scattered gaming set. Instead, given the high number it is possible they may relate to some kind of recurrent pattern of extramural activity that was particularly concentrated during the cemetery period rather than to activity within the town itself. It is of course possible that the cemetery area was used for recreation and that these are chance losses, perhaps from games played either by those visiting the cemetery to remember the dead or those using the space expediently as an area in which to escape from life within the built-up area of the town. There are strong arguments against this interpretation, however, as it could be argued that an area which was probably quite wet, occasionally scattered with human remains and adjacent to a busy road would not be particularly conducive to relaxation or loitering. An alternative hypothesis is that some, or all, of these counters are actually funerary or commemorative offerings, perhaps a poor man's substitute for coins. Coins play important symbolic roles in funerary contexts and this normally results in the deposition of coins within the grave itself, often in direct association with the body (Brown 2008). None of the counters discussed here come from such a context, but they are concentrated in the cemetery phase (period 4 phase 2). Disarticulated human bone was recovered from the roadside ditch (period 4 phase 2) and from gravel dumped on the edge of the Walbrook (period 4 phase 3); this suggests bone displacement by the stream, and clearing and quarrying of burial areas (Ranieri and Telfer 2017, 108–28). A cemetery on the banks of the Walbrook might be an apt spot to 'pay the ferryman' to take the deceased across the river of the dead and into the next life even if the use of substitutes might be thought to undermine the efficacy of such an offering. Overall, the precise funerary significance, if any, of these discs must remain uncertain unless similar patterns are recognised elsewhere.

2.2 The small finds assemblage by function

Dress accessories, personal adornment and shackles (functional group 1, 35 finds; Figs 1–4)

This is a summary of the worn objects from the site. It excludes military belt fittings which are dealt with in the section on militaria (below, functional group 13), but it should be noted some of the brooches discussed here may also have military connotations, particularly penannular <1320> and the two light crossbow brooches, <1035> and <2801>. A knee brooch found during earlier excavations within the cemetery area to the west might also have military associations (Wardle 2015, 159, <S2>, fig 130) as knee brooches are rare finds in Roman London but are fairly common on military sites (Eckardt 2005, 154–6).

Otherwise a fairly diverse cross section of the population, including both men and women, seem to be represented by the dress assemblage, and similar results emerge from the analysis of the poorly preserved assemblage of leather shoes from the site (Chapter 4). Some of the styles of brooch have local Iron Age antecedents, or are at least distinctively Romano-British in style (also headstud and trumpet brooches found in the vicinity: Wardle 2015, 159–60). There are no particularly strong signs of native British influence in the dress/toilet assemblage, as is seen for example in the part-contemporary assemblage from nearby at 8–10 Moorgate (Pitt and Telfer in prep), and many of the dress accessories such as the signet ring and the hairpins are clear indicators of Roman dress traditions derived from the classical world.

Although they were worn, and are thus considered in this section, iron shackle <1040> and iron wrist ring <1142> are, of course, rather different in kind. Reports often place shackles in the 'security equipment' section, but in doing so it is possible to forget that they were worn by human beings and that as with other aspects of dress they will have very visibly denoted some aspect of their identity. Their contexts here seem to stress the symbolic dimensions to their use. In addition to the iron ring, which was found worn on the wrist of an inhumation burial, the shackle comes from a late Roman marsh context where two noteworthy finds of possible votive character were found: lead votive mirror <2143> (below, functional group 2) and destroyed iron candlestick <2436> (below, functional group 4).

Brooches (six finds)

A total of six copper-alloy brooches were recovered. They are classified after Mackreth (2011). The assemblage spans most of the Roman period, at least from the 1st to 3rd centuries AD. Three are types which can be regarded as having military connections.

The earliest are a copper-alloy simple one-piece/Nauheim derivative brooch with a strip bow decorated with punched decoration, <1034> (Fig 1), and a Harlow-type Colchester derivative, <1662> (Fig 1), with a central rib on the bow flanked by channels with rocker decoration. This is the archetypical Harlow brooch as Mackreth type CD Ha.1a (Mackreth 2011, 50–1). Both were in use in the mid–late 1st century AD and thus pre-date the earliest recognised stratigraphic phase of activity on the site, although they were found here in later Roman deposits.

A fragment comes from the lower bow/foot of a copper-alloy bow brooch, <1366> (Fig 1). Firmly assigning it to a type is impossible, but the general shape would perhaps be most appropriate for a trumpet, headstud or related Romano-British brooch, perhaps dating between *c* AD 60 to the mid 2nd century AD. This comes from an early 3rd-century AD deposit.

The sole copper-alloy penannular brooch, <1320> (Fig 1), as Mackreth PEN k5.b, comes from a supposedly pre-Roman context but must be intrusive here. It is a relatively rare type which Mackreth associates particularly with the Roman army. It is a form that was in use from the mid 1st century AD onwards, with a fairly close dated parallel from an early 2nd-century AD context at Staxton (Yorkshire East Riding) (Mackreth 2011, 214–15).

Two crossbow brooches (Fig 1) are later Roman forms typically associated with either Roman soldiers or in some instances civilian officials who dressed in a militarised fashion. These are both 'light' crossbow brooches, <2801> from period 5 phase 1 as Mackreth type CR 2.a and <1035> from period 5 phase 2 as Mackreth type CR 2.e1, which typologically speaking lie towards the beginning of the crossbow sequence (Mackreth 2011, 199–201). These can belong to the 3rd or 4th century AD, pre-dating the more robust forms of 4th- to early 5th-century AD date and both examples here are from 3rd-century AD contexts.

Crossbow brooches of any sort are not particularly common finds from London, and Pemberton (2014) cites only 17 examples in his recent review of brooches from London. Of these it is notable that quite a number are known from the extramural areas, including other finds to the north of the City of London at Barbican and Spital Square (MoL 36/132/4) and two assigned more generally to 'London Wall' (MoL 436 and 15.083). While the presumption may have been that these derived from burials, as in the case of a developed crossbow brooch from the eastern cemetery (Barber and Bowsher 2000, 206–8, B538.3, a gilded copper-alloy crossbow brooch found in association with an adult male inhumation burial along with a late Roman 'chip-carved' belt set), the present examples which cannot be

clearly associated with funerary activity caution against the blanket application of this interpretation to such finds.

Bead (one find)

A single glass bead, <3013> (Fig 2), is a small biconical dark blue type which is long lived, but most common in the late Roman period, and here derives from a late 3rd- or 4th-century AD context (Guido 1978, 97).

Bracelets (six finds)

Three types of bracelet are represented by six finds. Wire cable bracelets are amongst the most common from Britain and elsewhere in the Roman empire, belonging to Cool group I (Cool 1983, 120–9). Four are present here but there is some variation within this group in terms of both the cable and the fastening.

Two, <433> and <1301> (Fig 2), are near-complete bracelets, from 2nd-century AD contexts assigned to period 4 phase 3 and period 4 phase 2 respectively. They retain two strands in their cable and fastened in the same fashion as single strand expanding wire bracelets with the terminals overlapping and twisted around one another in several coils (Cool 1983, 130–5, group III). This is an unusual feature for cable bracelets and only 1% of the 400+ examples collected by Cool exhibited it (ibid, 120). These are also polychrome, incorporating alloys of pink/orange and yellow colour. Their relatively loose twists suggest that a third strand, perhaps of iron, which would have appeared silver or black, is missing from each. A polychrome bracelet with two copper-alloy strands and a third of iron, and with this same type of fastening, comes from Barge Yard in the middle Walbrook valley and is illustrated by Cool (ibid, fig 33.4, no. I 207). Elsewhere, it is argued that polychrome cable bracelets represent a chronologically distinct variant, already in use in the early Roman period. They have been recognised from a number of waterlogged Roman sites in London, including several in the Walbrook valley (Marshall and Wardle in prep).

The other two examples, <2838> (Fig 2) and <2839>, are both from a single late Roman context (period 5 phase 2). They are made from three copper-alloy wires and one retains part of a sheet collar around one end, presumably part of a different form of fastening. They are not well enough preserved to determine if the colours of the alloys varied.

The fifth bracelet is example <218> (Fig 2), a fragment of a narrow copper-alloy bangle with zigzag decoration on the outer edge, as Cool group XXII, dating to the later 3rd or 4th century AD (Cool 1983, 152–81, fig 5.5, table 5.7). This was residual in the 16th-century 'Deep Ditch', a feature which ran along the western side of the site and was cut into Roman deposits (Hartle 2017, 10; Cubitt et al in prep).

A sixth bracelet, and a third type, may be represented by <2885> (Fig 2), although it is comparatively crude. This has a lozenge-sectioned hoop, now distorted, with one broken terminal and one conical terminal bent into a slight hook. This was probably a penannular bracelet but could conceivably have been part of a single strand wire bracelet with a hook and eye fastener.

Finger ring (one find)

An iron finger ring, <2429> (Fig 2), expands to the bezel where it is missing an intaglio and belongs to Henig type III, which was most commonly in use in the 1st–2nd century AD (Henig 2007, 9). Its maximum internal diameter is 15.3mm, roughly equivalent to modern

British ring size I, although of oval rather than circular section. This example was found in a late 2nd-century AD deposit.

Hairpins (19 finds)

A total of 19 hairpins were recovered with 15 examples made of bone and four made of copper alloy. Pins were used to arrange, fix and ornament Roman female hairstyles. Classification of bone examples is after Crummy (1983) and classification of copper-alloy pins is after Cool (1990).

Eleven of the bone pins are straight/tapering forms most typical of the 1st and 2nd centuries AD but perhaps continuing into the early 3rd century AD. Following Greep (1983; 1995; 1998), recent work on hairpins in London groups these pins together as group A. Of these, three are undecorated Crummy type 1 pins, as <2756> (Fig 3), with rounded or pointed heads, six are Crummy type 2 pins with simple incised horizontal grooves at the head, as <469> (Fig 3), and two are slightly more unusual examples which can be considered as variants of type 2. Example <1765> (Fig 3) is finely incised, the head appearing as a small globular terminal. This more closely resembles that of related metal pins than other bone examples of Crummy type 2. Example <2570> (Fig 3) is cut in higher relief giving the impression of a stack of biconical and truncated cone units. Another slightly unusual type 2 variant pin with a recessed section rather than separate grooves came from nearby at Moor House, City of London (Gaimster 2006, 24–5, fig 24.2).

Four bone pins come from later forms with expanded heads and swelling shafts. These fall into group B (Greep 1983; 1995; 1998). These are most typical of the later Roman period, although some variants come into use as early as the 2nd century AD. Only two of these retain their heads which form the basis for further classification. These both have the globular heads typical of Crummy type 3, as <2757> (Fig 3), which was long lived and very common, appearing in contexts in London spanning the 2nd–4th centuries AD.

All four of the copper-alloy pins come from late Roman deposits of period 5. The earliest copper-alloy pin, <2845> (Fig 3), is a hand pin of Cool type 7b, which should date to the 1st century AD. Similar pins are not uncommon locally in either bone or metal, and their symbolism, which may be apotropaic, has recently been discussed in detail by Eckardt (2014, 153–76). Example <377> (Fig 3) is a pin of type 9 with a ring head (Cool 1990, 159–60, fig 6.6) assigned an early Roman date on the basis of a 'Walbrook' find assumed to date to before *c* AD 125, which receives support from another example from a 1st- or early 2nd-century AD context at Colchester (Essex) (Crummy 1983, 61–2, fig 66 no. 1940). The present example comes from a period 5 phase 2 Walbrook flooding deposit dated *c* AD 250–400, but another was recently discovered at Sugar Quay, City of London, from a context provisionally dated to the 1st or 2nd century AD (SGA12, <1759> [547]) which, taken with the other evidence, suggests that the Broadgate ticket hall site, Liverpool Street, find is residual or redeposited. Example <1295> (Fig 3) from period 5 phase 1 belongs to Cool group 5c (Cool 1990, 156–7, fig 4.6), but stylistically related pins also appear in her group 3b (ibid, 154–5, fig 3.4). She sees both as long lived but argues the former was most popular in the 2nd century AD. This example appears in a slightly later, early 3rd-century AD, deposit. Example <378> (Fig 3) from period 5 phase 2 does not closely correspond to any of Cool's groups, though it might be thought of as related to her group 3b. It could be linked to her group 3b, but the bead and reel decoration is closely comparable to Crummy's type 6 in bone with she dates to *c* AD 200/250–400 and this accords well with the late 3rd-century AD date of the present context (Crummy 1983, 24–5, fig 22).

Iron shackle and wrist ring (two finds)

As worn objects these two iron objects are included in this section, although as both may be either literally or symbolically associated with imprisonment or slavery their social significance is markedly different than the other classes of dress accessory.

Iron shackle component <1040> (Fig 4) of Manning type 7 came from a marsh deposit in Open Area 100, period 6 (Manning 1985, 83–4, fig 23; Ranieri and Telfer 2017, 130–4). A component of the same type comes from excavations at Bucklersbury House, City of London, in the middle Walbrook valley, and other British finds include those from the Great Chesterford (Essex) hoard and from the town at Silchester (Hampshire) (Manning 1985, 84; Wilmott 1991, 127–8, fig 88 no. 455). Given the size, internal diameter 81mm, it cannot have been securely attached to a hand or arm, but may have been attached to a leg as part of a set of fetters. Similar components form part of Bavay-type and Villepart-type fetters with dated parallels from late Roman contexts (Thompson 1993, 115–23 and 147). Thompson has argued that the distribution of fetters when compared to other forms of shackles has a greater, though not exclusive, emphasis on good agricultural land away from the frontier, suggesting a strong relationship with chained slaves (ibid, 147–9).

Of more ambiguous significance is iron wrist ring <1142> (Fig 4) found on the forearm of skeleton [6853]. This is a decapitated inhumation burial of a male aged between 26 and 35 years which is discussed in more detail in the main monograph text (Ranieri and Telfer 2017, 86–93, fig 70 (Bu6)). The corresponding section of the left arm is missing raising the possibility that it was part of a pair. Iron jewellery is known from the Roman period and this includes annular bracelets, but these are normally much less robust, tending to be made from wire or bar less than one third of the thickness of the present example, which is nearly 0.5kg in weight in its corroded state (Crummy 1983, 45–7, fig 48 no. 1737; Manning 1985, 78, J10–J11). The everted butt join is very crude and this object is far too heavy and unwieldy to have been worn as a piece of jewellery during life. Instead it is better seen as an object associated with a highly specific funerary rite, probably closely related to other adult inhumations with iron leg/ankle rings recently found at both York and London (Cool 2015, 2–6; Harwood et al 2015, 95–6, 144 (Bu30/1), 148 (Bu73/1)).

A very local London context for this unusual find is provided by two burials from the 2nd-century AD phase of the Finsbury Circus cemetery, just a short distance to the west, across the Walbrook stream. These were found with pairs of robust solid iron leg rings (Harwood et al 2015, 95–6, 144 (Bu30/1), 148 (Bu73/1)). One was a young adult male while the preservation of the second did not allow for determination of sex, but was probably also adult. Unfortunately, the head and neck had been truncated in each instance and as such it is impossible to determine if these were also decapitation burials. Another adult male inhumation with similar iron leg rings, this time definitely decapitated, was found at Driffield Terrace, York (Cool 2015, 2–6).

These iron rings were not functional manacles or fetters used to secure the living as they could not be opened or closed, but they may have been symbolic representations of them or could have served to signify a final act of enslavement or imprisonment. Removable forms of shackle were very occasionally also taken to the grave (Cool 2015, 3), including a rare example from Britain of a late Roman male inhumation wearing shackles that was recently excavated at Great Casterton (Rutland) (C Chinnock, pers comm 2015). However, they must normally have been removed for reuse as such burials are rare. A fragment of a genuine pair of iron fetters, <1042>, was found on the site in a later context, but examples of shackles, both fetters and manacles, have been found elsewhere in London, particularly along the Walbrook valley (three manacles from the Walbrook valley, two of which are more

specifically provenanced to the middle Walbrook at Bucklersbury House and the National Safe Deposit Company: Thompson 1993, nos 41, 42 and 44; a Bavay-type fetter also came from the Walbrook valley at Bucklersbury House: ibid, no. 136; and a further manacle from the middle Walbrook area at the Bloomberg site, City of London (BZY10): Marshall and Wardle in prep).

The internal diameter of ring <1142> is 58mm. This falls within the typical range of sizes for annular bracelets worn by adults. It is possible that the object was simply slipped over the hand, but as this rigid object was found on the forearm of a man rather than a woman it is likely that it would have been a very tight fit and it may not have been possible at all. There is serious doubt as to whether all the iron leg rings found in other burials could have been slipped over the foot. An alternative possibility is that these iron rings were forged *in situ*, perhaps explaining the rather crude nature of the joins. There is no clear osteological evidence for this here, but it cannot be ruled out. If it were the case it must surely represent a peri- or post-mortem action; the welding of a hot iron bar around a person's arm would have caused horrific damage and pain, and if this act was performed while still alive it might quite possibly have led to their death. The burning and damage that would occur, even to a dead individual, must be kept in mind when assessing the significance of such an action; alongside the decapitation it suggests a willingness to damage the body as part of the funeral rite.

If this ring is accepted as being directly related to the previous iron ring finds from York and London, then it expands our understanding of this phenomenon to include arm/wrist rings. Previous discussion has considered whether leg rings might be a measure taken to stop the dead from rising to walk again amongst the living, although, as Cool (2015, 4) notes, one of the York burials was also provided with shoes, perhaps for the journey to the afterlife. The different bodily emphasis of ring <1142> problematises this interpretation, as a single wrist ring will not practically serve to immobilise the deceased in the same manner and would not have restricted movement without some kind of tether or chain, for which there is no obvious allowance. If a second wrist ring was present, and is now missing due to truncation, the interpretation of the pair as manacles, either literal or symbolic, would be more convincing. There is no intrinsic evidence from the iron ring itself that this hypothesised pair was linked together and no sign of any form of chain. However, the position of the skeleton, with the wrists held near to one another, might be taken to imitate the pose of an individual whose hands were shackled together. That iron rings are found on multiple limbs, probably as analogues for different kinds of shackles, suggests that it is the act of imprisonment more generally that was being symbolically referenced.

Decapitation may perhaps have been a means by which the departure of these individuals on their journey into the next world was hastened/ensured, perhaps even as a form of execution, but these iron rings may not necessarily have been designed to prevent their return. Instead it may perhaps have been a class of object sent with them, either to impede their progress to a final resting place or to impact on them when they got there. Roth has noted how the act of chaining a living slave was not just a temporary form of imprisonment or punishment, but also one which may have resulted in a permanent change in their monetary worth and a blight on their status and prospects (Roth 2011, 75–6 and 90). Similarly, Aldhouse-Green stresses the symbolic and psychological impact of chains as a tool of both control and of humiliation in the Roman world (Aldhouse-Green 2004). An act which imitated imprisonment may therefore also have had a specific symbolic connotation or stigma attached even if the deceased was not a slave. At the very least such chains would undermine the status of a person as a free individual, perhaps representing the control of another over them or more general connotations associated with either slavery or criminality. It is possible, therefore, that the imprisonment of the body at the time of burial using iron rings sought to

ensure that death was no escape and was a means to transmit some aspect of the deceased's identity in life, perhaps as a criminal, prisoner or slave, into the afterlife.

Toilet/medical equipment (functional group 2, ten finds; Fig 5)

Finds of toilet equipment are limited to eight finds with two other finds which might more tentatively be associated with toilet or medical practices; an unusual iron tool or medical instrument, <2361>, and a lead mirror, <2143>, of probable votive significance.

Long-handled toilet or medical instruments (five finds)

Four items are copper-alloy long-handled ear scoops/ligulae with small circular heads, the handle tapering to a tip at the other ends. Three of these are undecorated, as <1296> (Fig 5), while the fourth, <1660> (Fig 5), has an incised spiral at the neck (Riha 1986, 58–9, group A, pls 25–6).

An unusual iron double-ended instrument, <2361> (Fig 5), comes from period 4 phase 2. No precise parallel for this object can be found, but Ralph Jackson kindly examined a set of photographs and suggested that it is possible that it is some form of surgical instrument (R Jackson, pers comm 2016). Other toilet and medical instruments made entirely of iron are much rarer than the copper-alloy equivalents but are known: for example, several objects from the doctor's burial at Stanway (Essex) (Jackson 2007b), iron examples from London include a bone lever/curette, probe/forceps, scalpel, spatula probe and saw-knife/spoon (Jackson 2008, 196, fig 4.4.2 nos 1–5) and two instruments with a small ligula/ear-scoop head at one end, the other end broken, from 8–10 Moorgate (MOQ10, <1799> and <2782>). The short hooked blade is somewhat comparable to that on a combined lever-hooked dissector published by Jackson (2007a, 21, fig 7.7). The forked end somewhat resembles the shorter nail-cleaners found as parts of portable grooming kits and could have served a similar toilet function, but the Y shape too, if used carefully, might also have been useful for a variety of scraping, lifting or extraction functions.

Glass ?palettes made from recycled vessel glass (two finds)

More unusual are fragments of two sub-circular glass discs, <2202> [6771] (Fig 5) in Open Area 6, period 4 phase 3, and <3017> [8381] in Open Area 7, period 5 phase 1. These are made from naturally coloured blue-green recycled vessel glass which has been trimmed to shape before the edges were ground. The use of vessel glass in this way was not particularly common, but there are other instances from London made from the grozed base and base ring of glass vessels from 1st- and 2nd-century AD contexts at 1 Poultry, City of London (Hill and Rowsome 2011, 43 and 491, fig 33 <G6>, and 147, 494, fig 149 <G56>). One interpretation is that they may have been used as palettes, or alternatively as being akin to the ceramic discs made from pottery vessels (discussed as counters below, functional group 5).

Mirrors and votive mirror (three finds)

Two finds are fragments of rectangular copper-alloy mirror plates, <1342> and <2821>, both retaining only one straight edge, from period 5 phase 1. Lloyd-Morgan suggests that these were not manufactured after the 1st century AD, but they have often been found in later contexts (Lloyd-Morgan 1981, 3–20, group A). They are not uncommon finds from London, but most survive only as small pieces with the notable exception of a near-complete find from a 1st-century AD burial in Southwark (Cotton 2008, 153–7, fig 3.6.2, table 3.6.1, fig 3.6.3.4 HR79 <84>).

Also placed here, and considerably more exotic, is a decorated lead disc, <2143> (Fig 5), from a period 6 marsh deposit. It is decorated on one face with cast relief detailing around the border and it is bent and damaged in the centre and at one edge. This is closely related to a family of objects variably described as 'lead mirrors', 'lead votive mirrors' or 'lead frames'. Square or rectangular examples are occasionally found in Britain (Lloyd-Morgan 1986) and are relatively common in the western provinces as a whole (Lloyd-Morgan 1981, 104–6, group Y), but example <2143> is more unusual.

Circular lead frames for glass mirrors are better represented in the central and eastern European and Mediterranean provinces. Although example <2143> is a solid flat disc and probably never held a glass mirror, it is closely linked to this group by its size, shape and decoration. Close parallels for the motifs can be found within type II.5 of Bózsa and Szabó's corpus of finds from the Hungarian National Museum. Amongst these is an example with the same simple one-piece construction (Bózsa and Szabó 2013, 96–7, nos 696–9 esp no. 699). They have been found in association with women in graves, and inscriptions suggest some may have been used as votive dedications to a range of female deities (Németh and Szabó 2010; Bózsa and Szabó 2013, 32–9). Other finds of possible religious or votive significance found in the same late Roman marsh context are noted here: iron shackle <1040> (above, functional group 1) and iron candlestick <2436> (below, functional group 4; also Ranieri and Telfer 2017, 133).

Comb (one find, not quantified)

A very small fragment of antler comb, <1860>, from the site, possibly from a double-sided composite comb tooth plate, could have been either late Roman or medieval date and was found residual in a post-medieval burial within the New Churchyard. It is therefore not included in the Roman finds quantification for the site, but is noted here for completeness sake.

Textile equipment (functional group 3, 15–16 finds; Fig 6)

The textile equipment reflects several stages in the preparation of yarn as well as sewing. No evidence can be directly associated with weaving. Also of relevance are three sets of shears from the site discussed with the tools (below, functional group 10).

Wool comb teeth (one find)

Three long thin tapering iron strips <2271–3> from Open Area 5, period 4 phase 2, are probably disarticulated teeth from an iron wool comb used to process fleeces (Manning 1985, 33–4). They have been treated as a single find for the purpose of quantification.

Spindles (two finds)

Two fragments of wooden spindles, <498> (Fig 6) and <3148>, were used for spinning wool or other fibres into yarn. Such objects are not common in London as a whole, but are often found on sites where the presence of waterlogged Roman deposits allows for their preservation, sometimes in large quantities as at the Bloomberg site (Marshall and Wardle in prep).

? Spindle whorl (one find)

Part of a perforated ceramic sub-circular disc, <3207>, was recovered. This could have been a spindle whorl broken in the process of construction, but its current large size and irregular

shape make this identification uncertain. The same context also produced an unperforated ceramic 'counter', <3236> (below, functional group 5).

Needles (11–12 finds)

At least 11 finds are needles of which six are made from bone, three are made of copper alloy and two are made of iron. A seventh bone needle is damaged and unstratified, but is probably Roman in date. Considerable ambiguity remains about the precise function and date of different needle types; for example, Stephens has argued that some may be hairdressing tools for sewing hair rather than textiles. Work on the large assemblage from the Bloomberg site indicates strong metric differences between types, which must indicate functional differences, but the modest number of examples that can be classified here add little to the debate (Stephens 2008; Marshall and Wardle in prep).

Most of the bone needles are broken across the eye, but two retain their heads: <1762> (Fig 6) with a pointed head and conjoined double circle eyes (as Crummy 1983, 65, type 1c; Greep 1983, 186–7, fig 50 type 2.1) and <2754> (Fig 6) with a spatulate head with a rectangular/oblong eye (as Crummy 1983, 65–7, type 2a). Of the copper-alloy needles, <362> and <1307> (Fig 6) have spatulate heads with rectangular eyes (ibid) and <1319> (Fig 6) has an unshaped head with a groove across a slit eye (ibid, 67, type 3). Of the iron needles, none retain their full head, but example <2402> is also of this type.

