Excavations at Billingsgate Buildings, Lower Thames Street, London, 1974

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Front cover: *Saxo-Norman bucket* (p. 144).

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EXCAVATIONS AT BILLINGSGATE BUILDINGS 'TRIANGLE', LOWER THAMES STREET, 1974

by
DAVID M. JONES

with Finds Reports edited by
MICHAEL RHODES

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The text of this report was completed in March 1978.

The three-digit numbers quoted in brackets or given as 'Layer Numbers' in the site report and prefixed by the word 'Context' in the unpublished site records and in the finds reports belong to the same sequence. They derive from a referencing system used on the Department's excavations whereby each recognisable layer, feature, structural element, etc. and any other stratigraphic divisions or entities used by the excavator in the process of recovery (*i.e.* levels, intersections or areas of the site which have produced unstratified finds, etc.) is given a unique serial number. For convenience this is termed 'Context Number'. For a complete list of the Context Numbers used in this report with a definition of each, see pp. 20-22.

SUMMARY AND INTRODUCTION

by Tony Dyson and John Schofield

The purpose of the Billingsgate Buildings excavation was two-fold: to examine the Roman terracing of the bank of the Thames, seen to the west on either side of the present London Bridge in the 1920s, and in particular to investigate as near as possible to the line of the Roman riverside wall, which in 1974 had not yet been proven as a certain late Roman addition to the waterfront and to the defences of London as a whole; the discoveries at Blackfriars were to be made in 1975-6. A length of masonry supposed to form part of this wall had been found about 95m to the west, below the frontage of a building on the north side of Lower Thames Street, in 1911, and although this alignment, when projected, did not seem to cross the present excavation trench, its plotting was not entirely satisfactory and further clarification seemed desirable. Moreover, a site on the former river bank to the north of Thames Street was seen as a complement to the sequence of Roman and later wharves then being excavated on the New Fresh Wharf site, 45m to the south-west, and it is in the light of this latter site that several of the problems raised by the Billingsgate Buildings excavation will be more satisfactorily explained.

All the post-Roman features and layers of the present site were partly destroyed by the intrusion of a modern basement, and all that survived were the bottoms of a Saxo-Norman wicker-lined pit and a timber-lined well, and of a medieval wicker-lined pit. But for the Roman period one of the two most distinctive features of the excavation was a series of artificial terracings of the river bank, undertaken in the late 1st and 2nd centuries A.D. and represented by three sets of oak posts with horizontal planks retaining dumps of building rubble, soil and domestic refuse. These revetments, which were buried or destroyed by the end of the 2nd century, appear to be the eastern continuations of the more substantial box-structures excavated on sites on either side of the probable line of the Roman bridge (at, or close to, the foot of Fish Street Hill) in 1920-9. Consideration of the function of these structures must await the detailed reporting of the wharves and other structures encountered at New Fresh Wharf, but it is clear that for up to 120m on either side of the bridge approach the northern bank was the subject of considerable terracing activity in the late 1st and early 2nd centuries A.D. The most southerly of these structures may have functioned as a quayside, but the evidence is inconclusive both on the sites excavated in the 1920s and on the Billingsgate Buildings site. For while the levels of the revetments at the present site compared with what little is known of Roman tidal levels, no specifically river-lain deposits were found lying against or over the revetments. It is possible that such deposits were removed or obscured after the 2nd century, but at the moment it is perhaps safer to assume that the late 1st and early 2nd century quay lay a little to the south, under the present Lower Thames Street.

The dumps behind the revetments produced building materials which included tiles, opus signinum, tesserae *and window-glass, together with fragments of wall-painting,*

decorative stone wall (?) inlay, and straw, possibly from thatched roofs. Although the provenance of this redeposited debris cannot be established, it is unlikely that it had been brought from any great distance. The known Roman buildings nearest to the site lay under the present Pudding Lane to the west, where a ragstone and tile wall with an adjoining hypocaust was found in 1836-41, and under Monument Street to the north-west where a portion of tessellated pavement with an obscure inscription in smaller black tesserae was discovered in 1887. Neither of these buildings has been dated, but they presumably followed the establishment of the terracing in the late 1st and early 2nd centuries. There may even have been a relationship between the successive revetments and the demolition and re-erection of buildings nearby.