Domestic material (functional group 4, 15 finds; Fig 7)

Lamps (three finds; cf also crucibles below, discussed with metal- and wood-working debris)

Fragments of at least three ceramic lamps were found and their forms are classified after Loeschcke (1919) where appropriate. Two, <2496> (Fig 7) and <2498>, are large nozzle/body fragments from type 11a open lamps of figure eight shape with no foot rings made in Verulamium/London region white ware (VRW) and thus dated *c* AD 45–160. Lamps of this type in this fabric are extremely common in London (Eckardt 2002, 92–4) and as both examples here are from 2nd-century AD deposits they could have been made locally at the Northgate kilns, located a short distance to the south but still within the upper Walbrook valley. The Northgate kilns were one of a number of sites that produced this ware (Seeley and Drummond-Murray 2005).

The third lamp, <3030> (Fig 7), is a fragment from the base of a closed factory lamp in an imported central Gaulish colour-coated ware (other fabric) (CGOF) with the maker's name [EVCA]RPI in relief and is dated *c* AD 60–130. This was residual in a late Roman context. Eckardt notes that EVCARPI lamps from Britain are quite common, listing 20 examples. Where fabrics are sourced they are also Gaulish imports (Eckardt 2002, 204).

For another possible open lamp/crucible fragment <3029> (Fig 18) in VRW, see below ('Metal- and wood-working debris (Fig 18)').

Iron candlesticks (two finds)

Two iron candlesticks were found. Candlesticks became more common in the later Roman period as the use of lamps declined (Eckardt 2002, 55 and 251–8). Such finds are not particularly common in London but, in part, this may reflect poor preservation of metal finds; iron, lead and copper-alloy examples have recently been identified from waterlogged late Roman contexts at 8–10 Moorgate and at the Bloomberg site (Marshall and Wardle in prep; Pitt and Telfer in prep), and the distribution of late candlesticks in the town is weighted

towards the Walbrook valley in contrast to late lamps which are more frequently found on the drier hilltops (Eckardt 2002, 73, fig 32b).

The first candlestick, <2880> (Fig 7), is a simple L-shaped spike with a projecting socket which could have been hammered into a wooden upright. Most examples of this form are of medieval date (Goodall 2011, 300), although it may be that other Roman examples have therefore been mistakenly dated to this period. Eckardt has shown that the type seems to have first developed in the late Roman period and the 3rd-century AD (period 5) context here would therefore be appropriate (Eckardt 2002, 254–5 and 338, fig 119 with parallels).

The second candlestick, <2436> (Fig 7), from a late- or post-Roman marsh context (period 6), is of two-part construction. A distorted conical socket projects from the top of a narrow stem whose narrowed end passes through a perforation in the centre of a damaged base plate whose legs are now flattened and damaged; the end is then burred to hold it in place. The form of the socket and its construction method are comparable to that of a late Roman iron candlestick from the mithraeum at Carrawburgh (Northumberland) (Manning 1976, 39 and 56, fig 23 no. 148), and metal candlesticks are often found in religious contexts (Eckardt 2002, 58 and 144–50). It is possible that this candlestick has been deliberately crushed to put it out of use. This possibility is bolstered by the context of this find, in a marsh deposit alongside a possible votive mirror, <2143> (Fig 5), which has certainly been deliberately 'killed'.

Querns (two finds)

Two rotary hand querns, used for grinding grain to make flour, are represented by fragments of basaltic lava imported from the Mayen region of Germany. Both may be residual and neither is substantially complete. Example <2540> comes from a late 4th-century AD context, period 5 phase 2, while <2539> was residual in a context associated with the New Churchyard.

Spoons (three finds)

Three spoons were recovered. Example <432> (Fig 7) is a tinned copper-alloy cochlear spoon with a round bowl with an internal lip, a type which predominantly belongs to the 2nd century AD (Riha and Stern 1982, 116, pls 12 and 33). Example <2019> (Fig 7) is a lead-alloy spoon with a purse-shaped bowl (sometimes described as mandolin- or fig-shaped by other authors) and a damaged moulded or slightly offset handle. Crummy offers a general Roman date for spoons with this bowl shape (Crummy 1983, 69–70, type 3) and, discussing manufacturing evidence for a similar type at Castleford (Yorkshire West Riding), Bayley and Sherlock suggest a late 3rd- to 4th-century AD date (Cool and Philo 1998, 196). At Augst (Switzerland), however, examples of this spoon bowl form are of mid 2nd- to early 3rd-century AD date, and this example comes from a context dating to the first half of the 3rd century AD supporting this dating (Riha and Stern 1982, pl 33). Examples in lead alloy are not common, but an unpublished London find, of the same form and in the same material, comes from nearby at London Wall in the City of London (LOW88, <302> [1301]). Lead-alloy spoons more generally are currently the subject of new research (ongoing at the time of writing) by Rachel S Cubitt.

A copper-alloy spoon with an offset handle and a large pointed oval bowl, <1477> (Fig 7), was residual in the 16th-century 'Deep Ditch'. This general form is not common in London compared to other spoon types, but there are other examples from the town (eg MoL 59.94/22). The form is typical of the late Roman period in the empire more generally and is perhaps best known from the many silver examples found in some numbers in hoards of this

date. Johns discusses the development of the handle offsets and suggests that simple open forms, as <1477>, are introduced before the more elaborate types but continue until the end of the Roman period alongside the others (Johns 2010, 100, fig 5.1).

Vessels (four finds)

Fragments of two stone mortars of probable Roman date were found. Example <226> is a relatively small vessel made of Purbeck marble from period 4 phase 3, while vessel <450> is a large mortar made of an unsourced fine-grained stone, now laminated, from period 6 (Fig 7). These two vessels are of drastically different sizes and may have been used for a variety of grinding or mixing tasks associated with toilet, craft or cooking activities.

A wooden stave, <2553> from period 4 phase 1, is part of a coopered vessel. It is broken across a circular perforation or bung hole and as such was probably part of a small closed barrel or cask rather than an open vessel such as a tankard.

A convex inverted teardrop-shaped copper-alloy escutcheon, <2866> (Fig 7), was backfilled with lead and has a loop projecting from the top. The precise function of this object is not clear, but it is possible that it was used to attach a handle to a metal vessel.

Bone hinge (one find)

A lathe-turned cylindrical bone hinge from a box or piece of furniture, <447> (Fig 7), is made from a cattle (*Bos taurus*) metatarsal, as is typical for objects of this type. This example belongs to the longer variant with two drilled holes (Greep 1983, 202–4, type 2.2). Traces of black material, perhaps pigment, remain within the grooves of a band of turned line decoration near the centre, and the two drilled circular holes are both set to one side of this line. The function of these objects is discussed by Jones in relation to other finds from London, some of which retain the central wooden spindle and pegs (Jones 1984).

Leisure and recreation (functional group 5, 13 finds; Fig 8)

The range of gaming equipment is restricted to counters, some of which might also have had other functions. Note also two discs made from recycled glass vessel base sherds <2202> and <3017> (Fig 5). They have been interpreted as possible palettes (above, functional group 2) but could alternatively have served a similar function to the ceramic examples.

Above, it was noted that the distribution of these discs is concentrated in the cemetery phase (period 4 phase 2) and it was tentatively suggested that they could have been used in funerary rituals. However, such finds are also relatively common on normal domestic sites in London as well.

Bone counters (eight finds)

Eight bone counters belong to three major types classified and dated after Greep (1983; 1998). They may have served as gaming pieces, tokens or gambling chips. Three belong to Greep type 1 with undecorated flat parallel faces, as <1813> (Fig 8). This type was in use in Britain from the time of the Roman conquest and probably passed out of use during the 2nd century AD when they may have been replaced by type 2. Here all three are from mid 2nd-century AD contexts, but their distribution has an earlier emphasis than the other types which are found in 3rd-century AD (period 5) contexts. Several of these have light scratches, but these are unlikely to represent deliberate decoration or graffiti.

Example <357> (Fig 8) belongs to Greep type 2 with one flat face and one dished/countersunk face. This type dates to the 2nd century AD or later, and this example

comes from a late 3rd- or 4th-century AD context. It has four small kidney-shaped marks cut into the face of the reverse. Quite a number of examples of type 2 counters with similar inscribed dots are recorded including examples with two, three, four and five dots (*RIB* 2(3), 105–69: two dots, Caerleon (Monmouthshire) 2440.168; three dots, St Albans (Hertfordshire) 2440.172; four dots, Chichester (Sussex) 2440.185; and five dots, Wroxeter (Shropshire) 2440.203). The feature seems to be most common on this counter type, but similar drilled or cut dot values with values of up to ten can also appear on counters of type 3 (*RIB* 2(3): Caerleon 2440.321).

Four Greep type 3 counters have concentric circle decoration on the obverse. He gives these a general Roman date as they are found in sets with counters of types 1 and 2, but some evidence from London is beginning to suggest that type was rare before the late 1st century AD (Marshall and Wardle in prep). One example, <1864> (Fig 8), has an incised X on the reverse which may be the Roman numeral for ten but may also stand for denarius (*RIB* 2(3), 106).

Ceramic discs made from reused pottery sherds (five finds)

There are five discs made from reused Roman pottery vessel sherds, as <3037> and <3038> (Fig 8). These may have served as counters, but the difficulties of interpreting such objects have been discussed in some detail by Crummy (1983, 93–6). The present examples have all been deliberately trimmed and are fairly circular, but the edges have not or have only partially been ground and smoothed. They are large and very varied in size, ranging from 36.2mm to 93mm in diameter in contrast to the bone counters (above) which are all smaller, ranging from 15.5mm to 21mm. This suggests that if some or all were gaming counters they were not used on the same sort of boards as the bone ones. Three were made from sandy coarse wares, one similar example, <3236>, was more precisely assigned to Verulamium/London region white ware (VRW) and a fourth, <3037>, is larger and was made from a Gaulish amphora (Pélichet 47/Dressel 30 amphora fabric – GAUL1) sherd. None are inscribed. Four were found in 2nd-century AD contexts while the fourth is residual in a post-Roman context.

Weighing and measuring (functional group 6, five finds)

This is a small group of weighing equipment in which two distinct weighing technologies are represented: the use of an asymmetrical steelyard arm which had a sliding counterbalance and the use of an equal-armed pan balance.

Four weights were identified. Three are disc-shaped weights comprised of a very light copper-alloy example, <1297> (5.04g), and two heavier lead examples, <2117> (61g) and <2123> (64.4g), the latter with a raised lip around the edge and hole in the centre. The first two must have served as pan weights, but the third could have been suspended via the perforation. The perforation is too small and off-centre for a spindle whorl. The fourth is a steelyard weight, <2934>, of a common biconical form and weighs 191g; it is missing its iron hook.

A small copper-alloy steelyard fragment, <2798>, a rectangular-sectioned panel broken across two offset loops from a post-Roman context, is not intrinsically datable but was found alongside residual Roman pottery and is perhaps most likely to be of Roman date.

Writing, literacy and seals (functional group 7, 24 finds; Fig 9)

This is a relatively large assemblage of writing equipment. Given the large group of styli, the scarcity of wooden stylus tablet fragments is curious, perhaps suggesting a different mode of

preservation or a different mechanism for disposal than in the middle Walbrook valley, as at the Bloomberg site where early Roman writing equipment is also exceptionally well represented (Tomlin 2016; Marshall and Wardle in prep). Writing with ink is not represented amongst the small finds, but two fragments of samian inkwells are from the site, from contexts [703] in Open Area 6, period 4 phase 2, and [6726] in Open Area 7, period 5 phase 1.

Seal box (one find)

A single copper-alloy seal box fragment, <1299>, was recovered. A leaf-shaped base of Andrews type P3 (Andrews 2012, 20–2) or Augst type 2b (Furger et al 2009, 54–63). This type was most common in the 2nd century AD and the lid would probably have been enamelled. It was found here in a later Roman period 5 phase 2 context with mid 2nd-century AD coins and intrusive post-Roman finds. Seal boxes have traditionally been seen as sealing correspondence, and as it is possible that some were used in this manner they have been classified as such here. However, the possibility that seal boxes were also used to seal other classes of objects such as packages or money bags has recently been suggested (Andrews 2012, 80–92).

Styli (19 finds)

A total of 18 iron styli and one copper-alloy stylus were recovered. The use of copper alloy is comparatively rare and this can reasonably be considered a high-status object. The styli were relatively evenly distributed throughout the Roman sequence from period 4 phase 1 to period 5 phase 2. Classification of styli from Roman Britain has until recently tended to follow the simple classification system of Manning (1985) with distinctive decorated examples treated in more detail by Major (2002), but a more extensive typological survey based around the collection from Augst is now available (Schaltenbrandt Obrecht 2012) and a review of styli (by M Marshall) from London is currently underway (at the time of writing) based upon several large new excavated assemblages which collectively span most of the Roman period. In the references below, numbered groups referred to are the loosely defined interim groups outlined in the forthcoming Bloomberg site publication (Marshall and Wardle in prep) and alphanumerical groups and types referred to are the Augst types (Schaltenbrandt Obrecht 2012).

Very early types, mostly with slightly swelling shafts, that principally date to the end of the 1st century BC and the first half of the 1st century AD, are found in small numbers in London but are absent at the Broadgate ticket hall site, Liverpool Street (Schaltenbrandt Obrecht 2012, group A; Marshall and Wardle in prep, Bloomberg group 1). Styli with shafts that taper towards the tip, as <1054> (Fig 9; Schaltenbrandt Obrecht 2012, group B; Marshall and Wardle in prep, Bloomberg group 2) or have straight shafts, as <2410> (Fig 9) and <2293>, continue into the 2nd half of the 1st century AD and are very well represented in London from recent excavations of early Roman deposits at the Bloomberg site (Schaltenbrandt Obrecht 2012, group C; Marshall and Wardle in prep, Bloomberg group 3). Their scarcity here reflects the predominantly 2nd-century AD or later dating of the stratigraphic sequence seen in other classes of material. Example <2293> comes from a fairly early (period 4 phase 1) deposit, but the other 1st-century AD types are from period 5 deposits. All three are quite likely to be redeposited here from elsewhere in the town.

The dominant group within the present assemblage are those which have relatively wide grips and shafts that either taper towards the eraser or else are waisted in the centre before expanding again slightly to the eraser. Most have long tips and a high proportion are decorated. In the Augst scheme most would be classified as variants of group H with some

closely related to or belonging within groups P or Q. The preliminary grouping below is based on tip morphology and decoration and is not based on the Augst types but individual styli are related back to them where possible.

Three styli have long, or incomplete and probably long, tips swelling at the grip before a relatively straight shaft with decoration concentrated around the grip and neck. The swelling grip and related decoration of examples <1056> and <2391> (Fig 9) seem most comparable to Augst H33 dated to the late 1st or 2nd century AD (Schaltenbrandt Obrecht 2012, 138–9; other related forms fall into her H43 and H47: ibid, 150–3). Example <2431> (Fig 9) has a more pronounced swelling at the base of the tip which steps in then out again before the grip proper which together with the copper-alloy inlaid decoration places it in Augst Q68, dated to the late 2nd or 3rd century AD (ibid, 172–3; for similar but more highly decorated examples of the same type from London: ibid, 743, pl 192, MoL 76–7).

Four styli have long tips and decorated shafts which taper towards the eraser. These can be divided into those with two zones of decoration around the grip and neck, <2398> (Fig 9), <2343> and <2350> as Augst H35 (Schaltenbrandt Obrecht 2012, 143–4), and decoration along the whole length of the shaft, <2345> (Fig 9) as Augst H36 (ibid, 146–7). Schaltenbrandt Obrecht sees both types as arising during the later 1st century AD and in use in the 2nd century AD.

A single stylus, <1053> (Fig 9) from period 5 phase 1, has a long tip, expanded at the base and a decorated shaft tapering towards the eraser. This falls into Augst type H43, which she dates to the late 1st–2nd century AD (Schaltenbrandt Obrecht 2012, 150–1; for other London finds: ibid, 737, pl 189, MoL 51–2).

Three styli have long narrowed tips and a shaft which tapers to the eraser, as type H40 (Schaltenbrandt Obrecht 2012, 148–9, type H40, dated to the early 2nd century AD). Of these, two are undecorated, <91> and <92> (Fig 9), and come from a single deposit in period 5 phase 1. A third, <1033> (Fig 9), is decorated with bands of copper-alloy inlay and grooves that may represent missing examples around the tip and grip. Although otherwise similar, it also closely resembles styli of group Q71 which are supposedly later in date; it also comes from a later period 5 phase 2 context (ibid, 179–80, type Q71, dated late 2nd or 3rd century AD).

Related, but of slightly different style, is stylus <88> (Fig 9) with a damaged long narrowed tip and a shaft that tapers towards the eraser, decorated but with raised reels at the grip instead of inlaid bands. Corrosion obscures details and makes it difficult to place within the Augst scheme, but comparable reels appear on Augst P56 (Schaltenbrandt Obrecht 2012, 166–8). A more dramatic series of mouldings at the grip/tip appear on example <2893> (Fig 9) which has a damaged narrowed tip, probably of some length, and a series of beaded mouldings at the grip, comparable to those of Augst type P54 dated 2nd or 3rd century AD, before the shaft tapers towards the eraser (ibid, 162–3). It comes from an early 3rd-century AD, period 5 phase 1, deposit.

Example <2418> (Fig 9) from period 4 phase 2 is something of an oddity and has a relatively short robust tip in comparison to many of the other styli noted here, although like them it is decorated and widest at the grip. The sharply stepped in tip has something in common with Augst type P52 and P53 but is shorter than is the norm.

The copper-alloy stylus, <1293> (Fig 9), is a rare find and is an object of some quality, being decorated with inlaid bands made from a second copper alloy in a contrasting colour and silver. It finds no exact parallel in the Augst corpus but is most comparable to her types P52 or P53 which together with individual features should imply a later Roman date

(Schaltenbrandt Obrecht 2012, 104–5, figs 95–6). It comes from a 3rd- or 4th-century AD deposit in period 5 phase 2.

Writing tablets (four finds)

Four fragments of wood and wax stylus tablets were identified, all of which were made from silver fir (*Abies alba*). They are typical of writing tablets from the town, the form and use of which are discussed in detail by Tomlin (2016). Two are Tomlin/Padley type 1 tablets recessed on one face from the diptychs or from the covers of triptychs or longer documents. Two are Padley type 2 tablets recessed on both faces and thus come from the interior pages of triptychs or longer documents, but are too poorly preserved to allow for closer identification. None retains any other features of note and none has legible traces of text.

Transport (functional group 8, 19 finds; Fig 10)

This exceptionally large group of transport equipment provides evidence for the passage of domesticated animals and of vehicles. It can be closely related to the road which ran through the site for most of its Roman history. Its general significance is discussed further, above (2.1) and in the main site monograph (Ranieri and Telfer 2017, 78–81).

Terrets (two finds)

Two copper-alloy terrets were recovered. These are rein guide rings for use with vehicles such as chariots and carts. Example <1338> (Fig 10) from period 5 phase 1 is a fragment of a relatively simple oval/D-shaped terret, a type that had been in use in Britain during the Iron Age but survived into the Roman period (Lewis 2015, 76–7, 87–9) and have even been found in 3rd- to 4th-century AD deposits (Bidwell 1985, fig 41.35). Example <380> (Fig 10) is a dropped bar terret with a projecting rectangular loop below a circular ring. This type was introduced from the Continent at the time of the conquest (Lewis 2015, 96). The present example was found in a 2nd-century AD, period 4 phase 1, context and other examples of comparable date come from Castleford (Cool and Philo 1998, 77–8, fig 26 no. 302).

Hipposandals (17 finds)

Seventeen hipposandals, or probable hipposandal fragments, were recovered. An 18th example is registered on the database, <1012> [2071]; however, no accession photo exists and it has never been seen by a finds specialist. It is possible, therefore, that this represents some kind of numbering/data entry error, perhaps a duplicate of <1135> which does derive from this context.

The typology of hipposandals is based on that of Aubert (1929), extended by Manning (1985), but as of yet there is no entirely comprehensive scheme. The site has produced a number of substantially complete examples which it is possible to classify using this scheme as well as at least two examples that are not catered for but which can be related to similar Aubert/Manning types and are described here as variants.

Five type 1 hipposandals, <351>–<354> (Fig 10) and <472>, have a long looped neck at the toe and wings with short projections forward, while a sixth, <473> (Fig 10) has a break at the toe suggesting it may also have belonged to this group. They span the 2nd and 3rd centuries AD from period 4 phase 1 to period 5 phase 2. A further hipposandal of this type was found during previous archaeological work at Liverpool Street (LSS85).

Type 2 hipposandals lack the long looped neck at the toe but have wings with long projections whose tips are welded together to form a loop in approximately the same position. Type 3 have similarly long wing projections, but they are not welded together and there is no

equivalent loop (Manning 1985, 65). Example <2296> (Fig 11) from period 5 phase 1 is an unusual example which shares features of both these types, with two long wings that are not welded together each with its own loop above the toe. Example <1135> (Fig 11) from period 4 phase 1 has similar long wings, as type 3, but the tips are broken and so their precise form and whether or not they are joined cannot be determined. It is also unusual in having a slightly bifid toe to the sole, which might indicate that it was designed for a species with a cloven hoof such as cattle.

Type 4 hipposandals (Manning 1985, 65–6) are represented by two examples both from period 5 phase 1. Example <476> (Fig 11) has no neck at the toe and has wings with small hooks holding loose rings. Example <438> (Fig 11) is a similar type but represents a distinct and somewhat unusual variant with an integral hooked loop on each wing instead of a loose ring. Another has recently been recovered from Ermine Street at Ware (Hertfordshire) where it is suggested the type may be for oxen rather than horses (N Crummy, pers comm 2016).

Other examples are represented by smaller and less well-preserved fragments, not all of which can be securely assigned to a type. A probable sole fragment, <1122>, cannot be assigned to a type but can be recognised as part of a hipposandal on the basis of grooves on the underside. Two loose wings, <1060> and <2450>, have short pointed projections like those associated with type 1 hipposandals but which also appear on other forms. Two hooked heel fragments, <474> and <475>, come from symmetrical hipposandals, as found on Manning types 1–4, while a third, <2351> (Fig 11), has the hook set at one side and comes from the heel of an asymmetrical hipposandal of Manning type 5 (Manning 1985, 66). Type 5 hipposandals are rare nationally, but at least seven examples are now known from London, most from the upper Walbrook valley: the present example, one found during earlier work at Liverpool Street (LSS85), three from 'London Wall' (Guildhall Museum 1908, 59), one from the Bloomberg site (Marshall and Wardle in prep) and another noted only as from London in the British Museum collection (Manning 1985, 66, H8). Continental scholars have suggested that these may in fact be ox-shoes (Brouquier-Reddé 1991).

The size of the present assemblage which was found directly in association with a road and includes a variety of types, often well enough preserved for detailed measurement, encourages some further comment to be offered about their function. That hipposandals were worn by horses is not in any serious doubt, and the fact is particularly clearly attested by the discovery of a horse's hoof *in situ* within a hipposandal from the Roman fort of Saalburg (Germany) (Jacobi 1897, 529, fig 87, 9). The large assemblage found here and in adjacent areas of the northern cemetery at Finsbury Circus is clearly directly associated with the road, and the large number of groups of articulated horse remains from the immediate area may indicate a wider equine significance to the northern extramural area (Harward et al 2015, 83–6; Ranieri and Telfer 2017, 77–81).

It is more questionable whether hipposandals were worn all the time, or by all horses, given that they are removable and the fact that, on most sites, hipposandals are not particularly common finds when compared to medieval horseshoes. It is possible that they were only worn in certain circumstances, such as to protect an injured foot, to prevent damage to unshod feet on metalled or paved road surfaces, or, where hipposandals have ridges or incised grooves on the base, perhaps to aid grip on uneven or slippery surfaces (Manning 1985, 63).

The possibility that some were worn by other animals has been noted above and is explored in more detail in relation to sizes here (Fig 12), as the relatively large number of complete examples encourages an attempt to consider their sizes and their relationship to the

size of the animals who wore them. The most striking feature is how narrow the soles are when compared to medieval horseshoes. The measurable examples have soles ranging from 64.0mm to 92.5mm in maximum width. Clark's study of medieval finds from London showed that none were narrower than 80mm, a width that only two soles here exceed, while most were in excess of 95mm continuing up to around 120mm (Clark 1995, 97–100, fig 76). This is noteworthy as, while some medieval horses do exceed the size of their Roman predecessors, measurements of metacarpals and metatarsals suggest that their feet were not uniformly larger (Rackham 1995, 169–72).

This could indicate that many of the hipposandals were actually worn by animals with notably smaller feet than medieval horses, perhaps donkeys or mules, or alternatively that the sole plate was not designed to cover the entire sole of the hoof. Even if this were the case, the space between the hipposandal wings that project at either side would limit the size of hoof that could fit into the shoe. Perhaps significantly, the maximum width of the hipposandals, including the wings, is actually more comparable to the width of medieval shoes, ranging from *c* 93mm to *c* 114mm encompassing their core size range. The significance of the length of the hipposandals also presents ambiguities, as the maximum length from toe to 'heel' ranges from 121mm to 170mm, overlapping with but also significantly exceeding the normal length range for medieval shoes which range from *c* 80mm to *c* 137mm. The length of the flat section of the hipposandal soles before the angle upwards towards the back is, however, more comparable ranging from 92mm to 136mm. As a working hypothesis it seems sensible to assume, therefore, that the hoof rested on this flat section, perhaps extending beyond it at the sides on to the flat portion of the wings. The steeper 'heel' section would appear to have projected back and up behind the hoof at an angle.

Given the ambiguities regarding both these different measurements and their relationship to the shape of the animal hoof/foot, it is at present difficult to come to firm conclusions about their significance. However, the disparities above suggest that the maximum width across the wings and the length between the toe and the angle are those dimensions most likely to reflect the size of the animal's hoof, rather than the maximum dimensions of the sole plate. When these two measurements are plotted together the hipposandals appear to form relatively discrete clusters by size, perhaps indicating that different styles were preferred for different animals, age/size groups or for fore and hind feet (Fig 12). The amount of data is small and it is not yet possible to offer a firm identification of the specific animals represented. It may be that most were horses, as is generally assumed. However, there is clear variation and it will be important to explore these patterns further in the future using larger data sets to determine if different species, or at least animals of different sizes within a single species, were being utilised.

Buildings and services (functional group 9, ten finds)

Windows

Seven fragments of naturally coloured flat matt/glossy cast window glass were recovered of which only one, <2224>, came from the edge of the pane.

Another find which is probably related is item <3144>, a silver fir (*Abies alba*) wood hexagonal 'glazing bar' with slots in two opposing edges. Amrein provides a recent discussion of the type (Amrein 2015). These objects have now been found on several sites in Britain and elsewhere and have often been interpreted as parts of large windows that needed to be glazed with more than one pane. Other London 'glazing bars' come from elsewhere in the Walbrook valley at Angel Court, City of London (Blurton 1977, 67, fig 21 no. 491), and at the Bloomberg site (Marshall and Wardle in prep). It should be noted that it is not certain

that all were used to join panes of glass, as opposed to panels of wood or other materials, and that the sole surviving window glass edge fragment from the Broadgate ticket hall site, Liverpool Street, was too thick to slot into this example. However, panes of glass of appropriate thickness are not particularly uncommon elsewhere.

Water pipes

Two fragments of iron water pipe junction collar, <1065> and <1078>, were recovered from the same roadside ditch (S12 phase 2) in period 5 phase 1 which would have joined lengths of wood water pipe. The diameter of the larger fragment, <1078>, could be measured and was *c* 100mm. Water pipe collars are often assumed to relate to a piped fresh water supply, but several roadside linear features which could be covered ditch or drain lines in London have also produced examples and an *in situ* pipe was associated with a large outdoor wooden tank at 1 Poultry (eg a ditch at St Swithin's House (WAO06): Hill and Rowsome 2011, 114–17). As such it is not impossible that these fragments were related to local water management.

Tools (functional group 10, 20 finds; Fig 13)

Shears (three finds)

Three fragments come from pairs of iron shears: a much corroded omega-shaped spring fragment, <2894>, and two blades, <1132> and <2358> (Fig 13). The first blade fragment, <1132>, is broken before it begins to expand to the loop and as such it could alternatively be interpreted as a small knife with a rather flat whittle tang set at the back. The smaller blade, <2358>, is more distinctive and comes from a late 2nd-century AD (period 4 phase 3) context. It is unusual in having a small projecting rivet at the break. This may be evidence for a failed repair or perhaps this set was of a three-piece construction, other forms of which have recently been discussed by Humphreys (in prep a). A similar find comes from nearby at 6–8 Tokenhouse Yard, City of London, in a late 2nd- to 3rd-century AD context (Leary and Butler 2012, 38–9, fig 37.10). This small fine set must have been designed for delicate work such as cutting complicated shapes out of cloth/leather, cutting threads or trimming small amounts of hair.

Metalworking tools (three finds)

Three objects have been identified as metalworking tools. A complete iron cross-peen hand hammer head, <1073> (Fig 13), came from a road surface (R1 phase 3, period 5 phase 1). Manning describes a slightly larger hammer of this type from Pakenham (Suffolk) and cites an extensive list of parallels (Manning 1985, 5, no. A5). An iron strip, possibly a part-worked blank, <1121>, from the same context might support the identification of this object as being used in iron smithing. A small iron punch, <2407> (Fig 13), from period 4 phase 3, will also have been used in metalworking. Item <1069> (Fig 13), an iron tool whose form is comparable to an awl of Manning's type 3b (ibid, 38–40, fig 9) except that it must be doubted whether such a stout object, whose lozenge-sectioned off-centre tip is unbroken, was ever used as a tool for piercing leather. It may instead also have been a metalworking tool.

Wood-working tool (one find)

Example <2409> (Fig 13), a short and stout drill bit of Manning type 1, came from a period 4 phase 3 context. He notes that the narrow head form, no wider than the shaft, limits the depth to which such a drill can bore, but that they were suited for tasks such as making starter holes for nails (Manning 1985, 26, fig 5.1).

Knives (five finds)

Five knives were recovered. Of these two incomplete finds cannot be assigned to a type on the basis of blade shape. These are a small blade fragment, <2406>, and a whittle tang knife with incomplete blade, <2294>.

Three knives are more distinctive. Examples <2285> and <2317> (Fig 13) have the long thin blades and integral iron handles that belong to Manning type 4, and he comments that they are not uncommon from London (Manning 1985, 110–11). This slender form was considered by Manning to be a razor or scalpel but could have other functions, such as a pen knife for sharpening the calamus. The former has the integral suspension loop typical of the type and was found in a period 4 phase 1 context, while the latter is unusual in having a zoomorphic head terminal at the butt and was residual in the lower fill of the 16th-century 'Deep Ditch'. The unusual and well-executed decoration on example <2317>, probably canine or ursine, contributes to the impression that this was a form of specialised personal knife. Zoomorphic terminals are known on other Roman knives, including examples with at least broadly comparable parallel-sided blades (eg Manning 1985, pl 53 Q3), but this is the first instance executed in iron that the authors are aware of.

The final knife, <346> (Fig 13), is unstratified. In Manning's scheme it is most comparable to type 21, but while the blade is of similar shape it is not as short as his classification would suggest (Manning 1985, 117). Similar knives, however, are relatively common in the late Roman period and the form can be paralleled in late 4th-century AD burials at Lankhills (Hampshire), for example, and in a late 4th-century AD context at Uley (Gloucestershire) (Clarke 1979, 249–50, figs 68.93, 92.617, 97.501; Woodward and Leach 1993, 192–3, fig 144.4).

Others (three finds)

An iron handle with a decorative twist and a loop at the terminal, <2405> (Fig 13), is broken across the blade, but most probably comes from a spear-shaped knife or spatula. A similar but more complete object from London is illustrated by Manning and other finds of the type have been recorded from the town (Manning 1985, 119, pl 57, Q87). The type is discussed elsewhere by Humphreys, with some variants likely to have been used in shaping pottery vessels (Humphreys in prep b).

An iron bar/strip, <2276> (Fig 13), is of a very distinctive form shifting from a square section at one end to a rectangular strip section at the other. Although both ends are broken, it seems probable that this is an example of an arm from 'Bügelzangen' three-piece tongs; the iron examples from London were recently brought together by Humphreys and Marshall (2015). It is unfortunate that some doubt must remain as to the identification of this broken fragment, missing its most diagnostic elements, as its 2nd-century AD (period 4 phase 1) context makes this one of the latest known stratified examples.

An unusual iron object, <1082> (Fig 13), comprises a perforated sub-circular panel with a square-sectioned bar projecting from one side and a flaring strip projecting from the other. It seems possible that they are part of some kind of set of small tongs, but the form is unusual as normally handles and jaws made as part of the same piece of iron are attached to the pivot plate at diagonally opposite points.

Hones (five finds)

A total of five hones were recovered. The stone types were examined by Ian Betts (pers comm 2015) and all are sandstone. Four are primary/purpose-made hones, while the fourth,

<451>, is a utilised pebble cobble. The others are bar hones whose sizes would be appropriate for knife hones used in the hand rather than for mounting on a bench to sharpen larger objects. Two of these, <2525> and <2925>, can be more closely linked to a hone industry (of uncertain location) that supplied Roman London with most of its hones, variably described as Kentish Rag, Wealdan Clay Formation or Carboniferous Inshore by different authors (Allen 2014, 39–58; Green in prep).

Fasteners, fixtures and fittings (functional group 11, 68–70 finds; Fig 14)

This miscellaneous category accounts for a very substantial proportion of the assemblage here, as it does for most Roman assemblages from London. In addition to the material discussed here, compare also the iron shackle, <1040> (Fig 4), discussed with the personal adornment and other worn objects (above, functional group 1), which could be regarded as a form of security equipment.

Keys (five–seven finds)

At least five, perhaps as many as seven, keys are represented in the assemblage. Five of these are iron; all are small- to medium-sized, slide lock keys of Manning type 2 (Manning 1985, 91–3, fig 25.7 type 2) which range from 51.5mm to 66.0mm in length. Four have rectangular-sectioned handles which constrict to a narrow square-sectioned neck before the bit, as <326> (Fig 14), while the fifth, <2347> (Fig 14), tapers continuously from the handle to the bit. This distinction in shape does not appear to be chronologically significant as the two types co-occur in a 2nd-century AD deposit here ([6772], period 4 phase 3) and both also occur in 1st-century AD deposits at the Bloomberg site (Marshall and Wardle in prep).

A further key may be represented by a rectangular-sectioned, cast copper-alloy handle fragment, <2855>, which is of appropriate size for a type 2 slide key and has a similar circular bow but is missing the neck and bit. An iron circular loop with a knop on it and a projecting shaft, <2900>, could be the bow from a rotary key. It too is not truly diagnostic.

Studs (12 finds)

A total of 12 copper-alloy Roman studs were found. The types are classified here using the scheme developed for the Bloomberg site (Marshall and Wardle in prep). Three are simple flat circular forms, as type F1, <1298>, <1344> and <1668>. A fourth flat-headed stud has notched edges, as type F2, <1402>. Three are simple domed forms, as type G1, <1333>, <1667> and <2841>, of which the last was backfilled with lead. More complex convex forms are represented by a boss and flange head, as type G3, <327>, and two embossed forms with a high centre boss and a raised border, as type H2, <1661> and <1671>. Defining the function of loose studs is difficult. None of these examples are of the decorated types which are strongly associated with the early Roman army.

A cast bell-shaped stud, <2850>, is missing the perforated iron shank. This is a common class of fitting used in a variety of contexts (Allason-Jones 1985). A more unusual variant of the type is represented by example <379> (Fig 14), a knobbed variant, made entirely from copper alloy with a perforated shank, which was probably a lock pin and is similar to a find from Augst (Riha 2001, 75, pl 40 no. 595).

Mounts (27 finds)

A total of 28 objects are classified as mounts in the catalogue (Table 5) of which 27 are included here; 13 are made of copper alloy and 14 are made of iron. The term mount is used

here in a very loose sense including both objects with integral rivets and others with rivet holes.

MOUNTS WITH POSSIBLE MILITARY ASSOCIATIONS (FOUR FINDS)

A copper-alloy belt mount, <1302>, is indisputably a piece of military equipment and as such is discussed with the militaria (below, functional group 13). Other mounts have possible military associations and are discussed here before other less diagnostic material. These are objects which are either stylistically related to military equipment or can frequently be paralleled on military sites. Example <2800> (Fig 14), from period 5 phase 1, is a cast copper-alloy rectangular mount with a enamelled foliate scroll on an enamelled field which has parallels from Chester (Cheshire), South Shields (Durham) and Corbridge (Northumberland) (Henry 1933, fig 46.9; Allason-Jones and Miket 1984, 95–6, no. 3.12 and parallels cited therein). It is of a similar width to contemporary belt mounts/buckle plates, but need not necessarily be identified as one. Example <2811> (Fig 14), from period 5 phase 2, is the terminal of a robust copper-alloy mount or strengthening fitting. The general size and morphology resembles a series of box mounts (Riha 2001, 64–6, pls 36–8 nos 429–77), but the terminal of this example is distinctive and closely related to 2nd-/3rd-century AD militaria such as pendants (eg Oldenstein 1976, 260–7, pl 34). Example <1041> (Fig 14) is an unstratified copper-alloy phallic mount with two shanks on the reverse and a perforation which may have been for a third fastening in the form of a nail or rivet. Phallic imagery was very popular amongst the Roman military, perhaps because of its connotations of masculinity and its protective/apotropaic symbolism, but it also appears frequently in the wider Roman world (Johns 1982). Similar-sized phallic mounts, probably attached to leather straps, are not uncommon (Allason-Jones and Miket 1984, 187–8, 3.588; Plouviez 2005, 157–60, fig 1 nos 2–4, fig 2 nos 1–3).

A rosette-shaped cast copper-alloy mount with lead backfilling and an iron shaft, <3005>, is very poorly preserved. This motif can again be well paralleled on military sites of appropriate date (Oldenstein 1976, pl 57 nos 704–11), but no exact parallel of certain military association can be identified. The combination of lead on the reverse and an iron shaft perhaps suggests a more heavy-duty function as part of a piece of furniture.

OTHER MOUNTS (23 FINDS)

Other mounts are less diagnostic and are represented by small fragments of copper alloy and iron, mostly of sheet or strip/strapping, with rivet/nail holes. They are briefly described in their individual catalogue entries. More notable amongst these is copper-alloy item <87> (Fig 14), from period 5 phase 1, made up of two conjoined perforated circles to either side of a central strip. This could be seen as manufacturing waste with two mounts on a sprue, but the central square nail holes have been perforated through and as such it is more probable that this object has been used and that this represents its final form.

Decorative rivets (two finds)

Two lead-alloy rivets with decorative heads with almost identical designs were both recovered from 3rd-century AD deposits. No exact parallels in Roman contexts have been found for these unusual objects, but the arrangement of ring and dot based motifs has some similarities to a enamelled mount from Catterick (Yorkshire North Riding) (Wilson 2002, 149–50, fig 303.2). A closer parallel can be cited from a medieval context in London, however, and the possibility that these are intrusive should be considered (Egan and Pritchard 1991, 194–5, fig 122 no. 1043, associated with pottery of the late 13th or early 14th century).

Copper-alloy nails (two finds)

There is a corroded example of a typical globular-headed copper-alloy Roman nail/tack, <2853> (as Crummy 1983, 115, fig 116). A composite nail, <1665>, is comprised of a copper-alloy boss and flange head backfilled with lead to attach an iron shank. These were probably designed to execute decorative nailing patterns, and have been found in some quantity at the Bloomberg site (Marshall and Wardle in prep).

Other fittings (20 finds)

A range of other fittings and fasteners are catalogued but only listed here: two simple copper-alloy collars <1315> and <1656>; three iron double-spiked loops <93>, <2342> and <2870>; three iron staples <2099>, <2356> and <2424>; four iron hinges <1055>, <1083>, <1109> and <2353> and one made from copper alloy, <1355>; two iron clench nails/rivets <2365> and <2875> and a loose iron rove <2288>; iron boss <812>; iron possible hasp <2287>; and two iron T-clamps <1246> and <2877>.

Implements associated with agriculture or animals (functional group 12, three finds; Fig 15)

Ox-goads (two finds)

Two iron spiral ox-goads <2411> (Fig 15) and <2886> of Rees type 1 (Rees 1979, 75–9) were found. These appear to be by far the most common type in London where they account for 15 of 17 examples excavated by MOLA since 1992, in contrast to only two tubular examples of Rees type 2. The function of these objects is a matter of some debate and an alternative identification as a form of pen nib has been proposed on the basis of a tubular example from Vindolanda (Northumberland) (Blake 2013). The case remains unproven and the identification as a goad-tip is preferred here. For a fuller discussion of the arguments see Humphreys and Marshall (in prep). The present examples offer little to this debate, but if they are ox-goads then it is perhaps significant that possible ox-shoes were found at the site. The large assemblage of transport equipment and the proximity to the road raises the possibility that such goads were used with draught animals pulling vehicles as well as animals pulling the plough.

Lead ? net-sinker (one find)

A rolled lead sheet tube, <2016>, is of a class of object often interpreted as lead sinkers for nets (eg Dütting and Hoss 2014). Here we are some distance from the Thames waterfront, but it is possible that it was brought to the site from elsewhere or that fishing took place in the upper reaches of the Walbrook or the associated wet areas.

Military equipment (functional group 13, four finds; Fig 16)

Four finds are categorised here explicitly as military equipment, although it is possible that the iron spearhead is a specially made votive rather than a functional weapon and other objects from the site may have military significance. Above are noted three copper-alloy brooches (<1320>, <1035> and <2801>, Fig 1; functional group 1) that are probable military types and four copper-alloy mounts which may also have military associations (<1041>, <2800>, <2811>, Fig 14; and <3005>; functional group 11). They are discussed elsewhere with the dress accessories and the fixtures and fittings respectively but should be kept in mind when considering the overall distribution of militaria. The finds are mostly of 2nd-/3rd-century AD types, but where finer dating can be suggested on contextual or typological grounds the emphasis is 3rd century AD, possibly post-dating the nearby Cripplegate fort

(Howe and Lakin 2004; Shepherd 2012). See the main monograph for a more general discussion of this issue and for a medallion of Philip I, dated AD 245, that may also have military significance (Ranieri and Telfer 2017, 82–4).

Iron spear

A large iron spearhead, <1013> (Fig 16), came from a linear cut feature dating to the 3rd century AD. In terms of its size alone it could be placed amongst the spears of Manning's type 3 which he argues may be cavalry weapons (Manning 1985, 166–7). However, his typology mostly makes reference to 1st-century AD finds, and the precise form of the current example is different and very distinctive. It has a very robust socket, a reinforced midrib and thickened lozenge-sectioned tip.

Particularly noteworthy, however, is evidence for what may be the deliberate destruction or modification of the spearhead. While the pronounced bend could perhaps be the result of use damage and some of the losses around the edge of the blade could easily be the result of corrosion, a cut slit running longitudinally down into the blade seems deliberate, as does a damaged circular perforation cut through the blade to one side of the midrib. The circular perforation might be an original feature of the spear's design; this would probably indicate it was not a functional weapon. Whether the hole is an original feature or not, taken together with the other forms of damage it seems likely that this indicates that the spear has been used in a highly specific fashion and probably deliberately destroyed in a votive act.

The perforation could have been used to suspend the spearhead, perhaps to display it, to suspend something from the blade, or if a secondary feature it could be a way of symbolically destroying the blade. An iron spearhead of possible Roman date from Broomlee Lough, near Housesteads (Northumberland), is of very similar size, though of slightly different shape with more angular shoulders, and has two neat perforations of similar type which were presumably original features (Manning 1976, 20 and 46, fig 13 no. 19). The Broomlee Lough spear might be taken to be related to the ceremonial Beneficiarius lance, but there is no evidence for a second perforation typical of this type on the Broadgate ticket hall site, Liverpool Street, find and its shape would not be typical. A closer parallel for this treatment can be offered by an iron spearhead, very different in shape but with a similarly prominent midrib, which has a single perforation, from Ariconium (Herefordshire). That site also produced some unusual copper-alloy spearheads. Cool notes several examples of spearheads from overt votive contexts and concludes that the Ariconium find represents votive deposition. In fact, similar single perforations also appear on some votive miniature spears such as a silver find that was deliberately bent and twisted before deposition at the late Roman temple site at Uley (Woodward and Leach 1993, 131–3, figs 110–11 no. 5; Cool 2012, 151–2, fig 4.40).

Military mount

A copper-alloy mount, <1302> (Fig 16), from a period 6 context, has a central openwork panel with a raised rim and part of a pierced tab survives to one side. The style is typical of military metalwork of the 2nd–3rd centuries AD and the object type can be paralleled at military sites from contexts of appropriate date, such as at Housesteads (Allason-Jones 2009, ii, 444–5, fig 14.9 no. 93) and at Caerleon (Chapman 2005, 129, Sr47). In both cases similar examples have been identified as a form of belt fitting, while other mounts with similar decorative designs are known from other sites, for example South Shields (Allason-Jones and Miket 1984, 3.777 and 3.780).

Probable harness fittings

A much corroded copper-alloy facetted tubular ferrule/bead, swelling in the centre, <2852>, may be an example of a type paralleled at a number of military sites, for example Catterick (Wilson 2002, 109–10, fig 282.13 with further parallels), that has been suggested might have served as spacers between glass beads on a horse harness (F McIntosh, pers comm 2015).

A narrow iron rectangular frame, <2300> (Fig 16), is lacking a pin, but may perhaps come from an iron harness girth strap buckle. Bishop notes a range of rectangular harness buckles, some of similar size/shape, although these are of a more complex two-piece construction (Bishop 1988, 128–9, fig 36.1, table 2).

Religion (functional group 14, one find; Fig 17)

While only one object, pipeclay figurine <2495> (Fig 17), has been classified here as explicitly religious, several others might alternatively be placed here or have some evidence for a mode of treatment or deposition that might indicate their involvement in religious/ritual activity. Item <2143>, a lead-alloy 'mirror' discussed with the toilet equipment (above, functional group 2), is probably a non-functional votive and was found in the same context as iron candlestick <2436>, of a type that can be paralleled on temple sites, and iron shackle <1042>; all were found in a period 6 marsh deposit in Open Area 100 (Ranieri and Telfer 2017, 130–4). An iron spearhead, <1013>, was seemingly deliberately destroyed, its treatment resembling that of spears from some other possible votive assemblages (above, functional group 13) and was buried in a cut (S27) into the road surface in period 5 phase 1. An iron ring, <1142>, worn by a decapitated adult male skeleton in an inhumation burial and discussed with the dress accessories (above, functional group 1), is probably a symbolic shackle made specifically for use in funerary rites.

Pipeclay figurine

Item <2495> (Fig 17) is a lower head/upper torso fragment of a mould-made pipeclay Venus figurine from Open Area 8, period 5 phase 1. It is a common type imported from central Gaul. It is too small to assign to a type. These are by far the most common type of pipeclay figurine from Roman London with more than 85 examples known from the town (Fittock 2015, 112–15, figs 1–3). Fittock notes that mid–lower fragments are most common and considers the possibility of a link to votive practices related to healing, but the present example is from higher up the body (ibid, 127–9).

Metal- and wood-working debris (Fig 18)

There is very little material which can be firmly interpreted as metalworking waste. Copper-alloy waste is represented by a mere five cast/melted fragments and three sheet fragments widely distributed over time. Lead or lead-alloy waste is much more common, but much of this material seems likely to derive from the manufacture and destruction of buildings rather than the manufacture of lead objects. Here there are 50 cast/melted fragments with a particular concentration in the 3rd century AD (period 5) and there are 16 sheet fragments which are more evenly distributed, but are again more common in the 3rd century AD (period 5; Table 6). Neither provides clear evidence for metalworking in the immediate vicinity, however.

A single possible ceramic crucible fragment, <3029> (Fig 18), is a hemispherical form with a pinched out nozzle and flat base made in Verulamium/London region white ware (VRW). The exterior surface is very heavily burnt/sooted. This form has been identified as a crucible form by some pottery specialists (Rayner and Seeley 2008, fig 4.36, fig 42), and

analysis of an example in similar condition from a dump of metalworking ceramics at Governor's House, City of London (Dennis and Ward 2001, 117–18, fig 73 <S78>), suggested that a vessel of this form was being used for cupellation of gold. Other examples recently analysed as part of a PhD project on Roman crucibles at University College London (UCL) have also shown traces of gold (C Gardner, pers comm 2015). It should be noted, however, that very similar vessels are often interpreted as open lamps of Loeschcke type 12, and it may be that this same form was used for multiple purposes (eg Eckardt 2002, 235–8, fig 107 nos 767–73).

A second type of craft waste, <2554>, a fragment that may be from a wooden core from lathe turning, was also found in a period 5 phase 1 context.

Unclassified and unidentified objects of note (Fig 19)

As is typical in small finds assemblages, a portion of the Roman finds are unidentifiable, many comprising fragments of bar or sheet or else small pieces of larger objects which cannot be assigned a function. However, several more complete and diagnostic objects also fall into this category and are illustrated here either because they are of some intrinsic interest or in the hope that they may be identified in the future.

Two objects might be some form of nail or pin, although their use as a hairpin or dress accessory is unlikely. An iron pin-shaped object with a square section shaft and an expanded pelta or semi-circular head, <1070> (Fig 19), comes from a late 2nd-century AD (period 4 phase 3) context. Much larger objects of similar shape are interpreted elsewhere as 'spits' (Wheeler 1946, pl XLIX.1 and 2). Of more comparable size are several decorative 'pins' with square-sectioned shafts and peltate or T-shaped heads in the Museum of London core collection (MoL 31.97.5 and 528). Another iron 'pin', <2420> (Fig 19), has a more robust head and comes from a mid 2nd-century AD (period 4 phase 2) context. A probable fragment of a similar example comes from a 2nd-century AD context nearby at 6–8 Tokenhouse Yard (Leary and Butler 2012, 38–9, fig 37.4).

It is difficult to assign a precise function to bells, as <2891> (Fig 19). Recent work has tended to focus on their magical, symbolic and apotropaic functions but, of course, they may also have had more prosaic uses. As noted above (2.1), other examples are known from excavations in the Finsbury Circus area including examples from graves (Harward et al 2015, 59, 104, 152 (Bu111/3)).

3 Roman vessel glass

3.1 Introduction and overview

The assemblage of Roman vessel glass from the Broadgate ticket hall site, Liverpool Street, was fairly small comprising 81 sherds of which 47 could be more closely identified. For glass colour codes see Table 7. The overall dating emphasis is on the 2nd century AD and this is reflected in the general range of vessels (Table 8), largely restricted to naturally coloured and utilitarian types, most of which would usually be assigned a 1st- to 2nd-century AD date. Here they are present in 2nd- or 3rd-century AD deposits. There is a total absence of common diagnostic 1st-century AD forms, such as cast ribbed bowls (Isings 3) and Hofheim cups (Isings 12), which are typically present in early assemblages in London in some numbers. A possible exception is a tiny fragment which may be from an opaque turquoise cast vessel of 1st-century AD date. A few vessels could well be of 3rd-century AD date, but there are no truly diagnostic late Roman vessel fragments.

Most of the glass is derived from dumps in open areas, but a small proportion can be associated with the roadside ditches. Almost no vessels can be directly associated with a burial, the exception being fragment <2176>, a single naturally coloured body sherd found in a grave fill, [6839], in Open Area 5, period 4 phase 2. This is presumably residual rubbish rather than a grave good. Some of the vessels are of forms which are found in funerary contexts elsewhere, and nearby at Moor House, City of London, there was a strong emphasis on unguent bottles and flasks, forms that were argued to have been used in funerary rituals (Cool 2006, 22–3). Such forms are present here and might well have been used in such a fashion, but are widely distributed with no obvious concentration during the main phase of funerary activity (period 4 phase 2). The condition of the vessels provides no clear indications of use in a funerary context, for example semi-complete vessels that could be disturbed grave goods, or vessels burnt in such a way as to suggest that they are pyre goods from cremations.