In addition to the building material, the exceptionally rich deposits, waterlogged except for the top-most layers, produced a large quantity and range of finds. Predominant among the Roman finds was pottery, and consisted mainly of sherds from vessels, including Spanish and Italian amphorae, associated with the transportation, storage, cooking, serving and eating of food-stuffs. The Roman diet is indicated by a variety of nuts, fruit and vegetable seeds, by a cheese press, quernstones for grinding flour, and the bones of marine and freshwater fish, domestic fowl and ox, sheep, horse, goat and pig. Domestic life is represented by items of personal ornamentation or cosmetic use, most notably by a large number of men's, women's and children's leather shoes, while other household objects include ceramic lamps, a bone hinge, a fragment of wooden furniture, scraps of leather possibly from upholstery, needles and spindles. Some of these, and other, finds provide evidence of small-scale workshops of the 1st and 2nd centuries: a plasterer's tool, a copper implement, and indications also of shoe-making and repairing, cattle slaughtering, and bone, lead and bronze working. There is also evidence of local trading, while the imported pottery indicates extensive trade-links with Gaul and the Mediterranean. Gaming and sporting activities are represented as also, in the form of writing tablets of a legal nature, is civic life.

On the other hand, practically no material definitely later than the late 2nd century, nor earlier than the 11th or 12th centuries, was found on the site with the exception of the one coherent group, immediately overlying the Roman levels (Periods I-III), which consisted of 3rd-century pottery, two Saxon sherds and a possible Saxon shoe. These items may simply be intrusive, but they may also represent a wholesale disturbance of an original deposit in the Saxon period. This problem is of particular relevance to the date of the piled foundations, supporting ragstone blocks set into a shallow ditch, which in the late Roman or early Saxon period (IV) surmounted the destroyed or buried remains of the revetments. Detailed consideration of the date, function and topographical significance of this wall or platform must also await the publication of the New Fresh Wharf excavations, not least because to the north of that site portions of a riverside wall have very recently been found below the southern edge of Lower Thames Street. Similarly the Saxon levels and their problems may only be fully resolved in the light of the much more intact Saxon deposits at New Fresh Wharf. The main purpose of publishing the Billingsgate Buildings excavation now is that, quite apart from its wealth of finds, it represents the first part of a report on the long and complicated process of establishment and consolidation on the Roman riverbank which extended to the building of wharves currently still under examination to the south.

PART I

I. THE STRUCTURAL REPORT
by David M. Jones

(a) INTRODUCTION (Figs 1, 2)

The Billingsgate Buildings site (TQ 3301 8069) was located on the north side of Lower Thames Street, within the triangle of ground, demolished to basement level, formed by Lower Thames Street, Botolph Lane and Monument Street. A north-south trench, 12.5 by 2.5m was excavated by the Department of Urban Archaeology, Museum of London, in order to attempt to locate the Roman riverside wall[1], to obtain a profile of the river bank and to add to knowledge of London's riparian occupation.

Compressor drills were used to break through the modern basement floor and the remainder of the digging was done with hand tools. Most layers were removed with shovel and pick or fork, but trowels were used to define and clean occupation surfaces, timbers and other features. A light-weight crane was used part of the time to remove spoil from the bottom of the trench, and a diesel pump to combat water seepage. Spoil was sorted on shovelling platforms and the well fills (Period VI) were screened with 1mm mesh. Very thick layers were excavated in arbitrary 200mm levels to detect pottery seriation. The depth of the excavation required box shoring and precluded excavation in the south-west corner of the trench; the east section, however, includes a full profile of the natural gravels.

The artefacts, site books, plans and section drawings, and other records of the excavation are kept in the archives of the Department of Urban Archaeology under the code 'TR '74'.

It is in order to stress here that the nature of the Billingsgate Buildings excavation was not one which allowed for significantly firm conclusions to be drawn: the size of the site was small and the trench by chance was laid out exactly over a 19th-century sewer pipe trench which cut three quarters of the southern part of the trench down the middle and cut the northern and southern layers off from each other by turning a right angle into the east section. Thus layer recognition and the linking up of layers in the north and south ends of the trench was extremely difficult.

(b) THE EXCAVATION

(i) ROMAN PERIODS

Period I[2] *(c.* A.D. 60 – *c.* 70) (Fig. 3)

Period I consisted of two isolated features and a layer. None of these was physically related and therefore their relative chronology is unknown; the pottery from one of the features and from the layer suggests an early Flavian date. Layer 423 sealing the second feature (timber set A) indicates that it was also Flavian because it was associated with a feature of Period II (revetment I). The Period I features were not physically related to revetment I and there is no other stratigraphic evidence that any of them were earlier than revetment I; however, the pottery from layers and features of both Periods (I and II) shows that the two features and layer were earlier than revetment I.[3]