3.2 The vessel glass assemblage by form

Open tableware forms (Fig 20)

Opaque cast ?bowl

Item <2206> [6764] from period 4 phase 2 is a tiny fragment from the rounded rim of an opaque turquoise (TURQ) cast vessel. It is too small to be certain about its form, but the smooth curved edge would seem to preclude a 'tessera' and the colour and technique would be most appropriate for a 1st-century AD vessel.

Bowl base rings

Item <2179> [6888] from period 5 phase 1 is a natural blue-green (NGB) base fragment with a rather ovoid applied diagonal base ring (Fig 20). This type is most usually found on tubular-rimmed bowls of the 1st and 2nd century AD (Cool and Price 1995, 168, table 10.2; Price and Cottam 1998, 77–80). Also from this period came example <3020> [8358] (Fig 20), a NGB base fragment with a rather large and shallow diagonal tubular base ring and a slightly convex base. This may come from a large shallow bowl with a splayed tubular rim of 2nd-century AD or later date (Price and Cottam 1998, 110–11, fig 44, 2nd- to 4th-century AD date).

Cup with fire-rounded rim

The only probable drinking vessel, <2227> [6771], in natural blue-green (NGB) glass from a period 4 phase 3 deposit, is a small fragment with a fire-rounded rim 62mm in diameter. The small size would seem to preclude it from being a bowl and several types of drinking vessels in use during the 2nd–3rd century AD have rims of this basic type. The most common of these is the cylindrical Airlie cup, and item <2227> may be an example of this type although they are more usually colourless (Price and Cottam 1998, 103–6, figs 39 and 40; for references to rare instances of this form in green-blue glass: Cool and Price 1995, 82).

Bottles (Fig 21)

Square and cylindrical mould-blown bottles

Both square bottles (Isings 50) and cylindrical bottles (Isings 51) are represented. A single natural blue-green (NGB) rim/neck fragment of the appropriate size was found (<2226> [6777], Fig 21), which is of the typical folded out then in construction and is quite large at 55mm in diameter. A group of six NGB neck sherds, four joining, <2222> [6726] from period 5 phase 1, can be identified as a probable bottle because of their size and thick wall.

Nine body sherds can be identified as coming from square bottles, while only two, <2239> [6772] and <2230> [6777], can be identified as coming from cylindrical bottles. Four fragments come from bases of square bottles (Isings 50) and all have small traces from the edge of mould-blown base designs. In three cases this is probably only part of a circular border which is extremely common, but <2190> [6772] has a slightly more diagnostic L-shaped moulding. Price notes this feature on several bottle base designs, most notably a group with the inscription SAI in the centre, examples of which have been found in late 2nd-century AD deposits contemporary with this find from period 4 phase 3 (Price 2011, 22, map 3). However, as the centre is missing it is not possible to say what the full design was.

Four fragments come from handles of which <441> [1397] and <3023> [8385] (Fig 21) are simple ribbons, and <2245> [6795] and <2246> [6726] are reeded.

Other necked containers and serving vessels (Fig 22; Fig 23)

Jugs

NECK/SHOULDER FRAGMENT PROBABLY FROM A 1ST- TO 2ND-CENTURY AD CONICAL JUG

Fragment <2229> [6777] from Open Area 5, period 4 phase 2, comes from the neck/shoulder of a natural blue-green (NGB) jug, probably of conical form.

HANDLE FRAGMENTS FROM 1ST- TO 2ND-CENTURY AD GLOBULAR OR CONICAL JUGS (ISINGS 52/55)

Item <2213> [6777] (Fig 22) from Open Area 5, period 4 phase 2, is a fragment with tooled projections from the base of a handle extension, while item <2241> [6772] (Fig 22) from Open Area 6, period 4 phase 3, is a fragment of ribbon handle with a single central rib, probably further up a handle of the same type. They are most likely to be from natural blue-green (NGB) jugs of Isings types 52 or 55, dated *c* AD 60–175, although they could alternatively be from a slightly earlier amphorisk as Isings 15 (Price and Cottam 1998, 147–57, figs 64, 67 or 68).

OPEN BASE RINGS PROBABLY FROM 1ST- TO 2ND-CENTURY AD JUGS, BUT POSSIBLY FROM JARS

Items <2234> [6777] (Fig 22) from Open Area 5, period 4 phase 2, and <2196> [6772] from Open Area 6, period 4 phase 3, are both open base ring fragments from natural blue-green

(NGB) jugs or jars. They can be broadly dated *c* AD 43–175. As appropriate, jug neck and handle fragments which could be from the same vessels come from the same contexts, <2229>, <2213> and <2241> (above), and it is likely that they are from jugs.

SPOUTED JUG RIM

An irregular rolled in rim fragment <2201> [6772] (Fig 22) from Open Area 6, period 4 phase 3, is probably from a natural blue-green (NGB) spouted jug of 1ate 1st- to 3rd-century AD date (Price and Cottam 1998, 157–61, figs 69 or 70). From the size of the fragment it is difficult to determine for sure whether it is a pinched-in or pulled-out form.

HANDLE, PROBABLY FROM A SPOUTED JUG

Item <219> [714] from Open Area 6, period 4 phase 3, is a natural blue-green (NGB) handle with pinched projections which probably comes from a spouted jug of late 1st- to 3rd-century AD date (Price and Cottam 1998, 157–9, fig 69; cf Cool and Price 1995, 139–43, fig 8.8 no. 1007). It comes from the same area and period but not the same context as sherd <2201> (above), which is a rim fragment from a jug of that type.

UNDIAGNOSTIC RIBBON HANDLE FRAGMENTS, PROBABLY FROM JUGS

Two small fragments of ribbon handles could come from a range of jug forms. Fragment <3027> [8341] (Fig 22) from Structure 25, period 5 phase 1, is part of a small natural blue-green (NGB) handle, while fragment <3028> [8322] from Structure 12 phase 6, period 5 phase 2, is from the edge of a larger colourless (COL) handle.

Unguent bottles and flasks

TUBULAR BODY/BASE FRAGMENTS

Two small base fragments are probably both from natural blue-green (NGB) narrow tubular unguent bottles, as Isings type 8 (Price and Cottam 1998, 169–71). They come from period 4 phase 1 (<3025> [8367], OA4) and period 4 phase 2 (<2233> [6777], OA5).

?BATH FLASK HANDLE FRAGMENT

A small and rather amorphous naturally coloured fragment, <3021> [8287] from Open Area 100, period 6, with signs of having been looped/trailed may be from a bath flask handle (Price and Cottam 1998, 188–90, fig 87), but is too poorly preserved for certainty.

NARROW RIM, FOLDED OUT AND THEN IN

Item <2174> [6599] from Open Area 8, period 5 phase 2, has a colourless (COL) folded out and rolled/folded in rim only *c* 30–32mm in diameter. Given its context date and narrow neck it is more likely to come from an unguent bottle, as Isings form 83, 84 or similar (particularly Price and Cottam 1998, 177–81, 80a and 81), than a flask or jug (for 4th-century AD forms with similar rims: ibid, 165–7).

NARROW CONSTRICTED CYLINDRICAL NECKS

Items <2218> and <2219> are both fragments of narrow necks, *c* 15–17mm in diameter, with constrictions. They both come from [6583] in Open Area 8, period 5 phase 2, and could derive from the same vessel, but they do not join.

Jars and jug/jars

At least two forms of jars are represented: forms with folded horizontal rims and globular bodies, and funnel-mouthed forms.

FOLDED HORIZONTAL JAR RIM

A naturally coloured blue-green (NGB) rim fragment, <2183> [6856] (Fig 23), is from a 1st- to 2nd-century AD convex jar with a folded horizontal rim (Price and Cottam 1998, 140–2, fig 60a). It comes from a period 4 phase 1 deposit. Large examples of this form are commonly used as cinerary urns, but the rim diameter here is only 105mm and thus need not have served this function despite its extramural find-spot.

FUNNEL-MOUTHED JARS WITH ROLLED IN RIMS

Naturally coloured blue-green (NGB) rim fragments <2181> [6276] (Fig 23) and <2237> [6772] are from jars with funnel necks and rolled in rims of the late 1st or 2nd century AD (Price and Cottam 1998, 143–5, fig 62). The rims are 50mm and 70mm in diameter. Here they come from period 4 phase 3 and period 5 phase 1. The neck of example <2181> below the rim is rather straight and narrow, somewhat resembling that of a funnel-mouthed jug, but other jars of this shape can be cited (eg Cool and Price 1995, 112–13, fig 7.5 no. 826). A colourless (COL) rim fragment, <2208> [6749] (Fig 23), from period 4 phase 2, with a rim diameter of 65mm, is probably also from a jar of this form, although the colour is quite unusual. As the full circumference is not present to conclusively demonstrate that this vessel had no handle, it is possible that the fragment could come from a funnel-mouthed jug of 2nd- to 3rd-century AD date (as Price and Cottam 1998, 161–3, fig 71).

OTHER MEDIUM RIM FRAGMENTS FROM JUGS, FLASKS OR SMALL BOTTLES

Three fragments of natural blue-green (NGB) rims, with diameters between 35mm and 40mm, could come from jugs, flasks or in some instances small bottles (Price and Cottam 1998, 1507, figs 66–8). Of similar character to the group of jars mentioned immediately above, but narrower with more of the neck surviving and thus more probably from a flask or jug, is a funnel-mouthed rolled in rim <2186> [6777] (Fig 23) from Open Area 5, period 4 phase 2 (Cool and Price 1995, 149–52, figs 9.3 and 9.5). Rims <2244> [6777] (Fig 23) from Open Area 4, period 4 phase 1, and <2192> [6772] (Fig 23) from Open Area 6, period 4 phase 3, are folded out then in, the former having a somewhat triangular section and could come from a flask, jug or even small bottle.

4 Roman leather footwear

4.1 Introduction and overview

Excavations at the Broadgate ticket hall site, Liverpool Street, produced an assemblage of Roman leather shoes, predominantly of 2nd- or 3rd-century AD date. Most of the well-stratified shoes derived from dumps in the open areas to the south of the road (R1) or from the road's make-up layers and drainage ditches. A substantial group, including many of early forms, were found redeposited in the fills of the 'Deep Ditch', a feature which heavily truncated the Roman sequence and whose sides may have continued to erode during its use life (Table 9). The distribution of iron hobnails found loose is broadly complementary (Table 10). No shoes or hobnails came from burials, although some of the dumps and ditch fills from which they were recovered also included disarticulated bone, meaning that, as with other classes of finds discussed above, some may derive from disturbed funerary contexts. The bulk of the shoes were presumably worn by the population dwelling in the Roman town to the south.

Around 51 pieces of footwear appear to be represented, although much of the assemblage is either only moderately, or else very poorly, preserved and represented by only small fragments. This may reflect the manner in which the assemblage was deposited in the extramural area. A modest number of complete or near-complete shoes were found which, in conjunction with the composite construction of some of the shoes, makes accurate quantification difficult. Small groups of very small and heavily abraded nailed shoe bottom unit fragments from [1036] and [6777] have been deliberately excluded from the quantification tabulation for this reason. At most, one piece of diagnostic information was discernible for each of these fragments. As their relationship to each other and to other fragments could not be ascertained, inclusion in the table would have artificially inflated the estimated count while providing very little additional useful information.

The classification of the footwear into four basic types is based on construction style. Nailed shoes are closed shoes or boots with the sole and upper made in separate pieces. The layers of the sole are joined by nailing. Stitched shoes are closed shoes with sole and upper made in separate pieces and joined by stitching alone. *Carbatinae* are closed or semi-closed shoes of one-piece construction where the upper and sole are made from the same piece of leather. Sandals are open forms where the soles are made from one or more layers of leather, here always joined by nailing.

Classification of sandal sole shapes and nailing patterns for nailed shoes and sandals follow van Driel-Murray (2001, 356, fig 27, and 351, fig 21). Thonging arrangements for joining the insoles and middle sole layers of nailed shoes follow Mould (1997, 328–30). Where shoe sizes are referred to below, they relate to UK sizes using the sizing guide of the shoe retailer Clarks, but are also normally expressed in mm to allow conversion to other systems. Van Driel-Murray recommends that only insoles from stitched and nailed shoes should be used to calculate size histograms, and stresses that the sizes of sandals and *carbatinae* are not easily comparable. However, as no attempt has been made here to statistically analyse the modest number of complete shoes other reasonably complete examples are loosely equated to shoe sizes to allow for at least a rough approximation of their relative size and their owner's identity. The assemblage is too small/fragmentary to permit any attempt at detailed demographic analysis, but it is clear that both children and adults are present with a few adult shoes large enough that they were probably worn by men.

Some changes in the general character of the assemblage over time can be recognised. Nailed shoes are the most common and are in use throughout the sequence. Complete measurable examples are in adult sizes, but a wide degree of size variation is suggested by the fragments. Stitched shoes, which appear in sizes appropriate for children or small adults, appear here only in 2nd-century AD (period 4) deposits where they are fairly well represented. They do not appear to have been popular later on the site. *Carbatinae* are very poorly represented and do not appear at all in later Roman deposits, perhaps indicating that this style also declined in popularity during the Roman period. Conversely, sandals become proportionally more important over time. This may in part be a reflection of the increasing popularity of such sandals by men, perhaps reflected in the expansion of this type of footwear into male sizes in the later Roman period. Some of these trends can also be seen on a broader scale by considering the overall composition of dated assemblages from across London, and it may be that this is the normal pattern for the city rather than reflecting a site-specific set of variations (Table 11).

4.2 The leather footwear assemblage by type

Nailed shoes (Fig 24)

Nailed shoes are the best represented type (total 30 examples; 58.8%) throughout the Roman stratigraphic periods represented at the site. Generally speaking, they are quite poorly preserved with no surviving uppers, although example <2610> [6752] retains a heel stiffener. However, some details of construction, size and style could be recorded.

Only two examples are substantially complete, <2609> [6752] and <2610> (Fig 24). Both come from the roadside ditch (S12 phase 4, period 5 phase 1). They are adult sizes with their insoles measuring 224mm (*c* UK size 3/3.5) and 256mm (*c* UK size 7.5) respectively. The smaller example, <2609>, has 1c nailing with an irregular design on the tread, which might just be a very poorly executed tendril pattern (van Driel-Murray 2001, 352–3) and if so probably indicative of a late 2nd- or early 3rd-century AD date. The larger shoe, <2610>, has a markedly pointed sole and 3c nailing. A more highly distinctive nailing pattern can be seen on example <3323> [6777] (Fig 24), a smaller and more fragmentary find from period 4 phase 2 with widely spaced clusters of three nails. Similar 'nail triplets' are also present on sandals from the assemblage, for example <3321> [6583], and are a feature of a number of shoes in the assemblage from nearby at 8–10 Moorgate (MOQ10), where the 2nd and 3rd century AD are again well represented, and from elsewhere in the Roman empire (eg Mainz (Germany): Göpfrich 1986, 50, fig 48.8; Aardenburg (the Netherlands)/Krefeld Gellup (Germany): Van Driel-Murray 2001, 352, fig 22.f).

Where nailing patterns are otherwise discernible they are quite diverse, but there are obvious concentrations of type 1c (five definite, five possible fragmentary examples) and type 3c (five definite examples, one probable fragmentary example). However, neither type shows clear signs of chronological patterning within the sequence. Other type 1 and 3 patterns are represented by only one or two examples. Heavy type 2 nailing is very rare here, as elsewhere (van Driel-Murray 2001, 351), with only one fairly definite example, <3111> [6583] from period 5 phase 2.

Thonging slits, used to connect insoles and midsoles, are present in most instances where a sufficient proportion of the appropriate elements survive to allow identification (14 instances). There is no clear indication of significant chronological patterning in the position/arrangement. Type 1 (midline) thonging is best represented. It may be present as early as period 3 and is certainly present on shoes found through the rest of the sequence

from period 4 phase 1 through to period 5 phase 2. There are also examples residual in post-Roman deposits. The only other type certainly represented is type 2 (tread margin, waist/seat midline). Three examples of type 2 thonging and a fourth fragment which may be type 2 or 3 are all residual in the post-medieval 'Deep Ditch', with none coming from stratified Roman deposits. In eight instances tunnel stitching was observed on the bottom unit, arranged as for stitched shoes (below). There is some suggestion that the presence of tunnel stitching may be negatively correlated with the presence of thonging slits, a feature also noted at Billingsgate, City of London (Rhodes 1980, 109), although in the instance of some, as <2609> [6752], there is evidence for both features.

Carbatinae *(Fig 25)*

Carbatinae, shoes made in one piece, are present in much smaller numbers than in earlier Roman assemblages recovered from London (two examples; 3.9%), and here the only example from a stratified Roman context, <3319> [1402] (Fig 25), comes from a 1st- or early 2nd-century AD (period 3) context. It is amongst the earliest shoes from the site. A decline in popularity of this form of shoe by the 3rd century AD is also suggested by the small numbers of *carbatinae* from St Magnus House/New Fresh Wharf, City of London (MacConnoran 1986; Table 11). Both examples are highly damaged and abraded, and only one of the two examples, <3319> (Fig 25), can be securely identified to a specific dated style. This is of the late 1st- to mid 2nd-century AD Dragonby type (Volken 2014, 247, Dragonby U). The length of the flat pattern is approximately 250mm, but the length of the sole will have been less than this, perhaps closer to 220mm. This would suggest it is a small adult shoe, but this is only a rough approximation, especially given that this style of shoe is highly adjustable.

Stitched shoes (Fig 26)

Stitched shoes are reasonably well represented here (six examples; 11.8%). Shoes of stitched construction can continue into the late Roman period (van Driel-Murray 2001, 353), but they appear to have been most popular in the early Roman period in London (Table 11). Here all examples stratified in Roman deposits had been deposited before the end of period 4 phase 2 and they are absent from later Roman deposits, perhaps also indicating a decline in popularity. The construction is uniform with a margin of tunnel stitching for attaching the upper, aligned perpendicular to the edge on the bottom (flesh) side of insoles, and more widely spaced tunnel stitching parallel to the edge on the top (flesh) side of the outer sole, as visible on <3318> [6777] and <3320> [6822] (Fig 26). In places the stitching has been partially removed/obscured by post-depositional abrasion.

Where the sole shape can be determined, all have pointed or pointed oval toes and most are relatively narrow. The measurable insoles vary in length from 215mm to 224mm (*c* UK size 2/3), perhaps indicating that they were worn by children or small adults. Smaller fragments also tended to be relatively small and narrow. None of the stitched shoes here are of the size range that definitively indicates use by adult males. Amongst the stitched shoes is an unusual example, <489> [1335] (Fig 26), with a network of light slash marks all over the insole upper (grain) side. The purpose of this feature is not clear.

Sandals (Fig 27; Fig 28)

Sandals are particularly well represented in the present group (13 examples; 25.5%) and their distribution exhibits chronological trends in sole shape and construction that match those identified elsewhere in the Roman world. Early forms have semi-naturalistic sole shapes with individually defined toes, as examples <3107> [6882], <2607> [6772] and <490> [1373] (Fig 27). These are known to appear on sandals from the 1st to early 3rd century AD, changing

somewhat in form over this period, becoming more stylised with a single pronounced toe (van Driel-Murray 2001, 356, fig 27 shapes 1, 2 and 5). The identifiable examples that are securely stratified in Roman deposits come from period 4 contexts, while <3322> [6609], a fragmentary piece which may be related but has a damaged toe, comes from a period 5 phase 1 context. The smallest of the measureable examples is 175mm in length (UK child's shoe size 11), while the largest is 240mm in length (*c* UK adult size 5 or 6). None are so large that they must have been worn by adult males.

These early sandals normally have pairs of thong slits fairly widely spaced and perpendicular to the edge, although example <490> here seemingly lacks these. All have light type 1 nailing patterns, with type 1c the most common closely identifiable type.

At least four sandals in this early group have evidence for stamped decoration on the sole, a relatively common phenomenon on sandals. Several have simple ring and dot stamps, often faint or heavily worn. There is also a hint of two elongated stamps along the midline of example <3107>, although these are too worn to identify. Two sandals have more elaborate designs: <490>, with a complex pattern of small rosette stamps and an impressed marginal line, and <3322> (Fig 27), an incomplete fragment which probably comes from a sandal of this sort, highly decorated with impressed lines and with palm/feather, ring and dot and rosette stamps. As yet there is no comprehensive study of sandal stamps from London. Ring and dot and simple rosette/spoke wheel motifs are common, while more complex motifs such as two-handled urns and eagles are rarer (Rhodes 1980, 118–20). The design of example <3322> is particularly complex and no precise local parallel for the palm motifs can be offered.

Later sandal types from the site can be subdivided on the basis of their sole shape. The more naturalistic toes are gone in favour of late 2nd- to 3rd-century AD forms with fairly wide blunt toes (van Driel-Murray 2001, 356, fig 27 shapes 3 and 4). These types are represented here by examples <2598> [6743], from period 5 phase 1, and <3321> [6583], from period 5 phase 2, and a form with an even broader toe, with the placement of the big toe distinguished, which were in use from the middle of the 3rd century AD (van Driel-Murray 2001, 356, fig 27 shapes 6–9), as example <492> [1372] (Fig 28) which was residual in a post-Roman context. Where securely identified and stratified in Roman deposits, these late sandal forms all come from period 5. All the late sandals from the site are of multilayered nailed construction; none are of the single layer constructions that appear during the 3rd century AD (van Driel-Murray 2001, 356 and fig 27, sole shapes 11 and 12 in use in the later 3rd and 4th century AD) and none have the exceptionally wide flat toes of the 3rd–4th century AD that give the soles an almost triangular shape, seen at New Fresh Wharf, City of London, for example (MacConnoran 1986).

As with the early sandals, all have light type 1 nailing with a single marginal row. Example <3321> (Fig 28) has triplet clusters, a feature noted above in relation to the nailed shoes. Example <492> (Fig 28) has a distinctive nailing pattern with two short parallel columns of nails on the tread. Related patterns can be seen on other mid–late Roman sandal types, locally at New Fresh Wharf and elsewhere, at Mainz for example (Göpfrich 1986, 50, fig 48.4; MacConnoran 1986, 221, fig 8.15). Thong construction evidence normally takes the form of a continuous marginal row of closely spaced slits, perpendicular to the edge, with a gap behind the waist before continuing around the heel. However, the typologically latest example, <492>, lacks this feature, perhaps indicating a mid–late 3rd-century AD date; van Driel-Murray (2001, 356) notes that slits disappear during the 3rd century AD.

Sandal <2598> (Fig 28) is only 175mm in length, roughly equating to UK child shoe size 10/11, while the others are from slightly bigger examples. Sandal <492> (Fig 28) is

200mm in length, roughly equivalent to UK shoe size 1 and thus perhaps worn by a larger child or small adult. None of the fully measurable late sandals here are big enough to have been definitively worn by an adult male, but fragmentary sandal <3321> (Fig 28) is a possible candidate.