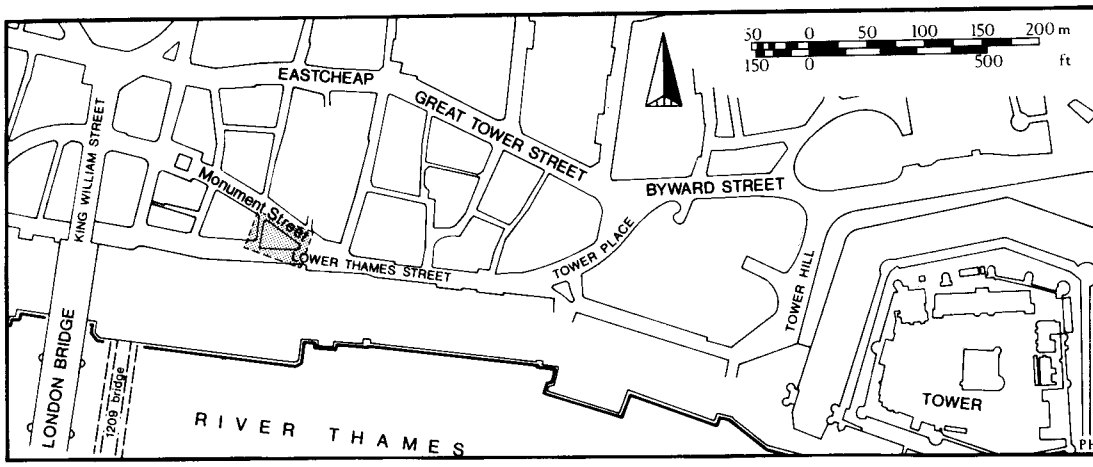

Fig. 1. Billingsgate Buildings, 1974: Location Plan.

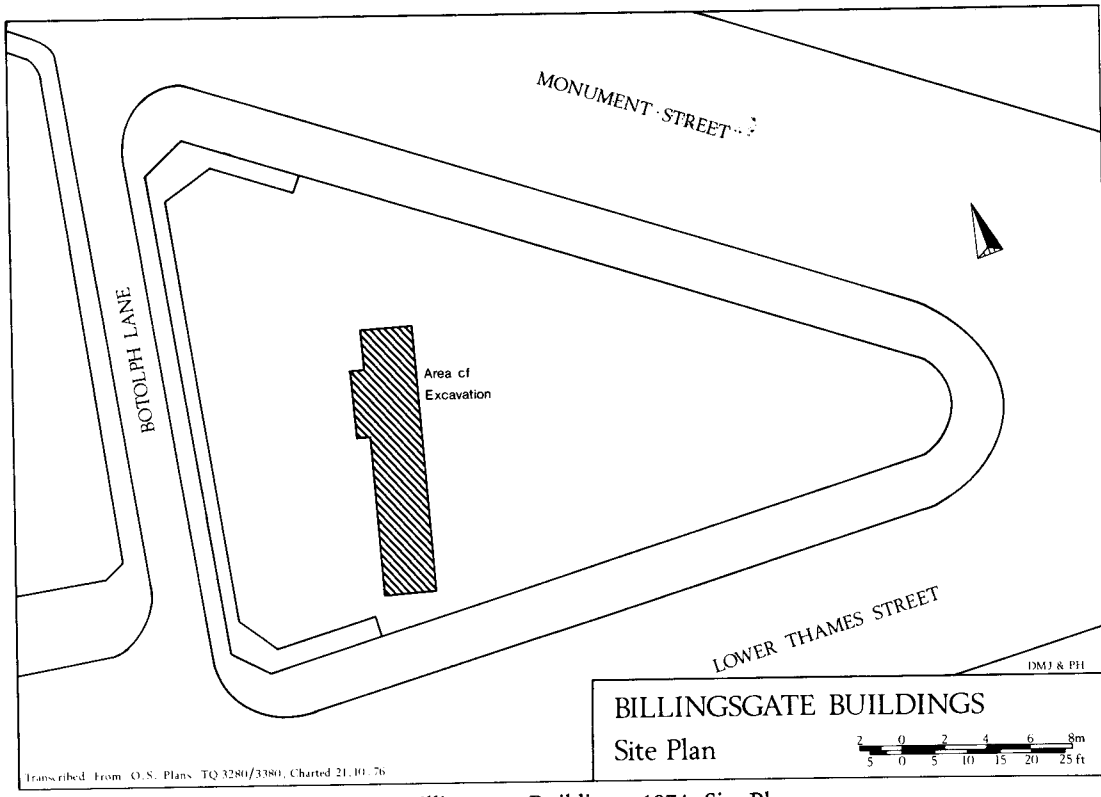

Fig. 2. Billingsgate Buildings, 1974: Site Plan.