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Tables

Table 1 Rate of deposition of small finds (SFs) by period

Period	Activity	Start date	End date	Length (no. of years)	No. of SFs	No. of SFs per year	No. of glass sherds	No. of glass sherds per year	No. of shoes	No. of shoes per year
1	natural		100 BC		1	-				
2	prehistoric	100 BC	*c* AD 43	143						
3	early Roman landscape, pre-road	*c* AD 43	AD 120	77	1	0.01			5	0.06
4.1	road and water management	AD 120	AD 140	20	40	2.00	6	0.30	11	0.55
4.2	road, cemetery and dumping	AD 140	AD 160	20	55	2.75	24	1.20	8	0.40
4.3	land consolidation and reclamation	AD 160	AD 200	40	58	1.45	18	0.45	3	0.08
5.1	renewed roadside ditches and marsh formation	AD 200	AD 250	50	115	2.30	19	0.38	6	0.12
5.2	renewed roadside ditches and marsh formation	AD 250	*c* AD 400	150	156	1.04	8	0.05	6	0.04
6	Roman abandonment and marsh	*c* AD 400	1100	700	18	0.02	1	0.00	1	0.00
PR	post-Roman activity				6	-	5	-	11	-
U/S	unstratified				5	-				
Total period of Roman activity		***c* AD 43**	***c* AD 400**	**357**	**455**	**1.27**	**81**	**0.22**	**51**	**0.14**

Table 2 Number of small finds by material and period

Period	**1**	**2**	**3**	**4.1**	**4.2**	**4.3**	**5.1**	**5.2**	**6**	**PR**	**U/S**	**Total**
Material												
Stone						1	1	4	2	1		**9**
Ceramic				1	3	3	1	2				**10**
Glass						1	1	1				**3**
Iron				22	21	28	48	46	7		2	**174**
Copper alloy	1			8	12	13	30	38	3	2	1	**108**
Lead				2	8	9	25	49	3			**96**
Composite					1			6				**7**
Bone			1	5	10	1	5	6	3	3	2	**36**
Wood				2		2	4	4				**12**
Total	**1**	**0**	**1**	**40**	**55**	**58**	**115**	**156**	**18**	**6**	**5**	**455**

PR – post-Roman; U/S – unstratified

Table 3 Number of objects per functional group by period; craft waste is quantified by number of fragments (in parentheses)

Period	**1**	**2**	**3**	**4.1**	**4.2**	**4.3**	**5.1**	**5.2**	**6**	**PR**	**U/S**	**Total**
Functional group												
1: dress accessories, personal adornment and shackles	1			2	4	3	6	12	3	3	1	**35**
2: toilet or medical equipment					2	2	5		1			**10**
3: textile equipment				2	3	2	5	2		1	1	**16**
4: domestic material			1	2		2	3	3	2	2		**15**
5: leisure and recreation					8	2		2		1		**13**
6: weighing and measuring					1	1		1		2		**5**
7: writing, literacy and seals				1	3	4	9	7				**24**
8: transport				6			7	5			1	**19**
9: buildings and services					1	1	5	3				**10**
10: tools				5		3	4	4	2	1	1	**20**
11: fasteners, fixtures and fittings				8	11	8	19	16	4	2	2	**70**
12: implements associated with agriculture or animals					1		1	1				**3**
13: military equipment							2	1	1			**4**
14: religion							1					**1**
Craft waste				(3)	(8)	(7)	(19)	(37)	(2)			**(76)**
Total (including waste)	**1**	**0**	**1**	**26 (29)**	**34 (42)**	**28 (35)**	**67 (86)**	**57 (94)**	**13 (15)**	**12**	**6**	**245 (321)**

PR – post-Roman; U/S – unstratified

Table 4 Proportion of objects assigned to each functional group by period rounded to the nearest per cent, normalised after the exclusion of craft-working waste

Period	**1**	**2**	**3**	**4.1**	**4.2**	**4.3**	**5.1**	**5.2**	**6**	**PR**	**U/S**	**Total %**	***Total no.***
Functional group	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**		
1: dress accessories, personal adornment and shackles	100			8	12	11	9	21	23	25	17	**14**	***35***
2: toilet or medical equipment					6	7	7		8			**4**	***10***
3: textile equipment				8	9	7	7	4		8	17	**7**	***16***
4: domestic material			100	8		7	4	5	15	17		**6**	***15***
5: leisure and recreation					24	7		4		8		**5**	***13***
6: weighing and measuring					3	4		2		17		**2**	***5***
7: writing, literacy and seals				4	9	14	13	12				**10**	***24***
8: transport				23			10	9			17	**8**	***19***
9: buildings and services					3	4	7	5				**4**	***10***
10: tools				19		11	6	7	15	8	17	**8**	***20***
11: fasteners, fixtures and fittings				31	32	29	28	28	31	17	33	**29**	***70***
12: implements associated with agriculture or animals					3		1	2				**1**	***3***
13: military equipment							3	2	8			**2**	***4***
14: religion							1						***1***
Total no.	***1***	***0***	***1***	***26***	***34***	***28***	***67***	***57***	***13***	***12***	***6***		***245***

PR – post-Roman; U/S – unstratified

Table 5 Concordance of small finds, listed by functional group (FG), material and object type

FG	Material	Object	Typology (1)	Typology (2/comments)	Period	Land use	Context	Acc no.	Fig
1	copper alloy	brooch	bow brooch foot		5.1	S12 phase 2	[6609]	<1366>	1
1	copper alloy	brooch	Colchester derivative (Harlow)	Mackreth 2011 CD Ha.1a	5.1	S12 phase 5	[6741]	<1662>	1
1	copper alloy	brooch	crossbow (light)	Mackreth 2011 CR 2.a	5.1	R1 phase 3	[8326]	<2801>	1
1	copper alloy	brooch	crossbow (light)	Mackreth 2011 CR 2.e1	5.2	OA8	[6729]	<1035>	1
1	copper alloy	brooch	penannular	Mackreth 2011 PEN k5.b	1	OA1	[6869]	<1320>	1
1	copper alloy	brooch	simple one-piece		5.2	OA8	[6583]	<1034>	1
1	glass	bead	short biconical	blue	5.2	S12 phase 6	[8322]	<3013>	2
1	copper alloy	bracelet	late bangle	Cool 1983 XXII	8.3	S109	[707]	<218>	2
1	copper alloy	bracelet	cable (three strand/polychrome)	Cool 1983 III	4.2	OA5	[6777]	<1301>	2
1	copper alloy	bracelet	cable (three strand/polychrome)	Cool 1983 III	4.3	OA6	[1397]	<433>	
1	copper alloy	bracelet	cable (three strand)	Cool 1983 III	5.2	OA8	[8325]	<2838>	2
1	copper alloy	bracelet	cable (three strand)	Cool 1983 III	5.2	OA8	[8325]	<2839>	
1	copper alloy	bracelet	penannular		5.2	OA8	[8325]	<2885>	2
1	iron	finger ring	signet	Henig 2007 III	4.3	OA6	[6772]	<2429>	2
1	bone	pin	group A	Crummy 1983 1	4.3	S12 phase 2	[8439]	<2755>	
1	bone	pin	group A	Crummy 1983 1	5.1	S24	[8360]	<2756>	3
1	bone	pin	group A	Crummy 1983 1	5.1	S25	[8341]	<2752>	
1	bone	pin	group A	Crummy 1983 2	4.1	OA4	[1302]	<469>	3
1	bone	pin	group A	Crummy 1983 2	4.2	OA5	[6777]	<1862>	
1	bone	pin	group A	Crummy 1983 2	4.2	OA5	[6777]	<1763>	
1	bone	pin	group A	Crummy 1983 2	10	S119	[3704]	<2573>	
1	bone	pin	group A	Crummy 1983 2	U/S	-	-	<443>	
1	bone	pin	group A	Crummy 1983 2 (variant)	4.1	OA4	[6856]	<1765>	3
1	bone	pin	group A	Crummy 1983 2 (variant)	6	OA100	[6694]	<2570>	3
1	bone	pin	group A	Crummy 1983 ?2	5.2	OA8	[6716]	<1809>	
1	bone	pin	group B	Crummy 1983 3	5.2	OA8	[6730]	<1812>	
1	bone	pin	group B	Crummy 1983 3	6	OA100	[8287]	<2757>	3
1	bone	pin	group B	no head	5.2	OA8	[6730]	<1811>	
1	bone	pin	group B	no head	8.1	OA101	[8288]	<2753>	
1	copper alloy	pin		as Crummy 1983 6 in bone	5.2	OA8	[1023]	<378>	3
1	copper alloy	pin		Cool 1990 5c	5.1	R1 phase 3	[6731]	<1295>	3
1	copper alloy	pin		Cool 1990 7b	5.2	OA8	[8325]	<2845>	3
1	copper alloy	pin		Cool 1990 9	5.2	OA8	[1027]	<377>	3
1	iron	shackle	fetter	Manning 1985 7	6	OA100	[6582]	<1040>	4
1	iron	shackle/ring	solid wrist ring		4.2	OA5	[6853]	<1142>	4

FG	Material	Object	Typology (1)	Typology (2/comments)	Period	Land use	Context	Acc no.	Fig
2	copper alloy	long-handled instrument	scoop	Riha 1986 A	5.1	OA7	[6726]	<1660>	5
2	copper alloy	long-handled instrument	scoop		4.2	OA5	[6777]	<1669>	
2	copper alloy	long-handled instrument	scoop		4.3	OA6	[6772]	<1296>	5
2	copper alloy	long-handled instrument	scoop		5.1	OA7	[6726]	<1659>	
2	iron	? long-handled instrument	unusual hooked form		4.2	OA5	[6777]	<2361>	5
2	glass	disc/palette			4.3	OA6	[6771]	<2202>	5
2	glass	disc/palette			5.1	OA7	[8381]	<3017>	5
2	copper alloy	mirror	rectangular	Lloyd-Morgan 1981 A	5.1	S12 phase 2	[6609]	<1342>	
2	copper alloy	?mirror	?rectangular	Lloyd-Morgan 1981 ?A	5.1	OA7	[8381]	<2821>	
2	lead	votive mirror			6	OA100	[6582]	<2143>	5
3	iron	? wool comb	three teeth		4.2	OA5	[6777]	<2271–3>	
3	wood	spindle			4.3	OA6	[1397]	<498>	6
3	wood	spindle			5.2	S28	[6882]	<3148>	
3	ceramic	? spindle whorl	vessel sherd, unfinished		4.2	OA5	[6777]	<3207>	
3	bone	needle	broken across eye		11	S126	[1154]	<445>	
3	bone	needle	broken across eye		4.1	OA4	[6856]	<1865>	
3	bone	needle	broken across eye		4.2	OA5	[6777]	<1814>	
3	bone	needle	broken across eye		5.1	S12 phase 2	[6609]	<2569>	
3	bone	needle	broken across eye		U/S	-	-	<1253>	
3	bone	needle	Crummy 1983 1C		4.1	OA4	[6766]	<1762>	6
3	bone	needle	Crummy 1983 2A		5.1	OA7	[8381]	<2754>	6
3	copper alloy	needle	Crummy 1983 2A		5.1	S12 phase 3	[6747]	<1307>	6
3	copper alloy	needle	Crummy 1983 2A		5.2	OA8	[1045]	<362>	
3	copper alloy	needle	Crummy 1983 3		5.1	OA7	[6737]	<1319>	6
3	iron	needle	broken across eye		4.3	OA6	[6772]	<2357>	
3	iron	needle	Crummy 1983 ?3		5.1	S12 phase 4	[6744]	<2402>	
4	ceramic	lamp	factory		5.2	OA8	[6602]	<3030>	7
4	ceramic	lamp	open	Loeschcke 1919 11A	4.1	OA4	[6834]	<2498>	
4	ceramic	lamp	open	Loeschcke 1919 11A	4.3	OA6	[6772]	<2496>	7
4	iron	candlestick			6	OA100	[6582]	<2436>	7
4	iron	candlestick			5.1	R1 phase 3	[8326]	<2880>	7
4	stone	quern	?millstone	Mayen lava, ?post-Roman	10	S119	[3704]	<2539>	
4	stone	quern	rotary	Mayen lava	5.2	OA8	[6716]	<2540>	
4	stone	mortar			6	OA100	[1311]	<450>	7
4	stone	mortar			4.3	OA6	[714]	<226>	7
4	copper alloy	spoon	oval bowl, offset handle		8.3	S109	[6639]	<1477>	7
4	copper alloy	spoon	round bowl with lip		5.1	OA7	[1395]	<432>	7

FG	Material	Object	Typology (1)	Typology (2/comments)	Period	Land use	Context	Acc no.	Fig
4	lead	spoon	purse-shaped bowl		5.1	S12 phase 4	[6743]	<2019>	7
4	wood	barrel stave			4.1	OA4	[6822]	<2553>	
4	copper alloy	vessel	escutcheon		5.2	OA8	[8325]	<2866>	7
4	bone	hinge	Greep 1983 2.2		3	OA3	[1430]	<447>	7
5	bone	counter	Greep 1983 1 (dimple)	graffito	4.2	OA5	[6777]	<1813>	8
5	bone	counter	Greep 1983 1 (dimple)		4.2	OA5	[6777]	<1863>	
5	bone	counter	Greep 1983 1 (double dimple)	?graffito	4.2	OA5	[6819]	<1764>	
5	bone	counter	Greep 1983 2	graffito	5.2	OA8	[1027]	<357>	8
5	bone	counter	Greep 1983 3	graffito	4.2	OA5	[6825]	<1864>	8
5	bone	counter	Greep 1983 3		4.2	OA5	[6777]	<1861>	
5	bone	counter	Greep 1983 3		4.2	OA5	[6749]	<1849>	
5	bone	counter	Greep 1983 3		5.2	OA8	[1045]	<356>	
5	ceramic	counter	amphora sherd		4.2	OA5	[6796]	<3038>	8
5	ceramic	counter	amphora sherd		4.3	OA6	[6772]	<3037>	8
5	ceramic	counter	other sherd		4.2	OA5	[6777]	<3236>	
5	ceramic	counter	other sherd		4.3	OA6	[702]	<223>	
5	ceramic	counter	other sherd		8.1	OA101	[213]	<173>	
6	copper alloy	steelyard arm	fragment		7	OA100	[8299]	<2798>	
6	copper alloy	weight	pan	disc	5.2	OA8	[6729]	<1297>	
6	lead	weight	pan	disc	4.3	OA6	[6772]	<2117>	
6	lead	weight	perforated	disc	4.2	OA5	[6764]	<2123>	
6	lead	weight	suspended	biconical	8.1	OA101	[8242]	<2934>	
7	copper alloy	seal box	Andrews 2012 P3		5.2	OA8	[6730]	<1299>	
7	copper alloy	stylus	middle–late Roman type		5.2	OA8	[6758]	<1293>	9
7	iron	stylus	early type		4.1	OA4	[6856]	<2293>	
7	iron	stylus	early type		5.1	OA7	[6726]	<1054>	9
7	iron	stylus	early type		5.2	OA8	[6716]	<2410>	9
7	iron	stylus	middle Roman type	attached to hipposandal	5.1	R1 phase 2	[1078]	<351>	
7	iron	stylus	middle Roman type		4.2	OA5	[6749]	<2418>	9
7	iron	stylus	middle Roman type		4.2	OA5	[6777]	<2350>	
7	iron	stylus	middle Roman type		4.2	OA5	[6777]	<2398>	9
7	iron	stylus	middle Roman type		4.3	OA6	[6772]	<1056>	9
7	iron	stylus	middle Roman type		4.3	OA6	[6772]	<2343>	
7	iron	stylus	middle Roman type		4.3	OA6	[6772]	<2345>	9
7	iron	stylus	middle Roman type		5.1	S12 phase 2	[6609]	<1053>	9
7	iron	stylus	middle Roman type		5.1	OA7	[8381]	<2893>	9
7	iron	stylus	middle Roman type		5.1	R1 phase 3	[300]	<92>	9
7	iron	stylus	middle Roman type		5.1	R1 phase 3	[300]	<91>	
7	iron	stylus	middle Roman type		5.1	R1 phase 3	[300]	<88>	9

FG	Material	Object	Typology (1)	Typology (2/comments)	Period	Land use	Context	Acc no.	Fig
7	iron	stylus	middle Roman type		5.2	OA8	[6583]	<2431>	9
7	iron	stylus	middle Roman type		5.2	OA8	[6602]	<2391>	9
7	iron	stylus	middle Roman type		5.2	OA8	[6716]	<1033>	9
7	wood	writing tablet	Padley 1		4.3	OA6	[6772]	<2549>	
7	wood	writing tablet	Padley 1		5.2	OA8	[1045]	<331>	
7	wood	writing tablet	Padley 2		5.1	S12 phase 5	[6741]	<2550>	
7	wood	writing tablet	Padley 2		5.1	S12 phase 5	[6741]	<2551>	
8	copper alloy	terret	dropped bar		4.1	R1 phase 1	[1091]	<380>	10
8	copper alloy	terret	simple		5.1	OA7	[6726]	<1338>	10
8	iron	hipposandal	fragment, heel		5.1	R1 phase 3	[1323]	<475>	
8	iron	hipposandal	fragment, heel		5.2	OA8	[1314]	<474>	
8	iron	hipposandal	fragment, sole		4.1	R1 phase 1	[2070]	<1122>	
8	iron	hipposandal	fragment, wing		5.2	OA8	[6716]	<1060>	
8	iron	hipposandal	fragment, wing		5.2	OA8	[6716]	<2450>	
8	iron	hipposandal	Manning 1985 1		4.1	R1 phase 1	[1089]	<353>	10
8	iron	hipposandal	Manning 1985 1		4.1	R1 phase 1	[1089]	<354>	10
8	iron	hipposandal	Manning 1985 1	with stylus attached	5.1	R1 phase 2	[1078]	<351>	10
8	iron	hipposandal	Manning 1985 1		5.1	R1 phase 2	[1078]	<352>	10
8	iron	hipposandal	Manning 1985 1		5.2	OA8	[1314]	<472>	
8	iron	hipposandal	Manning 1985 ?1		5.2	OA8	[1314]	<473>	10
8	iron	hipposandal	Manning 1985 2/3		5.1	R1 phase 3	[6731]	<2296>	11
8	iron	hipposandal	Manning 1985 ?2/3		4.1	R1 phase 1	[2071]	<1135>	11
8	iron	hipposandal	Manning 1985 3		U/S	-	-	<471>	11
8	iron	hipposandal	Manning 1985 4		5.1	R1 phase 3	[1323]	<476>	11
8	iron	hipposandal	Manning 1985 4 (variant)		5.1	R1 phase 3	[1323]	<438>	11
8	iron	hipposandal	Manning 1985 5		4.1	OA4	[6834]	<2351>	11
9	glass	windowpane	matt/glossy		4.2	OA5	[6777]	<2178>	
9	glass	windowpane	matt/glossy		4.3	OA6	[6772]	<2200>	
9	glass	windowpane	matt/glossy		5.1	S12 phase 2	[6609]	<2182>	
9	glass	windowpane	matt/glossy		5.1	S12 phase 2	[6609]	<2220>	
9	glass	windowpane	matt/glossy		5.2	OA8	[6583]	<2216>	
9	glass	windowpane	matt/glossy		5.2	OA8	[6583]	<2224>	
9	glass	windowpane	matt/glossy		5.2	OA8	[6716]	<2199>	
9	wood	window bar			5.1	S12 phase 4	[6745]	<3144>	
9	iron	water pipe junction			5.1	S12 phase 2	[6609]	<1065>	
9	iron	water pipe junction			5.1	S12 phase 2	[6609]	<1078>	
10	iron	shears	?three-piece		4.3	OA6	[6772]	<2358>	13
10	iron	?shears			5.1	S12 phase 2	[6609]	<1132>	

FG	Material	Object	Typology (1)	Typology (2/comments)	Period	Land use	Context	Acc no.	Fig
10	iron	?shears			5.2	OA8	[8325]	<2894>	
10	iron	drill	Manning 1985 1		4.3	OA6	[6772]	<2409>	13
10	iron	punch			4.3	OA6	[6772]	<2407>	13
10	iron	?graver			5.1	OA7	[6726]	<1069>	13
10	iron	hammer	cross peen		5.1	R1 phase 3	[6731]	<1073>	13
10	iron	knife	blade fragment		4.1	OA4	[6822]	<2406>	
10	iron	knife	Clarke 1979 b/c		U/S	-	[1046]	<346>	13
10	iron	knife	Manning 1985, 4	zoomorphic terminal	8.3	S109	[6580]	<2317>	13
10	iron	knife	Manning 1985, 4		4.1	OA4	[6766]	<2285>	
10	iron	knife	tang fragment		4.1	OA4	[6856]	<2294>	
10	iron	?spatula	?spear-shaped		4.1	OA4	[6822]	<2405>	13
10	iron	?tongs	?three-piece tong arm		4.1	OA4	[6875]	<2276>	13
10	iron	?tongs	?tongs		6	OA100	[6557]	<1082>	13
10	stone	hone	primary hone		6	OA100	[8287]	<2926>	
10	stone	hone	primary hone		5.1	OA7	[6737]	<2525>	
10	stone	hone	primary hone		5.2	OA8	[8325]	<2925>	
10	stone	hone	primary hone		5.2	OA8	[6730]	<3158>	
10	stone	hone	utilised pebble		5.2	OA8	[1314]	<451>	
11	iron	key	slide lock	Manning 1985 2 (narrowed neck)	6	OA100	[979]	<326>	14
11	iron	key	slide lock	Manning 1985 2 (narrowed neck)	4.1	OA4	[1057]	<337>	
11	iron	key	slide lock	Manning 1985 2 (narrowed neck)	4.2	OA5	[6777]	<2362>	
11	iron	key	slide lock	Manning 1985 2 (narrowed neck)	4.3	OA6	[6772]	<1057>	
11	iron	key	slide lock	Manning 1985 2 (tapering body)	4.3	OA6	[6772]	<2347>	14
11	copper alloy	?key	? slide lock	handle	5.1	OA7	[8381]	<2855>	
11	iron	?key	rotary		5.2	OA8	[8325]	<2900>	
11	composite	stud			5.2	OA8	[8321]	<2841>	
11	copper alloy	stud	bell-shaped		5.2	OA8	[1023]	<379>	14
11	copper alloy	stud	bell-shaped		5.2	OA8	[8321]	<2850>	
11	copper alloy	stud			4.2	OA5	[6777]	<1668>	
11	copper alloy	stud			5.2	OA8	[6594]	<1344>	
11	copper alloy	stud			5.2	OA8	[6716]	<1298>	
11	copper alloy	stud			7	OA100	[6556]	<1402>	
11	copper alloy	stud			4.2	OA5	[6777]	<1667>	
11	copper alloy	stud			5.1	OA7	[6726]	<1333>	
11	copper alloy	stud			6	OA100	[979]	<327>	
11	copper alloy	stud			4.1	OA4	[6856]	<1671>	
11	copper alloy	stud			5.1	OA7	[6726]	<1661>	
11	composite	mount	cast (decorated)	rosette	5.2	OA8	[8325]	<3005>	

FG	Material	Object	Typology (1)	Typology (2/comments)	Period	Land use	Context	Acc no.	Fig
11	copper alloy	mount	cast (decorated)	?military foliate terminal	5.2	OA8	[8325]	<2811>	14
11	copper alloy	mount	cast (decorated)	phallic	U/S	-	-	<1041>	14
11	copper alloy	mount	cast (decorated)	rectangular (enamelled)	5.1	R1 phase 3	[8326]	<2800>	14
11	copper alloy	mount	cast (decorated)		8.2	S104	[8282]	<2846>	
11	copper alloy	mount	sheet	circles	5.1	R1 phase 3	[300]	<87>	14
11	copper alloy	mount	sheet	?lock plate fragment	5.1	OA7	[6726]	<1353>	
11	copper alloy	mount	sheet	rectangular	4.3	S12 phase 2	[6623]	<1340>	
11	copper alloy	mount	sheet	rectangular	5.2	OA8	[8325]	<2835>	
11	copper alloy	mount	sheet		5.1	OA7	[1395]	<431>	
11	copper alloy	mount	sheet		5.1	OA7	[6726]	<1337>	
11	copper alloy	mount	strip		4.1	OA4	[8445]	<2854>	
11	copper alloy	mount	strip		5.1	S12 phase 2	[6609]	<1341>	
11	iron	mount	sheet	rectangular	4.2	OA5	[6777]	<2360>	
11	iron	mount	sheet		6	OA100	[6582]	<2435>	
11	iron	mount	sheet		4.2	OA5	[6777]	<2270>	
11	iron	mount	sheet		4.2	OA5	[6777]	<2363>	
11	iron	mount	strip		6	OA100	[6694]	<2423>	
11	iron	mount	strip		4.1	R1 phase 1	[6765]	<2289>	
11	iron	mount	strip		4.2	OA5	[6777]	<2283>	
11	iron	mount	strip		4.3	OA6	[6772]	<2344>	
11	iron	mount	strip		5.1	R1 phase 3	[8326]	<2881>	
11	iron	mount	strip		5.2	OA8	[6716]	<2397>	
11	iron	mount	strip		5.2	OA8	[6716]	<2416>	
11	iron	mount	?strip		4.1	OA4	[6856]	<2281>	
11	iron	mount	?strip		4.1	OA4	[6875]	<2275>	
11	iron	mount	?strip		5.1	S12 phase 2	[6609]	<2442>	
11	iron	rivet	rove		4.3	OA6	[6772]	<2288>	
11	iron	rivet			4.2	S12 phase 1	[6781]	<2365>	
11	iron	rivet			5.2	S12 phase 6	[8322]	<2875>	
11	lead alloy	rivet	decorative		5.1	OA7	[6736]	<2121>	
11	lead alloy	rivet	decorative		5.2	OA8	[6716]	<1039>	
11	composite	nail			4.2	OA5	[6777]	<1665>	
11	copper alloy	nail			4.1	S16	[8451]	<2853>	
11	copper alloy	collar			4.2	OA5	[6777]	<1315>	
11	copper alloy	collar			5.2	OA8	[6716]	<1656>	
11	iron	double-spiked loop			4.1	S4	[6886]	<2342>	
11	iron	double-spiked loop			5.1	R1 phase 3	[300]	<93>	
11	iron	double-spiked loop			5.2	OA8	[8321]	<2870>	

FG	Material	Object	Typology (1)	Typology (2/comments)	Period	Land use	Context	Acc no.	Fig
11	iron	staple			4.2	OA5	[6777]	<2424>	
11	iron	staple			4.3	OA6	[6772]	<2356>	
11	iron	staple			5.1	S12 phase 5	[6741]	<2099>	
11	copper alloy	hinge	strap hinge		5.1	OA7	[6726]	<1355>	
11	iron	hinge	loop hinge		4.3	OA6	[6772]	<2353>	
11	iron	hinge	loop hinge		5.2	S12 phase 6	[6587]	<1083>	
11	iron	hinge	strap hinge		5.1	R1 phase 3	[6731]	<1109>	
11	iron	hinge	strap hinge		5.1	S12 phase 5	[6741]	<1055>	
11	iron	boss			5.1	R1 phase 3	[1652]	<812>	
11	iron	?hasp			4.3	OA6	[6772]	<2287>	
11	iron	T-clamp			5.1	R1 phase 3	[8326]	<2877>	
11	iron	T-clamp			U/S	-	-	<1246>	
12	iron	ox-goad	spiral		4.2	S12 phase 1	[8446]	<2886>	
12	iron	ox-goad	spiral		5.2	OA8	[6716]	<2411>	15
12	lead	? net sinker			5.1	S12 phase 2	[6609]	<2016>	
13	iron	spear			5.1	S27	[2069]	<1013>	16
13	copper alloy	belt mount			6	OA100	[6557]	<1302>	16
13	copper alloy	ferrule	facetted oval bead		5.1	OA7	[8398]	<2852>	
13	iron	?buckle	rectangular		5.2	OA8	[6729]	<2300>	16
14	ceramic	figurine	Venus		5.1	OA8	[6730]	<2495>	17

Table 6 Craft waste by type and material

Type	**Period**	**Ceramic**	**Copper alloy**		**Lead**		**Wood**
		No. of fragments	**No. of fragments**	**Weight (g)**	**No. of fragments**	**Weight (g)**	**No. of fragments**
Crucible	5.1	1					
Cast/melted	4.1		1	11.2	2	53.6	
Cast/melted	4.2		1	4.9	3	88.6	
Cast/melted	4.3		1	2.8	3	89.2	
Cast/melted	5.1				14	573.3	
Cast/melted	5.2		2	19.5	26	932.1	
Cast/melted	6				2	120.7	
? Melted sheet	4.2				3	38.7	
? Melted sheet	4.3				2	223.2	
Sheet	4.2				1	29.5	
Sheet	4.3				1	8.7	
Sheet	5.1				3	21.2	
Sheet	5.2		3	8.2	6	80.2	
?Turning	5.1						1
Total		**1**	**8**	**46.6**	**66**	**2259.0**	**1**

Table 7 Glass colours by number of sherds per period

Period	**3**	**4.1**	**4.2**	**4.3**	**5.1**	**5.2**	**6**	**7**	**8.1**	**9**	**Total**
Colour											
Colourless (COL)			1	1	1	2					**5**
Natural blue-green (NGB)		6	22	17	18	6	1	3	1	1	**75**
Opaque turquoise (TURQ)			1								**1**
Total	**0**	**6**	**24**	**18**	**19**	**8**	**1**	**3**	**1**	**1**	**81**

Table 8 Identified glass vessel forms by number of sherds per period

Period	**3**	**4.1**	**4.2**	**4.3**	**5.1**	**5.2**	**6**	**7**	**8.1**	**9**	**Total**
Form											
?Bath flask							1				**1**
Bottle			7	6	7	2					**22**
?Bowl			1		2						**3**
Cup				1							**1**
Flask/jug rim			1								**1**
Flask/jug/bottle rim		1		1							**2**
Jar		1		1	1						**3**
Jug		1	1	3	1	1					**7**
Jug/jar open base ring			1	1							**2**
Unguent bottle		1	1			3					**5**
Unidentifiable vessel		2	12	5	8	2		3	1	1	**34**
Total	**0**	**6**	**24**	**18**	**19**	**8**	**1**	**3**	**1**	**1**	**81**

Table 9 Summary of distribution of leather footwear by period, land use and type

Period	**Land use**	**Nailed**	**Stitched**	***Carbatina***	**Sandal**	**Total**
3	OA3	4		1		**5**
4.1	OA4	4	1		3	**8**
4.1	R1 phase 1	1	1			**2**
4.1	S10	1				**1**
4.2	OA5	3	4		1	**8**
4.3	OA6	2			1	**3**
5.1	S12 phase 2	1			1	**2**
5.1	S12 phase 4	2			1	**3**
5.1	S13 phase 2				1	**1**
5.2	OA8	4			2	**6**
6.1	OA101				1	**1**
8.1	OA101				1	**1**
8.3	S109	8		1	1	**10**
Total		**30**	**6**	**2**	**13**	**51**

Table 10 Distribution of loose iron hobnails

Period	Land use	Context	No. of hobnails
4.1	OA4	[6822]	10
4.1	OA4	[6856]	1
4.1	OA4	[6875]	6
4.2	OA5	[6777]	16
4.2	OA5	[6795]	5
4.2	S12 phase 1	[6781]	6
4.3	OA6	[6772]	23
5.1	OA7	[6726]	11
5.1	OA7	[6737]	3
5.1	S12 phase 2	[6609]	4
5.1	S12 phase 3	[6747]	4
5.1	S12 phase 3	[8394]	1
5.1	S12 phase 5	[6741]	1
5.2	OA8	[6583]	4
5.2	OA8	[6716]	71
5.2	OA8	[6729]	9
5.2	OA8	[6730]	8
5.2	S12 phase 6	[6587]	14
5.2	S12 phase 6	[6611]	4
5.2	S12 phase 6	[6656]	2
8.3	S109	[6580]	6
8.3	S109	[6637]	1
Total			**210**

Table 11 Comparison with selected London assemblages of Roman leather footwear by general type/construction (data after MacConnoran 1986; Keily 2011)

	1 Poultry	**Billingsgate buildings**	**Broadgate ticket hall site, Liverpool Street**	**New Fresh Wharf**
Dating emphasis (approx century AD)	**1st/2nd**	**1st/2nd**	**mostly 2nd/3rd**	**3rd**
	% (n=150)	**% (n=100)**	**% (n=51)**	**% (n=150)**
Type				
Nailed	62.7	53.7	58.8	66.7
Stitched	19.3	13.6	11.8	9.3
Carbatina	11.3	20.4	3.9	2.0
Sandal	6.7	12.2	25.5	22.0

Figures

Fig 1 Dress accessories and personal adornment: copper-alloy brooches – simple one-piece <1034>, Harlow Colchester derivative <1662>, bow foot <1366>, crossbow <1035>, <2801> and penannular <1320>

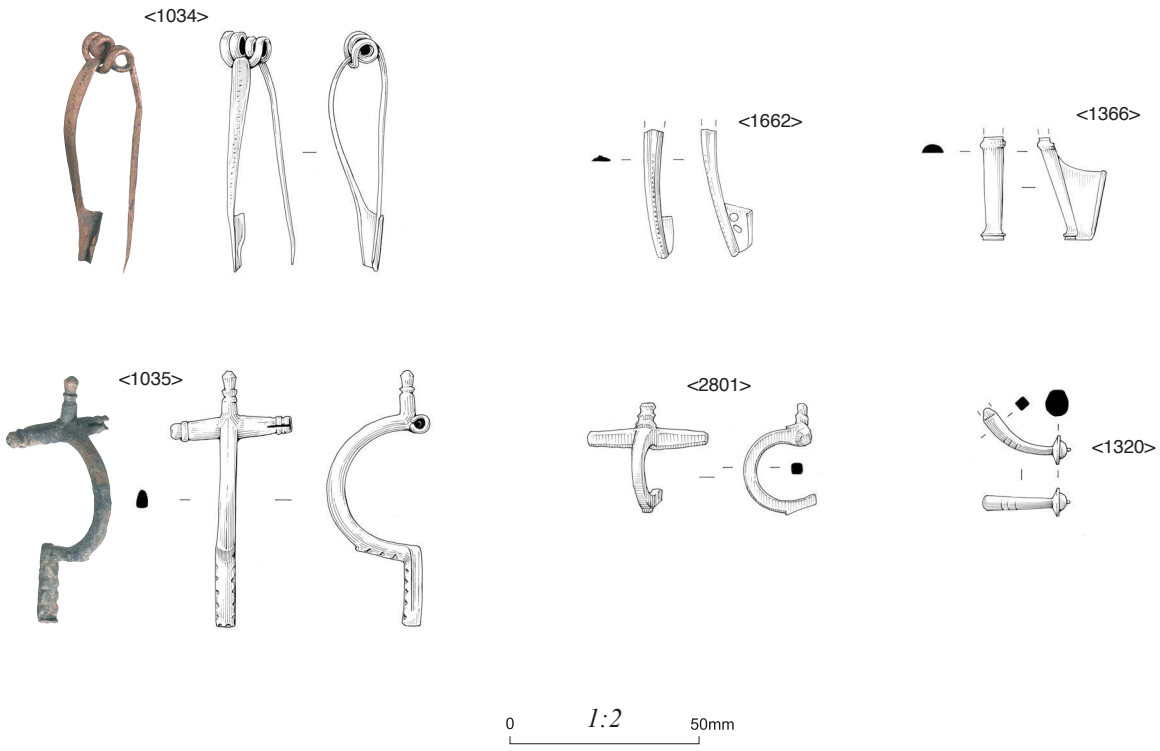

Fig 2 Jewellery: glass bead <3013>; copper-alloy bracelets <1301>, <2838>, <218>, <2885>; and iron finger ring <2429>

Fig 3 Hairpins: bone – Crummy type 1 <2756>, Crummy type 2 or variants <469>, <1765>, <2570> and Crummy type 3 <2757>; and copper alloy – Cool type 7b <2845>, Cool type 9 <377>, Cool type 5c <1295>, unclassified pin <378>

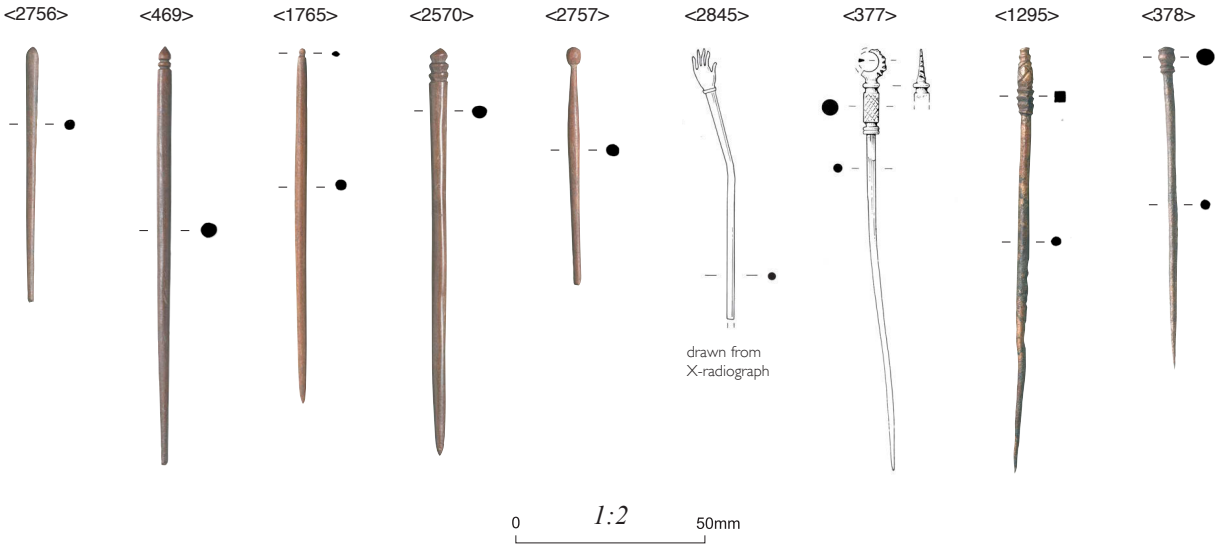

Fig 4 Iron fetters <1040> and iron wrist ring <1142>

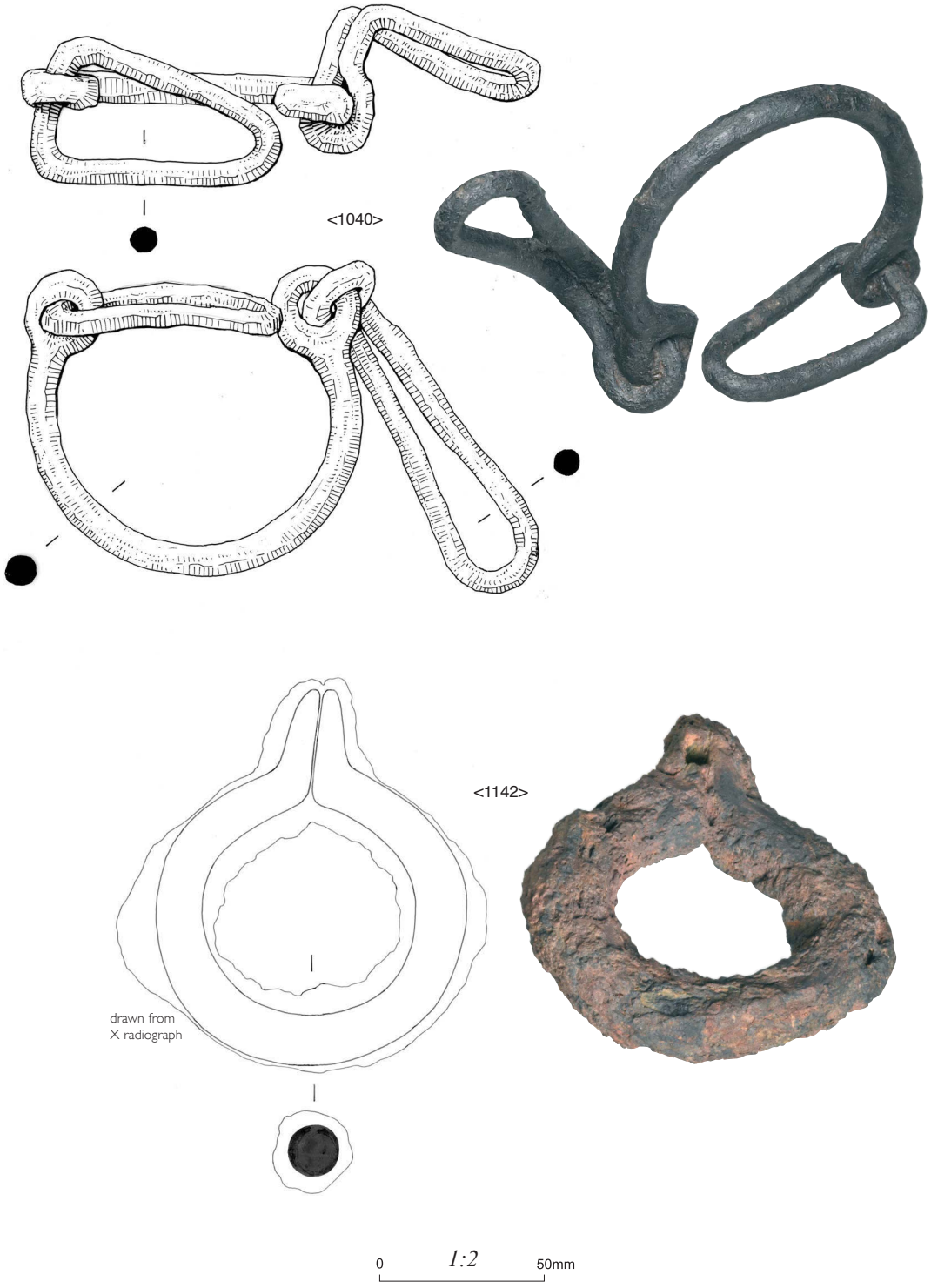

Fig 5 Toilet or medical equipment: copper-alloy ligulae <1296>, <1660>; unidentified iron implement, perhaps a medical instrument, <2361>; reworked glass discs, perhaps palettes or counters, <2202>, <3017>; and lead votive mirror <2143>

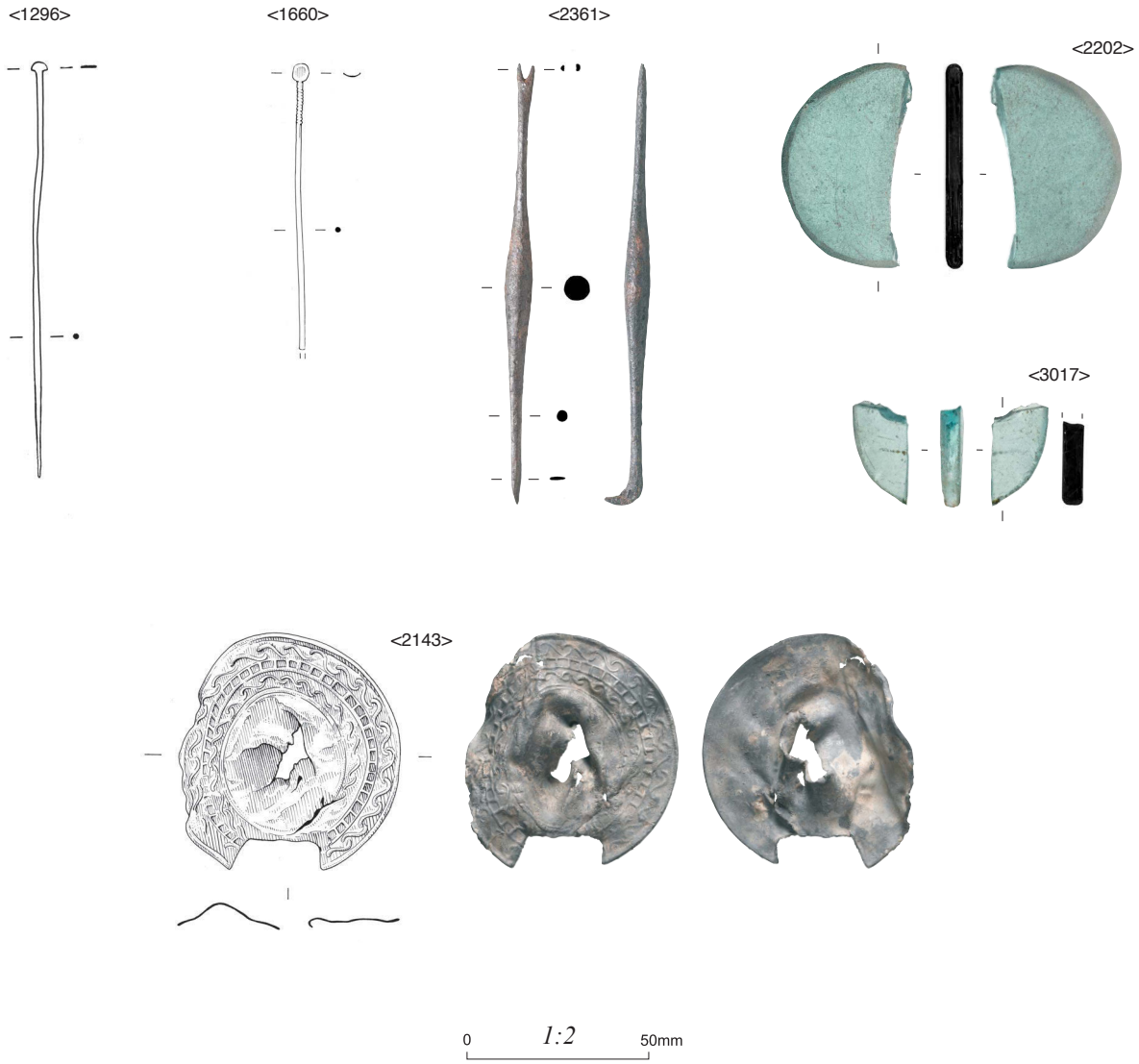

Fig 6 Textile-working equipment: wood spindle <498>; bone needles <1762>, <2754>; and copper-alloy needles <1307>, <1319>

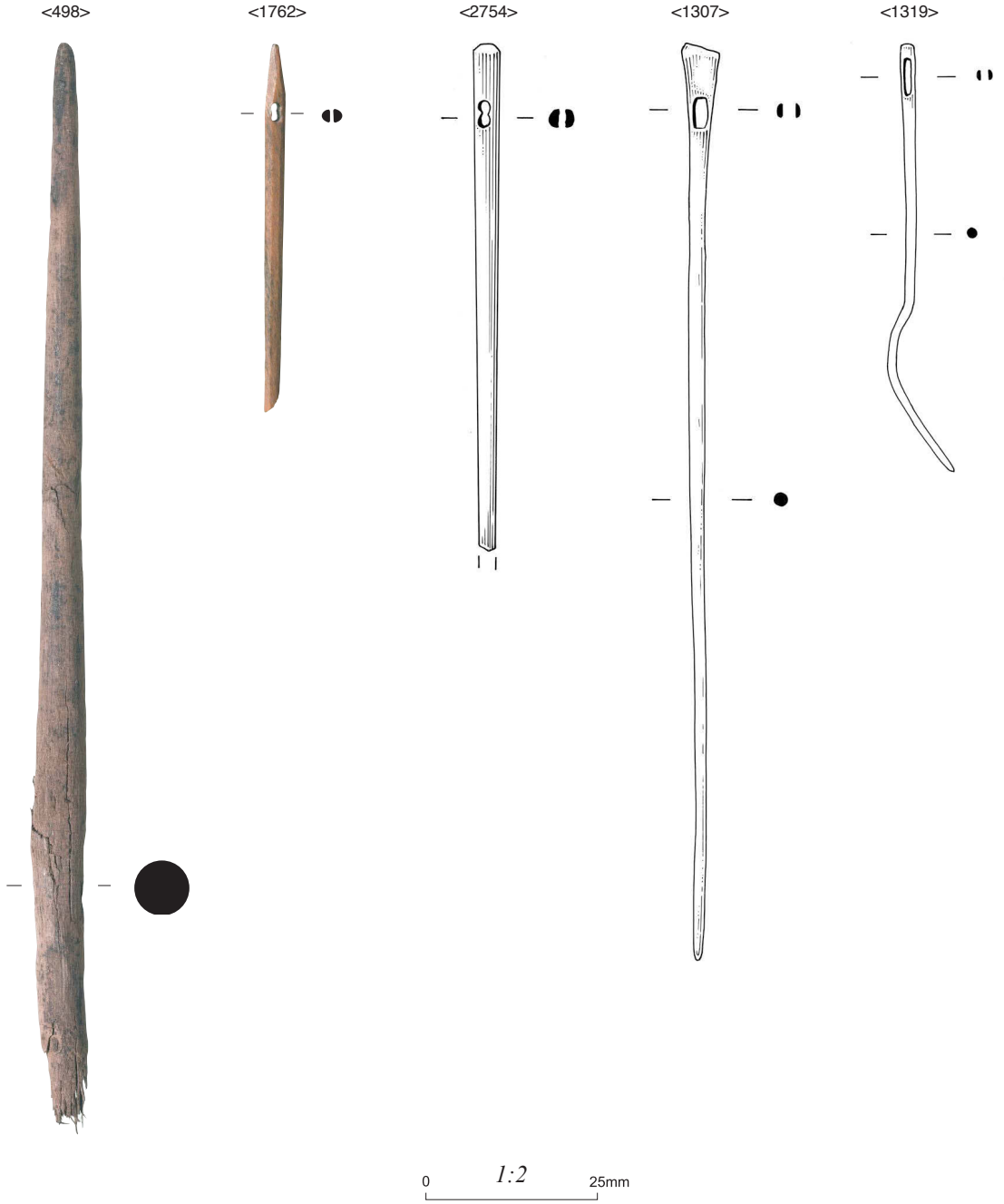

Fig 7 Domestic objects: ceramic lamps <2496>, <3030>; iron candlesticks <2436>, <2880>; copper-alloy spoons <432>, <1477>; lead-alloy spoon <2019>; stone mortars <226>, <450>; copper-alloy vessel escutcheon <2866>; and bone hinge <447>

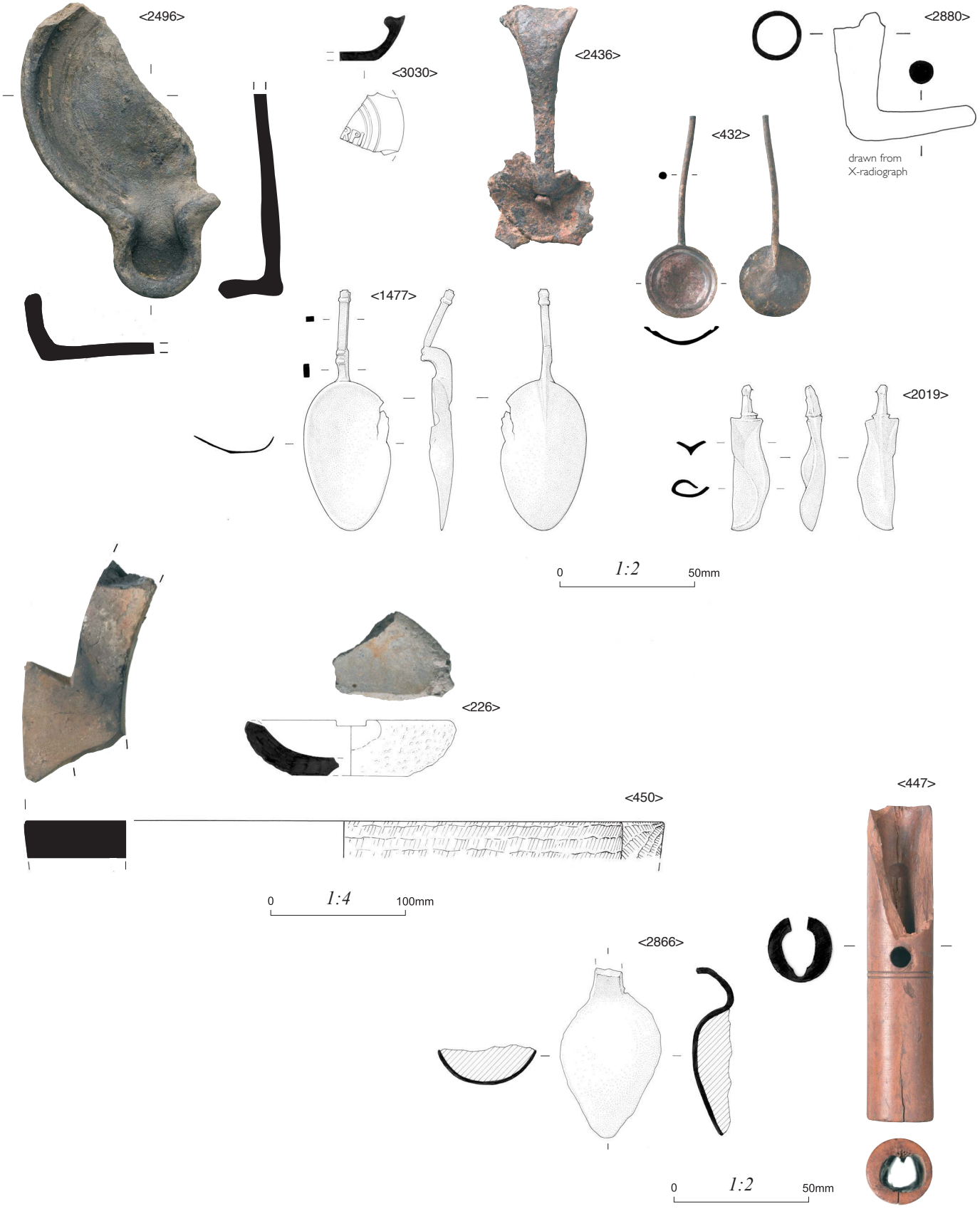

Fig 8 Gaming and weighing equipment: bone counters <1813>, <357>, <1864>; and ceramic counters <3037>, <3038>