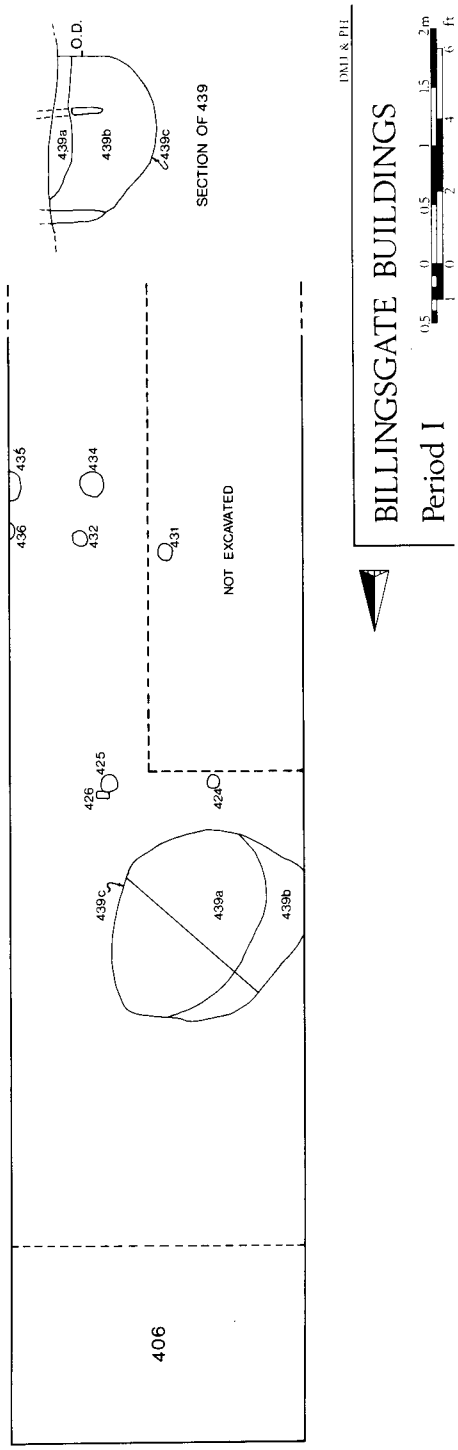

Fig. 3. Billingsgate Buildings, 1974: Period I, Plan.

At the north end of the trench was a thin layer of peat-like soil with clay and fine sand (406), containing broken pottery, tile, bone and shell. The extent of this layer is unknown and it lacked stratigraphic and chronological relationships to any features. Its function and the manner or purpose of its deposition are unknown.

South of this layer a pit was dug into the natural sand and gravel (439c). The two fills of this pit (439 a-b) included a large amount of oyster shells and bone but had a comparatively smaller amount of pottery and tile, both heavily abraded. The earlier fill (439b) was very loose grey sand and gravel similar to natural sand and gravel; the later fill (439a) was similar but included clay and peat-like soil as well. The pit was roughly circular in plan and semi-circular in profile. The contents of the fills suggest that it was used for rubbish dumping. The later fill was dumped into the pit from the east side (see Fig. 3, section).

Eight wooden uprights (timber set A)[4] had been driven into the natural gravel in the middle of the trench. All of these were broken and were buried in a layer of grey sand and gravel (423), which dates their destruction before the deposition of the sand and gravel. All but one of these uprights were round in section (diameters between 120 and 260mm); the one rectangular timber (426) was a wedge (100 x 70mm in section) stabilising one of the round uprights (425). The form of the structure of which these uprights were a part is unknown.

Period II *(c.* A.D. 70 – *c.* 160)

This period was marked by the erection and use of timber revetments to terrace the river bank.

The first three phases of this period were construction and use phases, when attempts were made to create an edge to the natural slope of the river bank. The revetments appear to be of a single design and to have been built one after the other, north to south, in rapid succession. Details of the growth ring structures of timber samples from each of the three revetments support this interpretation.[5]

Phase I (Fig. 4) *(c.* A.D. 70 – 100)

The builders of the first revetment removed any surviving structures of Period I, and drove round oak posts into the natural gravel (set I); planks (356a, b, c) were laid edge-to-edge one on top of another against the north side of the posts. Three of these planks (356a, b, c) were found *in situ,* while at least six other identical planks were found in the dumps of phase 2 (below) (set C, especially 337, 339, 340, 343, 347 and 415 in 249). These identical planks were probably part of the revetment, indicating that it was higher than what remained *in situ.* However, the tops of the posts were removed at some later date (probably in phase 2) as none of the remaining tops of the posts was above +1.6m O.D., as was the uppermost plank (356a). One of the planks of set C was probably the remainder of this topmost plank (356a), as only part of it was *in situ* (assuming that all the planks in the revetment were of similar widths). The inclusion of the planks in a later dump of phase 2 (below) suggests that the tops of the posts of phase 1 were removed after the construction of the 2nd revetment (below) and that the top planking of the 1st revetment was displaced at that time.