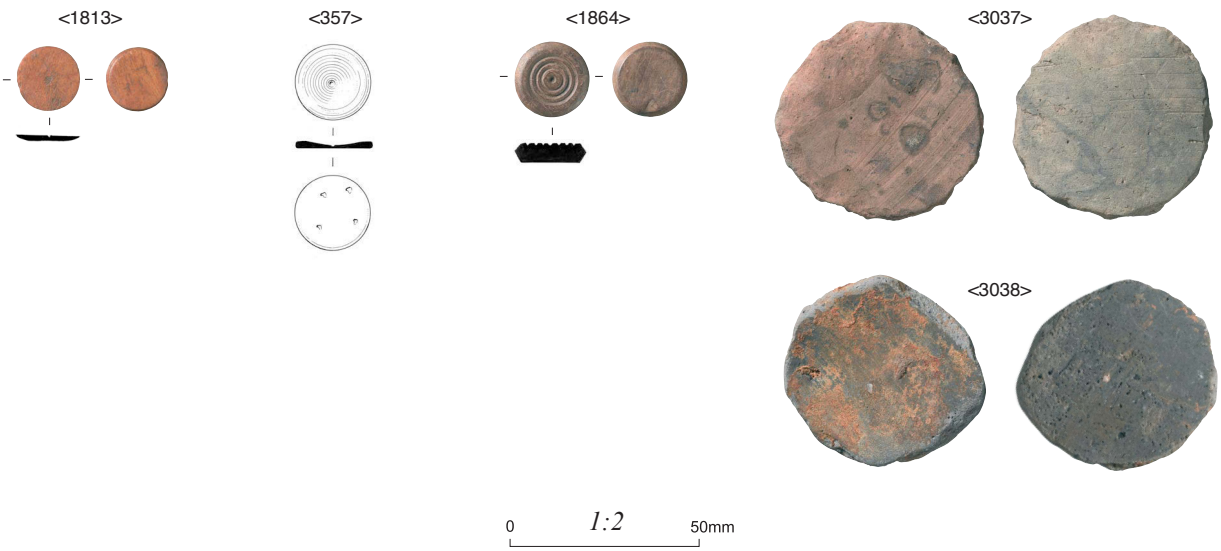

Fig 9 Writing equipment: iron styli early forms <1054>, <2410> and middle Roman forms <1056>, <2391>, <2431>, <2398>, <2345>, <1053>, <92>, <1033>, <88>, <2893>, <2418>; and copper-alloy stylus middle–late Roman form <1293>

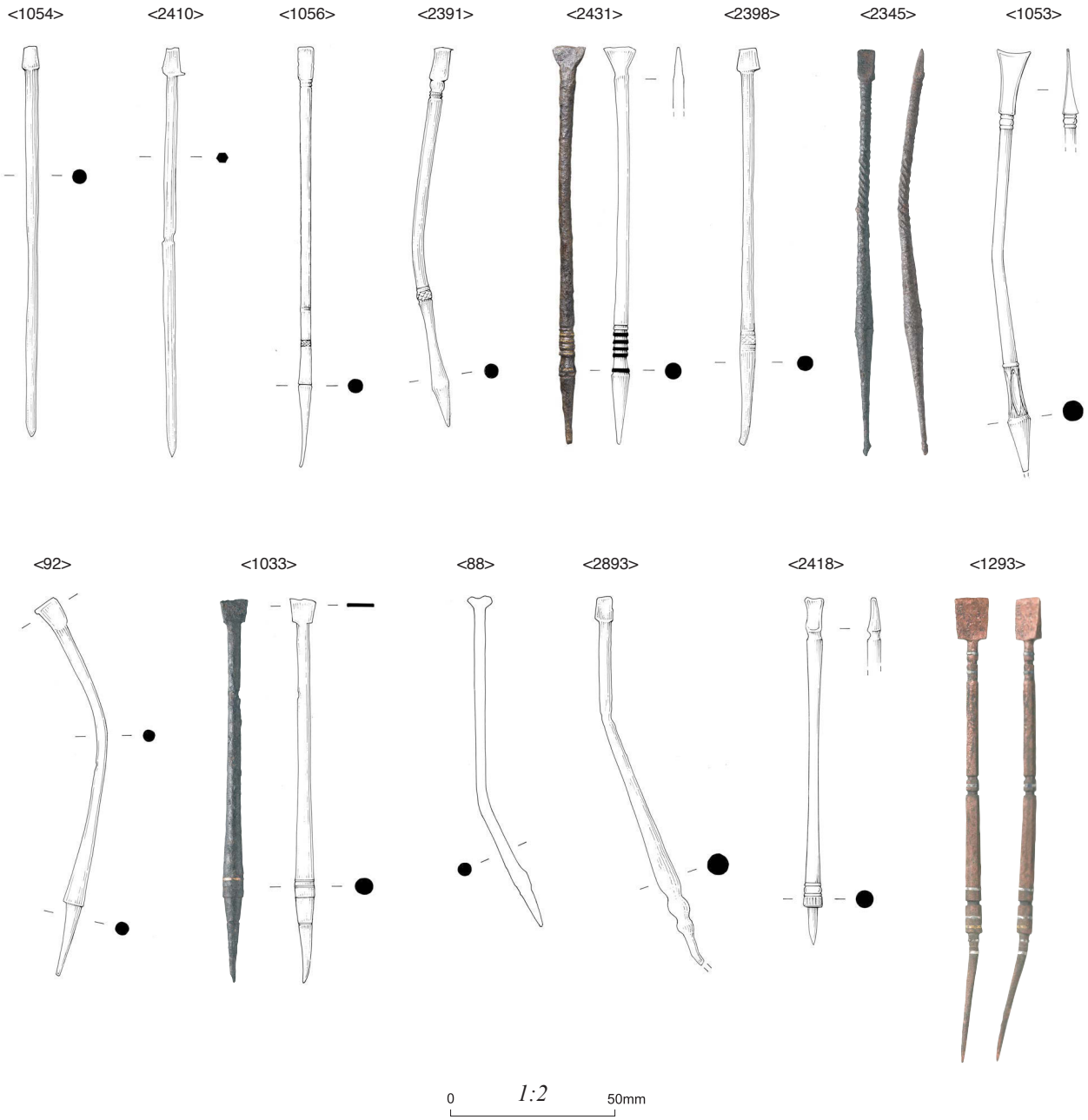

Fig 10 Transport equipment: copper-alloy terrets <380>, <1338>; and iron hipposandals type 1 <351>–<354>, <473>

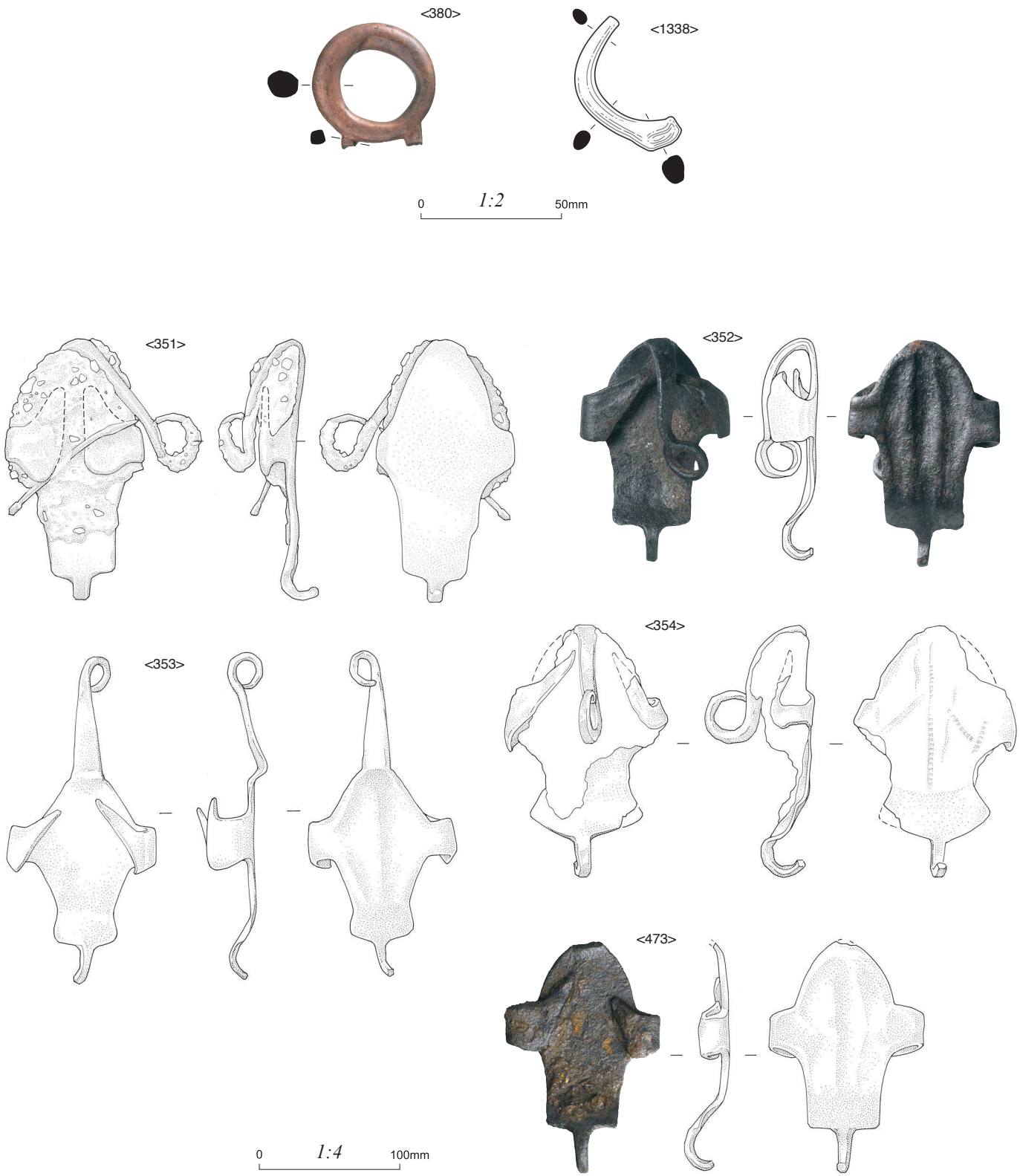

Fig 11 Transport equipment: iron hipposandals – type 2/3 <1135>, <2296>; type 3 <471>; type 4 <476>; type 4 variant <438>; and type 5 <2351>

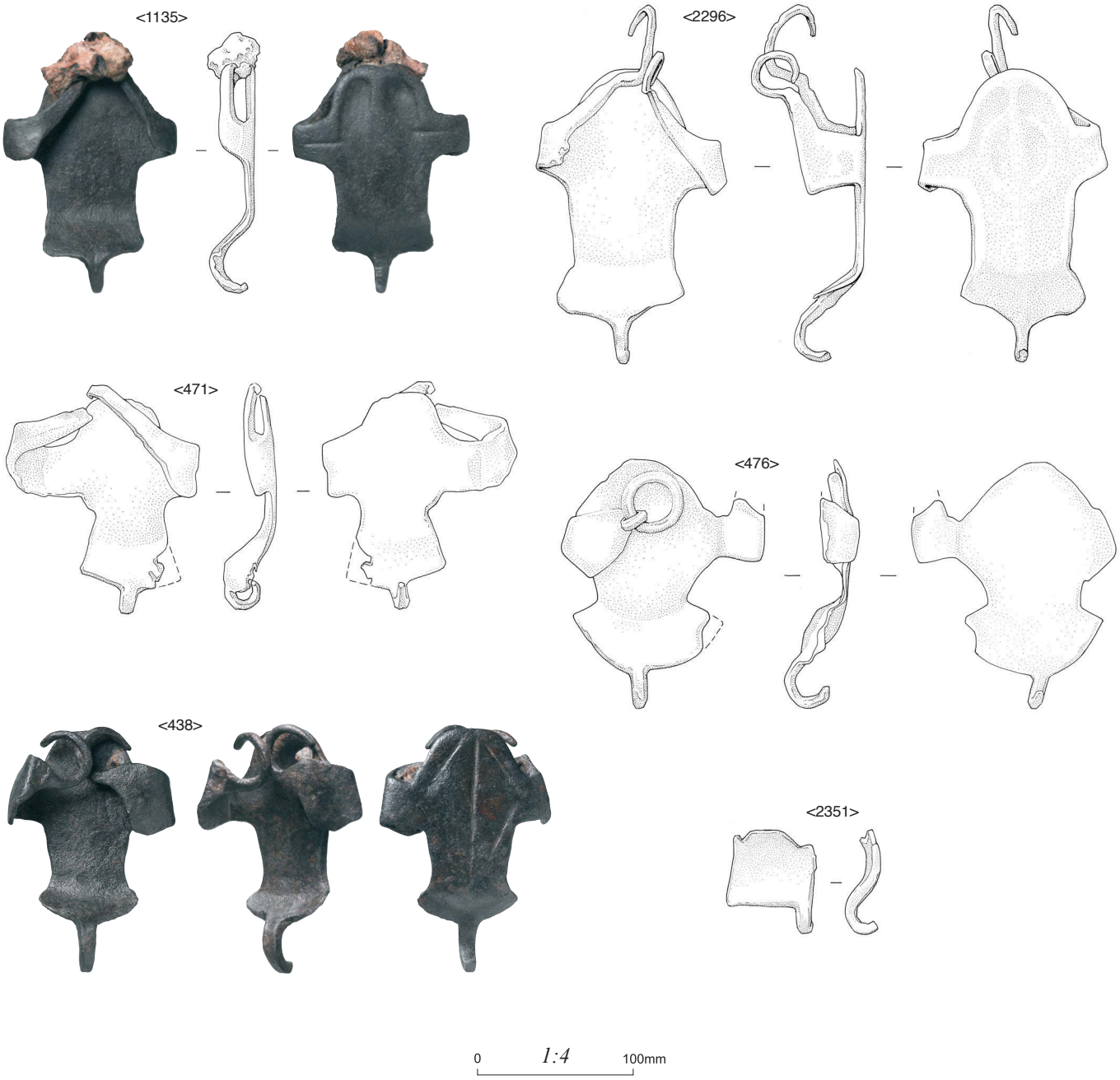

Fig 12 Plot of hipposandal types by length and width measurements (mm) (for measurements used see text)

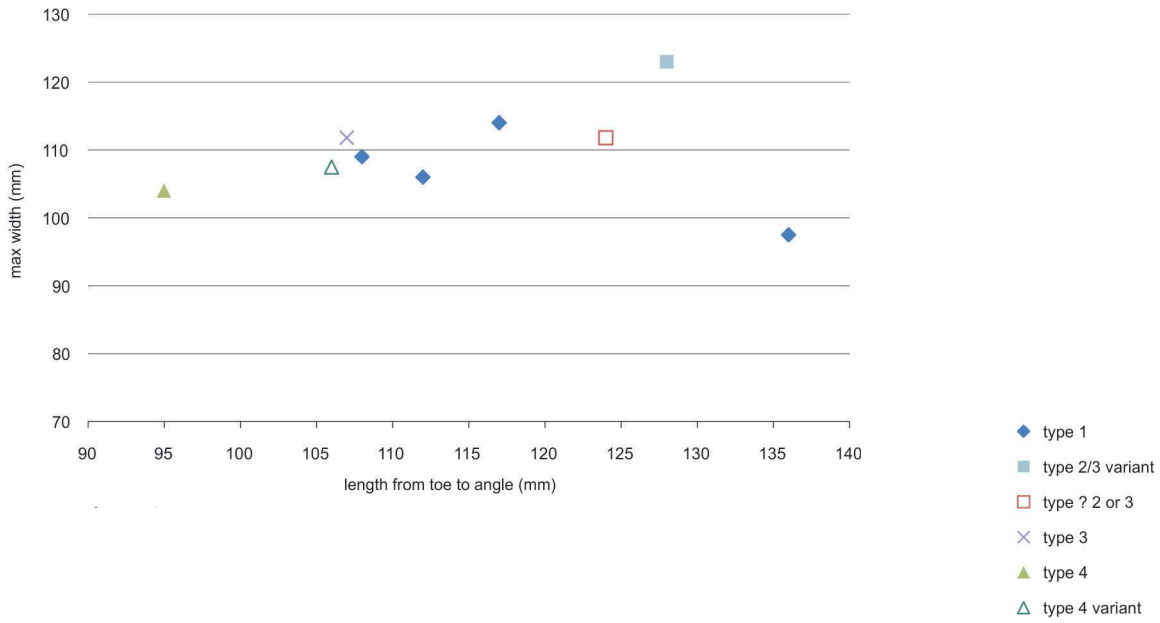

Fig 13 Iron tools: shears <2358>; metalworking tools <1073>, <2407>, <1069>; drill <2409>; knives <2317>, <346>; ?spatula <2405>; and ?tongs <2276>, <1082>

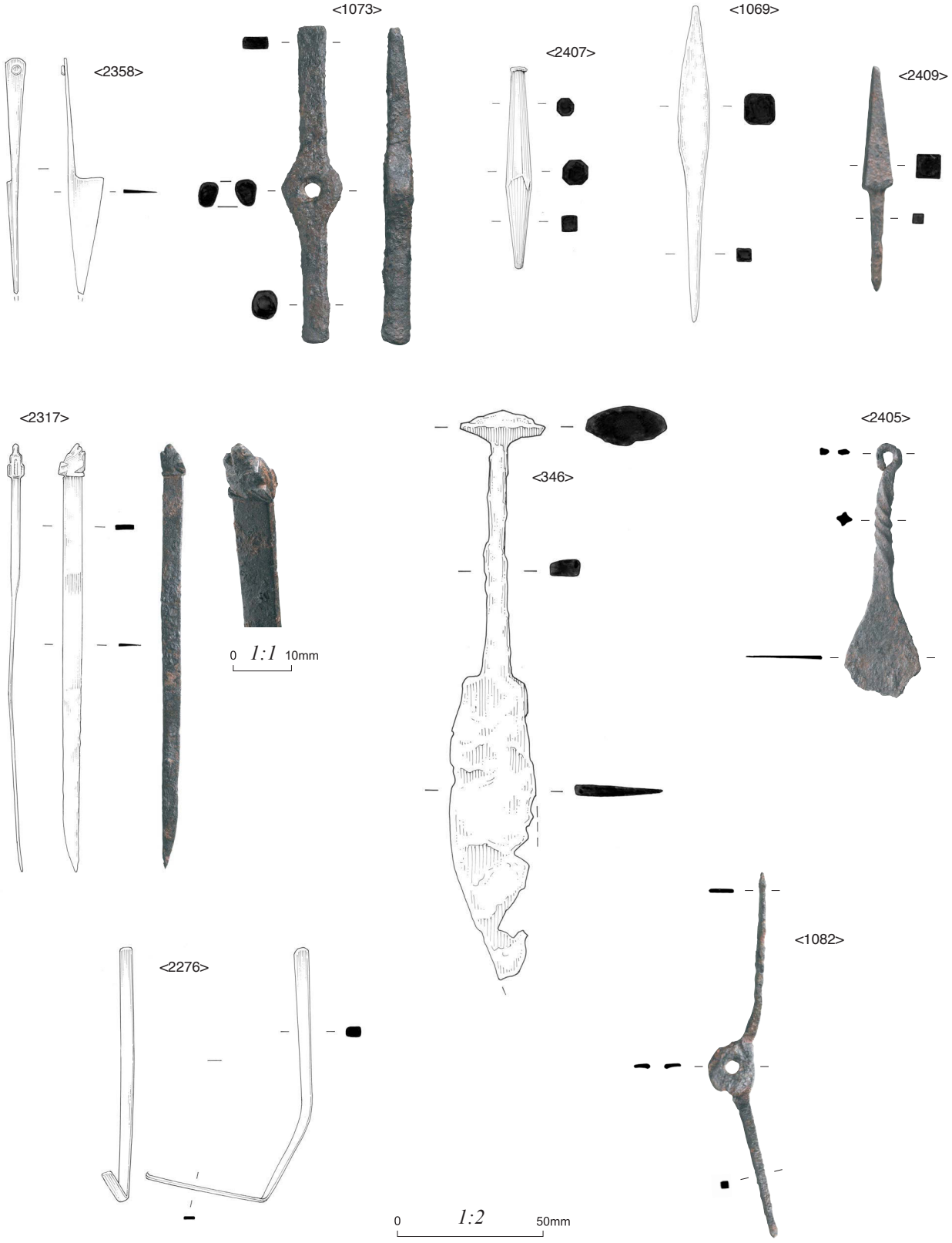

Fig 14 Fasteners and fittings: iron keys <326>, <2347>; copper-alloy stud <379>; and copper-alloy mounts <87>, <1041>, <2800>, <2811>

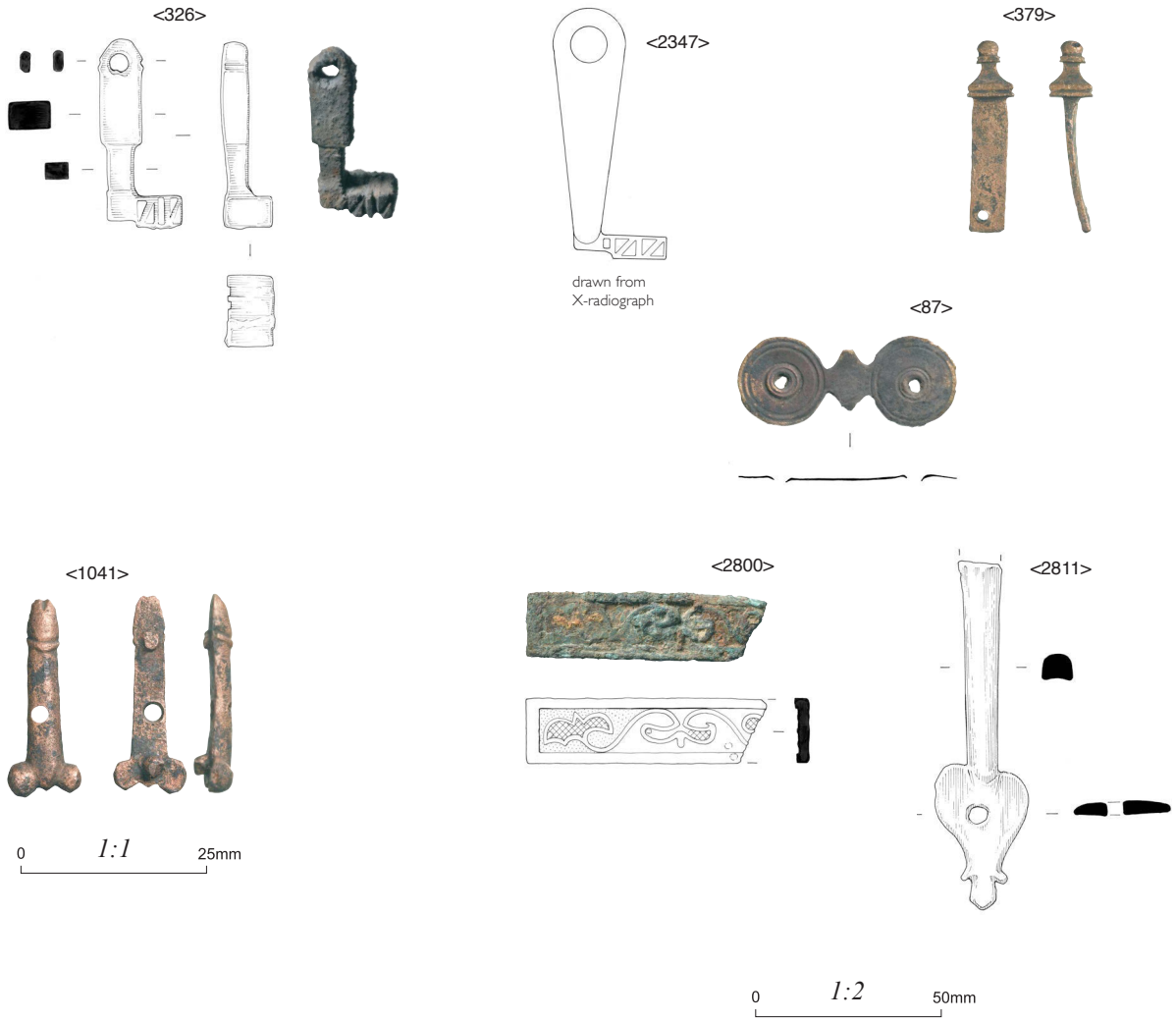

Fig 15 Iron ox-goad <2411>

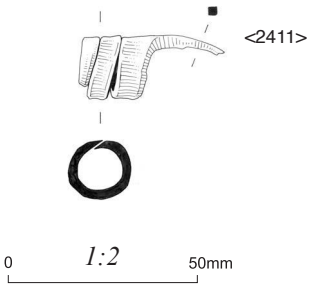

Fig 16 Military equipment: iron spearhead <1013>; copper-alloy mount <1302>; and iron ?buckle <2300>