A layer of nearly pure grey-green sand and gravel (332) was dumped behind revetment I, creating the first levelling of the river-side slope. The pressure of this material, probably both during and after the dumping, caused the revetment to lean about 10° south, assuming that the revetment was built upright. Dumping also appears to have continued down the slope over the end of the revetment and consisted of similar layers of sand and gravel with clay and peat-like soil, and included building rubble and domestic rubbish (layers 427, 423 and 430, 433 and part of 412). (Note: layer 412 was divided into arbitrary levels (412, 430, 433) during excavation; there is some seriation of the pottery, but the waterlogged condition of the site, due to constant seepage, made it impossible to detect any layering; the pottery from layer 412 spans the same time period as the pottery from several other layers of phases 1 and 2).[6]

Phase 2 (Fig. 4) *(c.* A.D. 100 – *c.* 125)

After and during the building and use of revetment I, but *before* the building of revetment II, an irregular line of piles (set B) was driven into natural gravel just south of revetment I. There was no planking associated with these piles, and they were not aligned to receive planks. The tops of all these piles were sealed in layers dumped behind revetment II, proving that they preceded the use of revetment II (piles 357-364 sealed in layer 322 and piles 383-387, 418 and 422 sealed in layer 349). The driving of the piles may have been simultaneous with the building of revetment II but their purpose is unknown.

Revetment II, built in a similar manner to revetment I, comprised rectangular and wedge-shaped oak uprights set very closely together (set II), driven through the phase 1 deposits and into the natural gravel. A

single plank (421) against the north side of several of these posts was all that remained of the planking; its lower edge rested on the top of the last dump of phase 1.

Various materials were dumped behind revetment II and, as with revetment I, down the slope beyond the revetment, during its use. These included layers of sand, gravel, clay and peat-like soil with isolated areas of clay and charcoal flecks within them: layer 349 included layers 349a and 319, and were followed by layer 249 which included layers 249a and 322 and three pieces of wood debris (341, 342, 440) (layers 349 and 322 buried the tops of the piles set B); down the slope south of the revetment, layers 409, 412a, and the remainer of 412 (see note in phase 1 above) were dumped intermittently after the layers behind the revetment. The top part of the posts of revetment I were removed before the dumping of the last sand and gravel material behind revetment II (249), which then displaced the top planking.

Phase 3 (Fig. 4) *(c.* A.D. 125 – *c.* 160)

A third revetment, of a similar type to the previous two, was built south of revetment II. It consisted of squared oak posts (set III) driven through the deposits of phases 1 and 2 and into the natural gravels. Planks (400a-d) were laid against the north side of the line of posts in the same fashion as revetment I, and, after they had been placed (and material dumped behind the revetment ?), another post was driven *between* the top and second plank, bowing them. Some of the timber in revetment III may have been taken from revetment II, although this is only speculation.

The material dumped behind revetment III was very organic soil, which, if it was wet when dumped, would have been very muddy (208, 394). Although it is included in the east section (see Fig. 10) one of these layers (394) is very dubious; it did not exist on the west side of the trench (west of the 19th-century sewer trench, see Period VIII below) and its consistency and the date range of its pottery make it likely that it is *not* a separate layer but part of layer 208.[7] Dumps of very similar material were also deposited south of revetment III, as with the previous revetments; these included a scattering of turves (408) overlain by organic peat-like soil (402), both probably dumped during use of the revetment.

Sealed within the dump (208) behind revetment III were horizontal and upright timbers (sets D1 and D2 respectively). Most of set D1 appears to have been debris included in the dump *(i.e.* timbers 205, 211, 212, 214, 379, 416); but the tops of the uprights of set D2 were all sealed in the dump and were therefore driven before or during the dumping. These uprights do not form any definite shape in plan and their function is unknown.

Two of the timbers in this dumping (208) crossed at right angles and were joined with a half-lap joint (timbers 380-381). Two uprights (317 and 378) appear to have been driven against the south side of the timber orientated east-west (timber 380). It has been suggested that these four timbers formed a "tie-back" for revetment III. However, there was no physical contact of any of these timbers with the timbers of revetment III; the south end of the north-south orientated timber (timber 381) was raggedly broken; and there was no evidence on either the planks or uprights of revetment III (set III) to suggest that a "tie-back" was slotted, hooked, or joined to it in any other way. A further complication concerns the levels of the two uprights apparently associated with one of the horizontal timbers (317 and 378 associated with 380): the tops of these two uprights were sealed in different layers (317 sealed in layer 207 (see Period III, below) and 378 sealed in layer 208); the levels of their tops were +2.95m O.D. and +1.56m O.D. respectively, a difference of 1.39m. Clearly the function or meaning of these timbers (317, 378, 380 and 381) could have been determined by excavating more of the revetment and its dumps to the east and west, to see if similar crossed timbers and uprights were to be found north of (or behind) revetment III. Unfortunately the Department had to rule against an extension of the trench. Given the available evidence, it is suggested that the four timbers represent debris within the dump behind revetment III, some of which was from a structure with a half-lap joint; the association of the two uprights with one of the horizontals was coincidental, one of the uprights being driven later than the other. Alternatively, the four timbers may have been a part of a structure built during the deposition of the dump behind the revetment (208), but insufficient evidence survived for further clarification.

A third group of wooden uprights were all driven into the dump behind revetment III (208); the tops of these were sealed in several different layers above the dump layer (sealed in 222, 207, 204 above 208). These uprights do not form a coherent plan and are too few for interpretation. They may have formed a structure standing on the dump layer or they may be unassociated uprights driven in at different times for unknown reasons.


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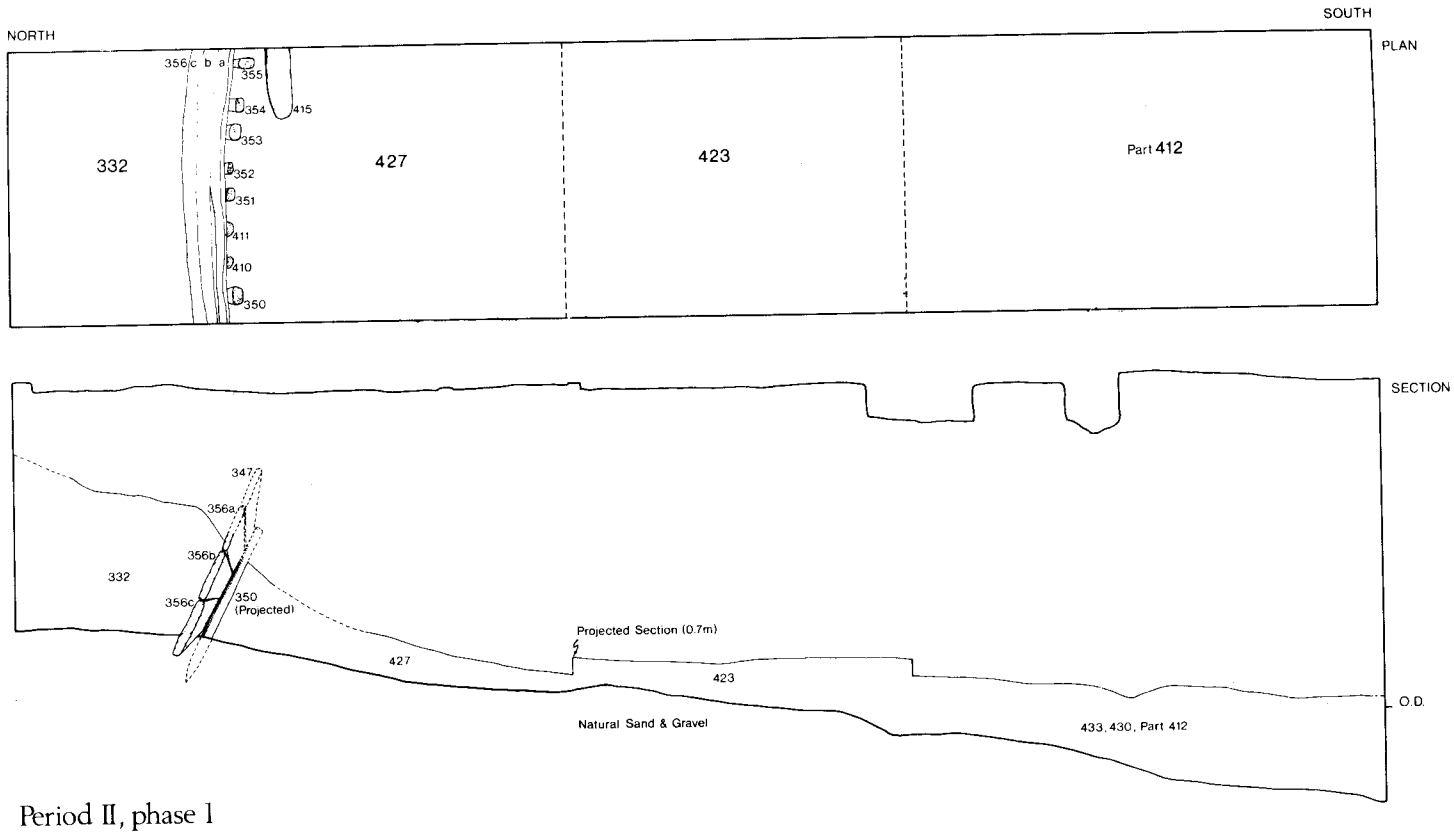
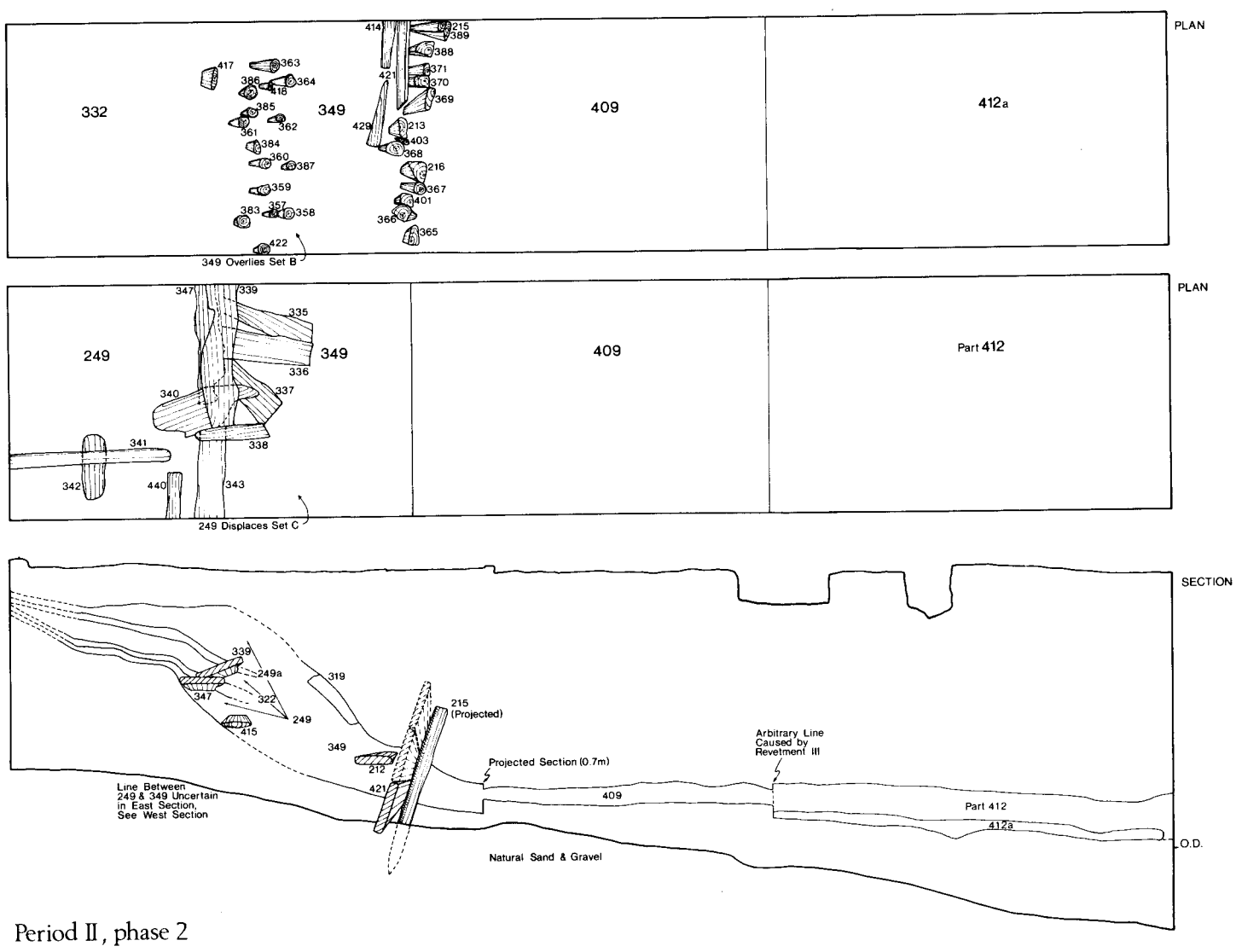
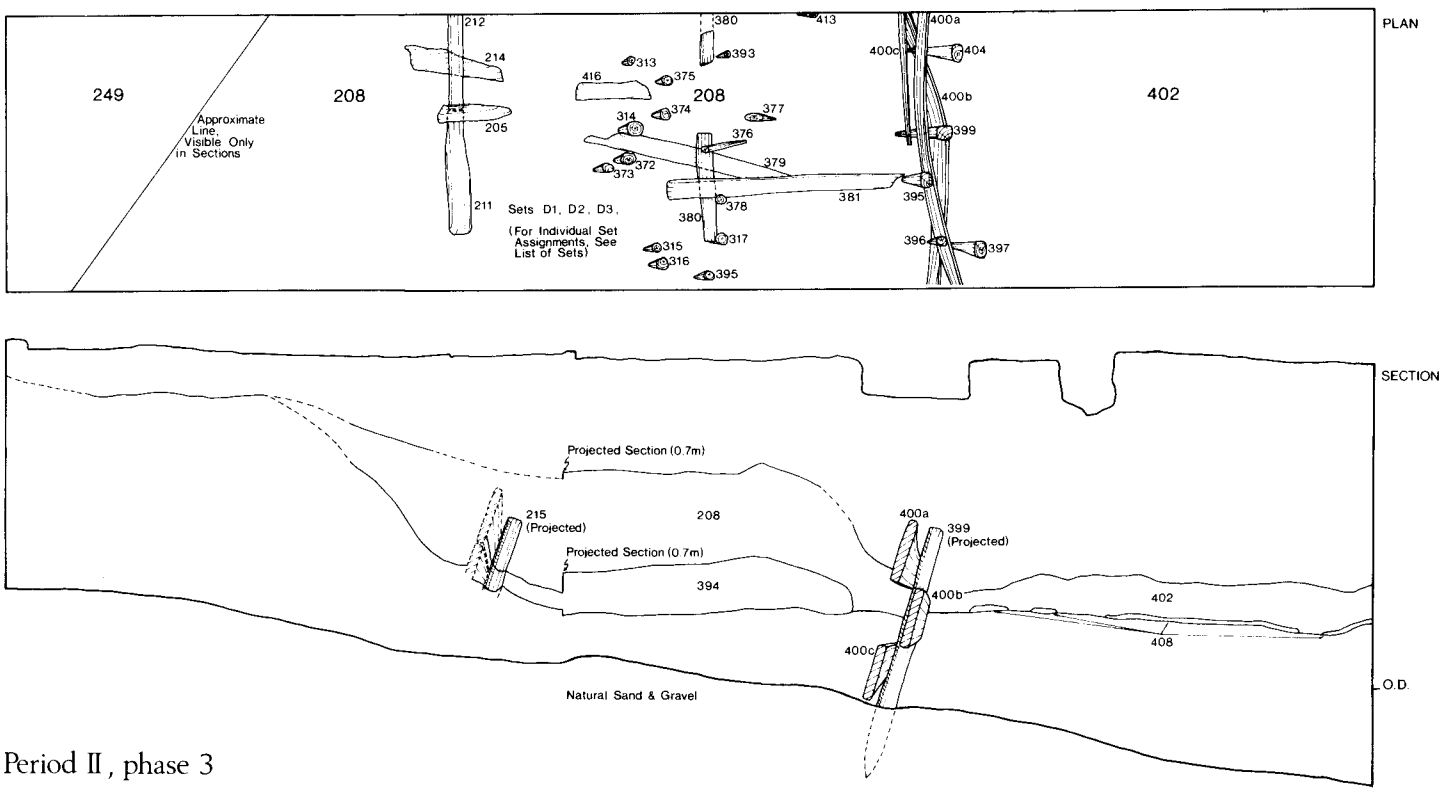