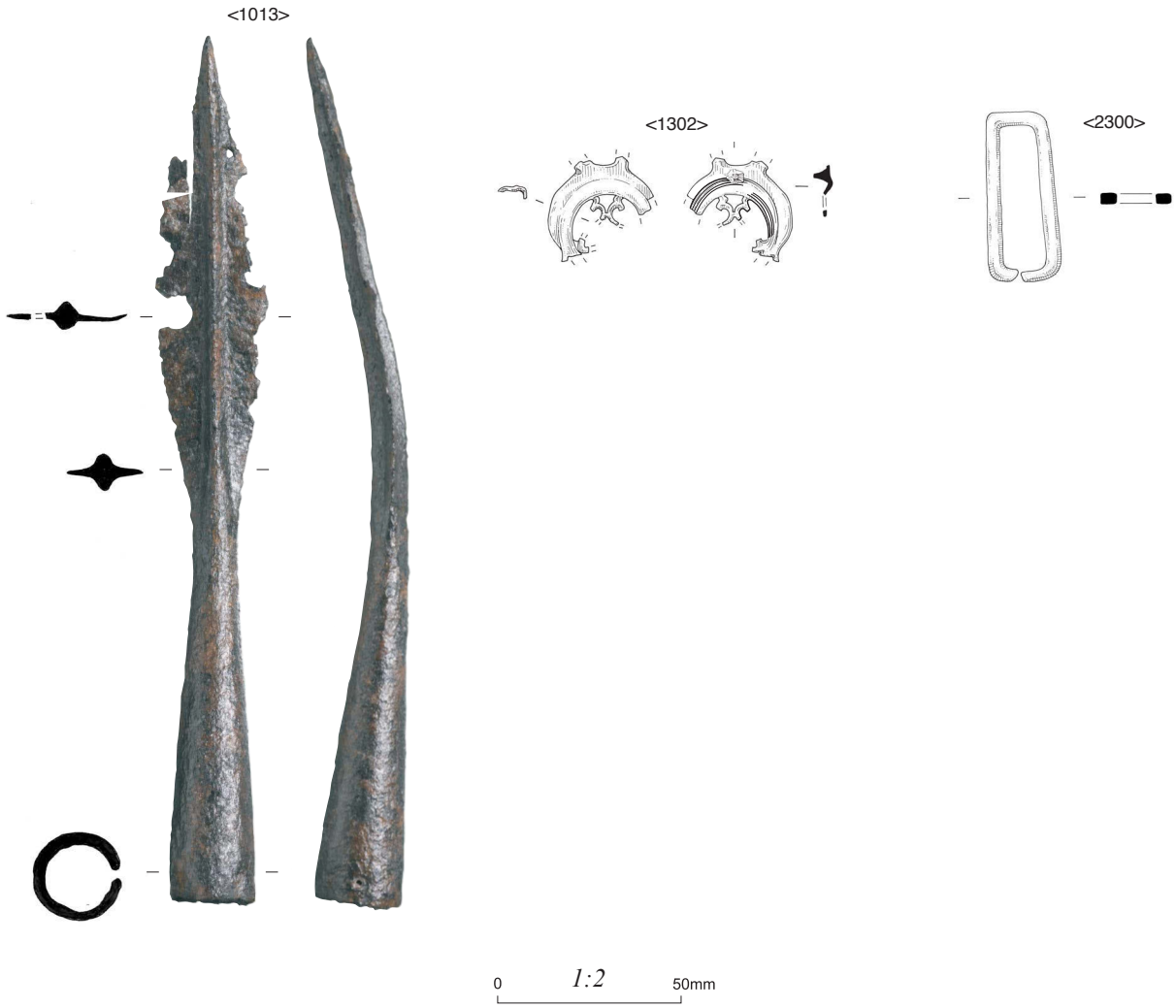

Fig 17 Pipeclay Venus figurine <2495>

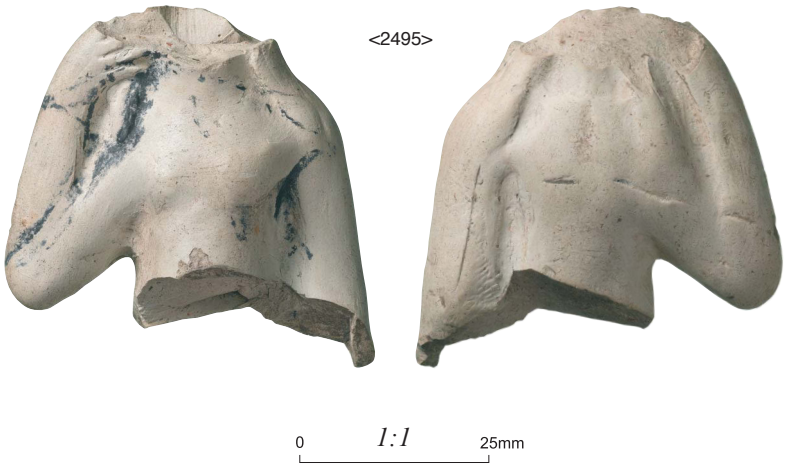

Fig 18 Ceramic crucible or lamp <3029>

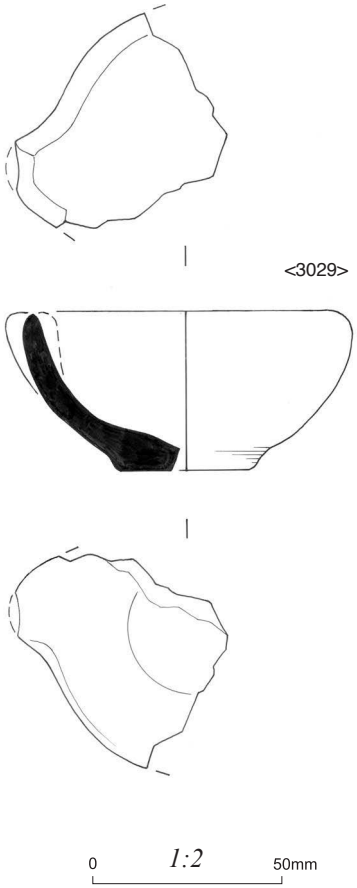

Fig 19 Iron pin, nail or skewer <1070>; iron pin or nail <2420>; and copper-alloy bell with iron clapper <2891>

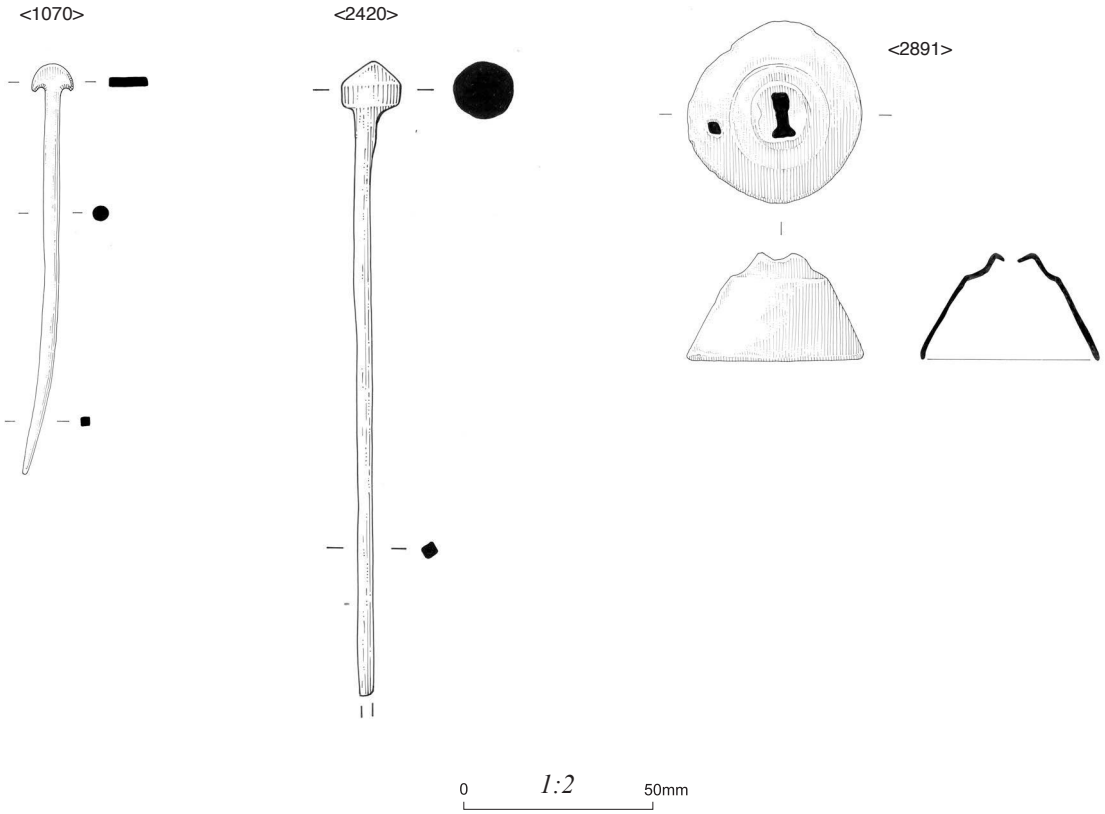

Fig 20 Glass vessels: open forms – probable bowl bases <2179>, <3020> and cup <2227>

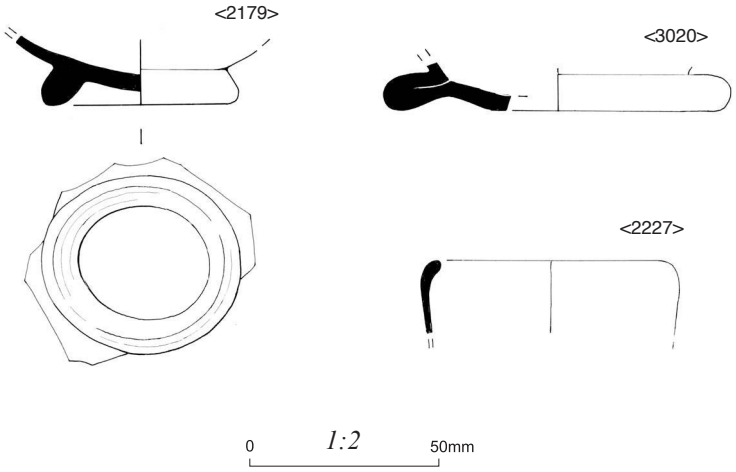

Fig 21 Glass vessels: bottles – rim <2226> and handle <3023>

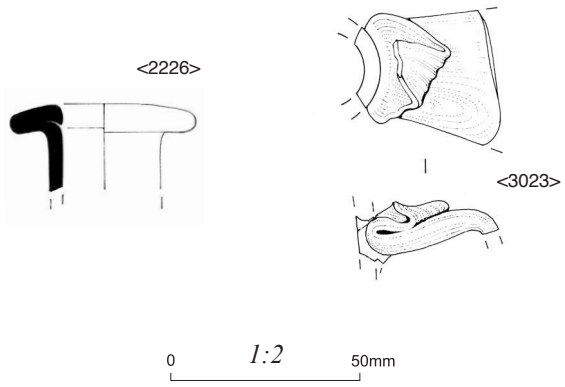

Fig 22 Glass vessels: base of handle <2213>, with tooled projections, and ribbon handle fragment <2241>, both from jugs; jug or jar base ring <2234>; spouted jug rim <2201>; and ribbon handle fragment <3027>, probably from a jug

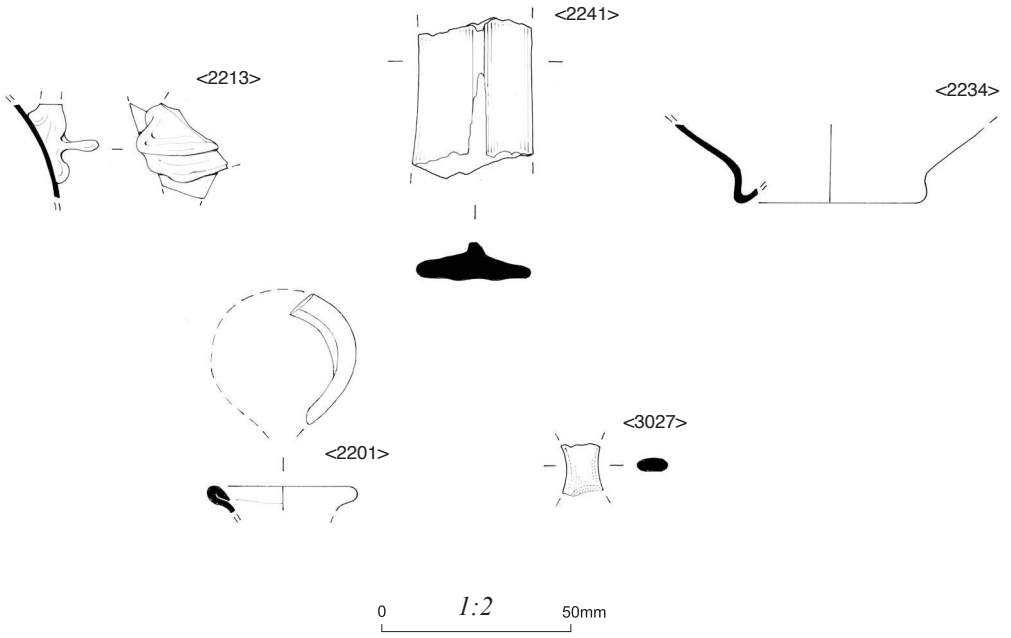

Fig 23 Glass vessels: other necked forms – folded horizontal jar rim <2183>; funnel-mouthed rolled in rims <2181>, <2208>, <2186>, from jars and jugs/flasks; and jug, flask or small bottle folded out and in rims <2244>, <2192>

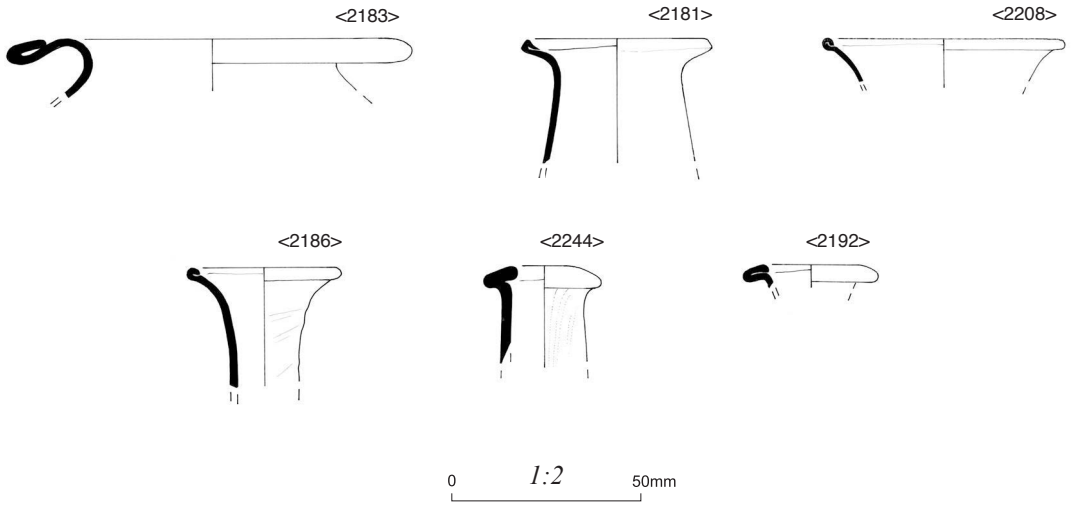

Fig 24 Leather, nailed shoes <3323> (OA5, period 4 phase 2) and <2609>, <2610> (S12 phase 4, period 5 phase 1)

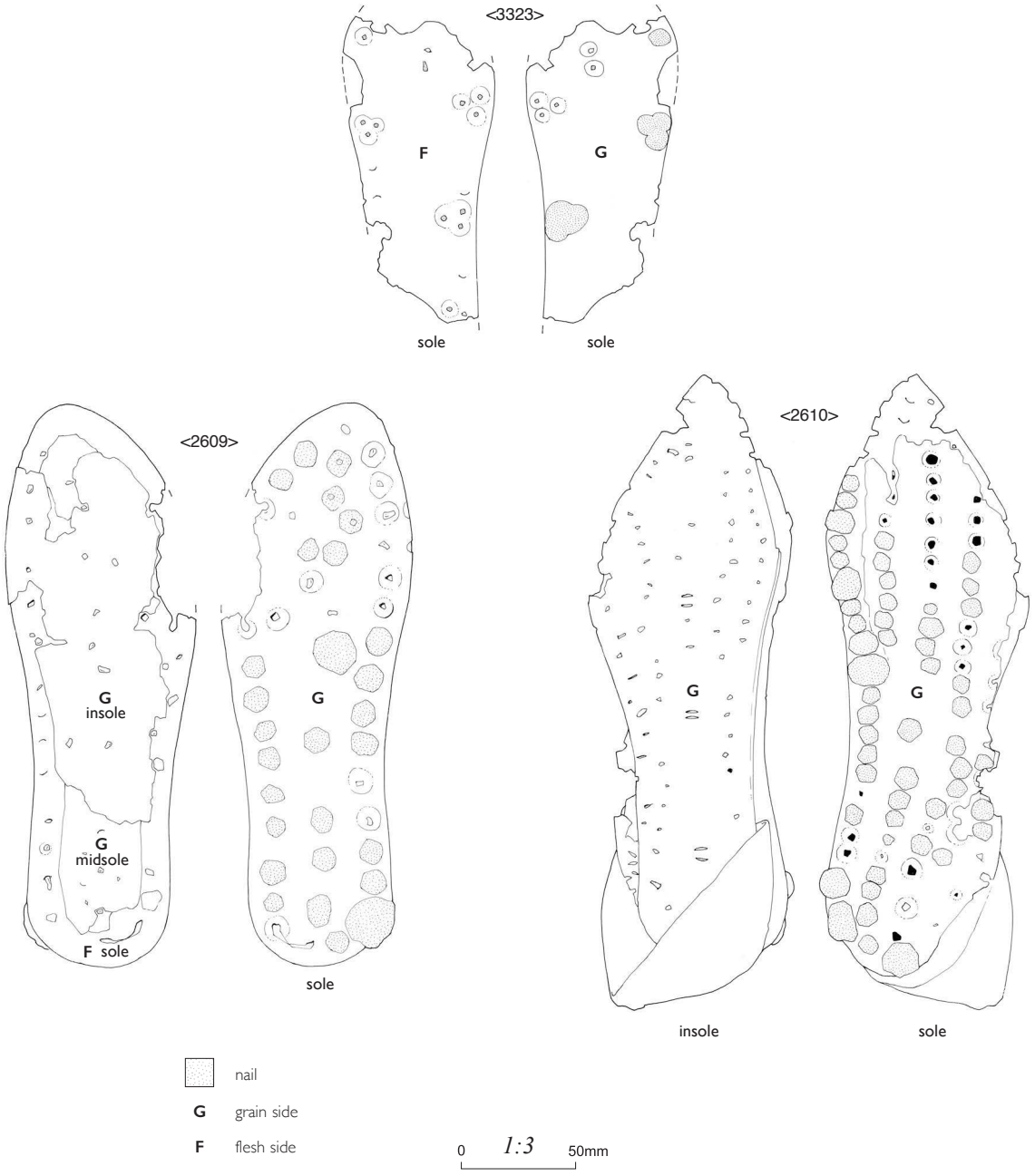

Fig 25 Leather carbatinae*, one-piece shoes, <3319> (OA3, period 3) and <491> (residual in post-Roman context) (for key to drawing conventions see Fig 24)*

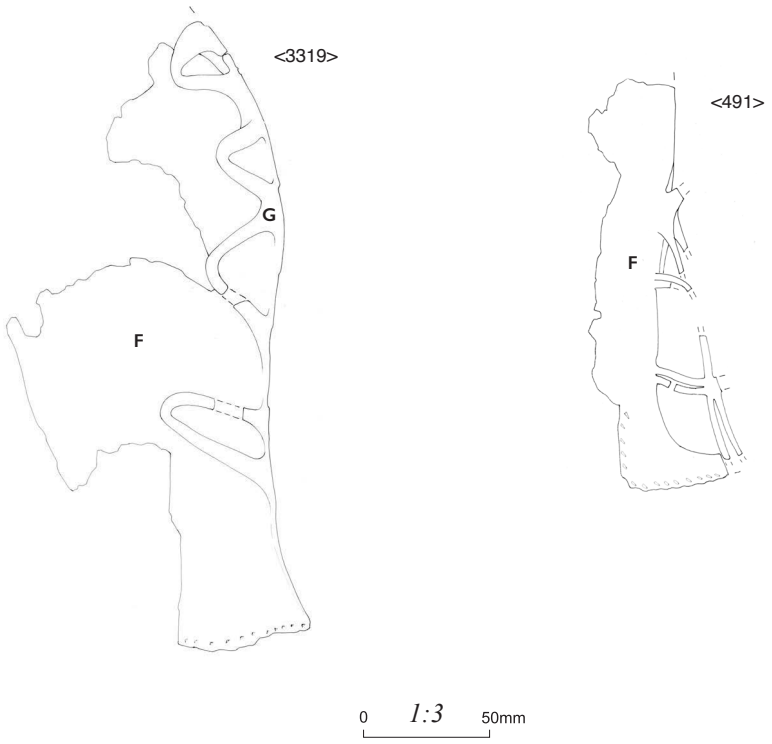

Fig 26 Leather, stitched shoes <489> with slash marks, <3320> (period 4 phase 1) and <3318> (period 4 phase 2) (for key to drawing conventions see Fig 24)

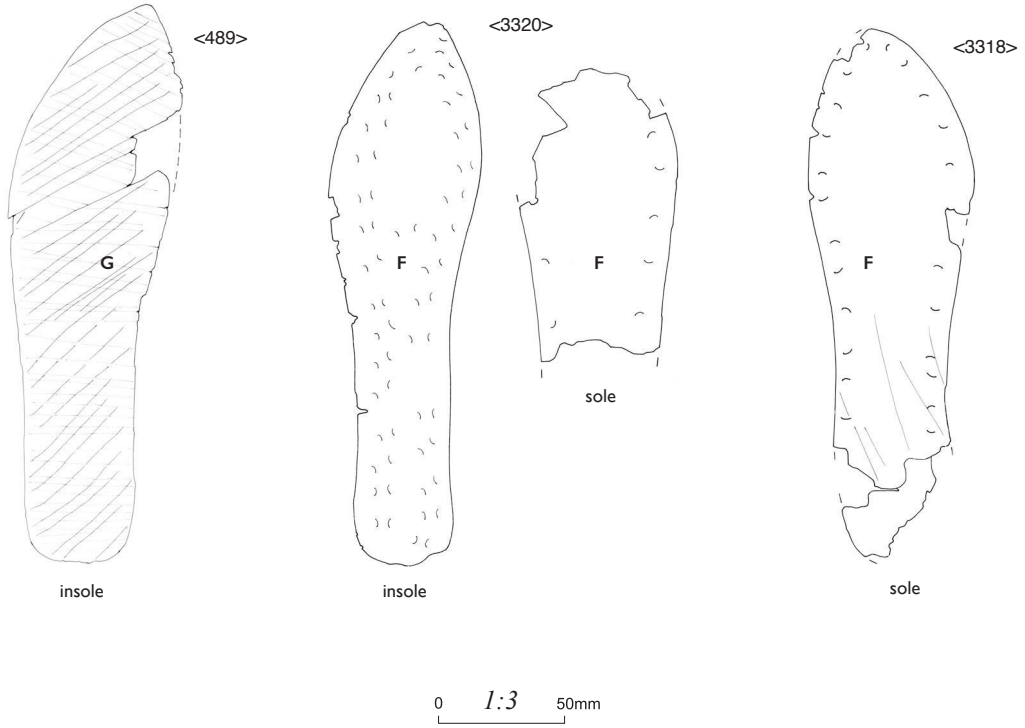

Fig 27 Leather sandals: early types – <3107> (period 4 phase 1), <2607> (period 4 phase 3), <490> (residual in post-Roman context); and decorated fragment <3322> (period 5 phase 1), possibly from an early type (for key to drawing conventions see Fig 24)

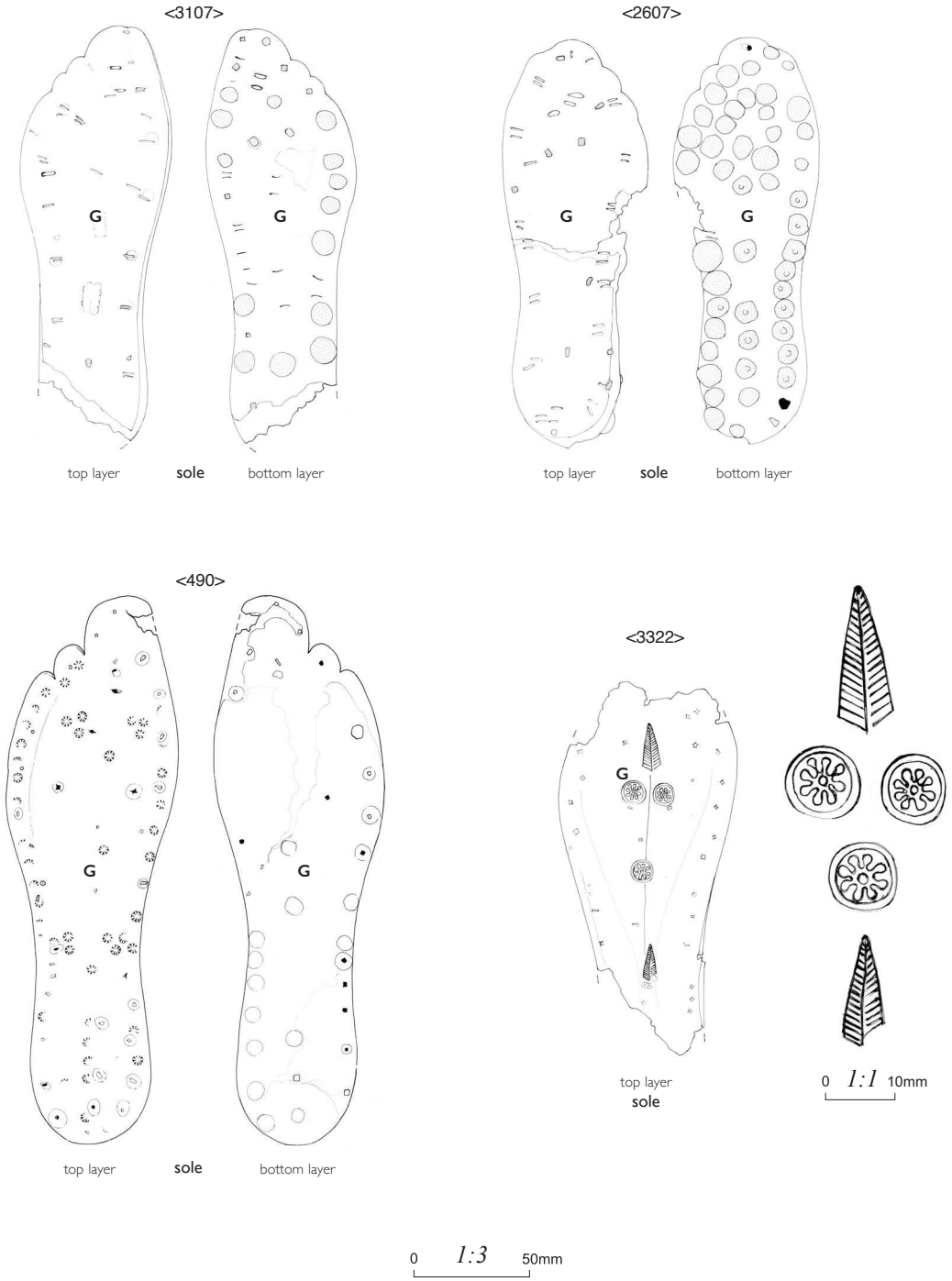

Fig 28 Leather sandals: later types – <2598> (period 5 phase 1), <3321> (period 5 phase 2) and <492> (residual in post-Roman context) (for key to drawing conventions see Fig 24)