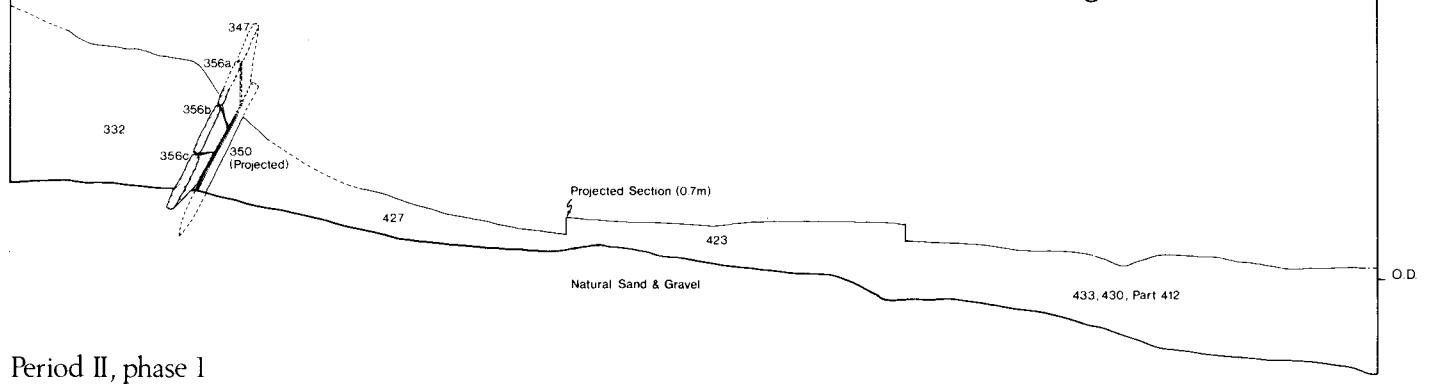
Period II, phase 1



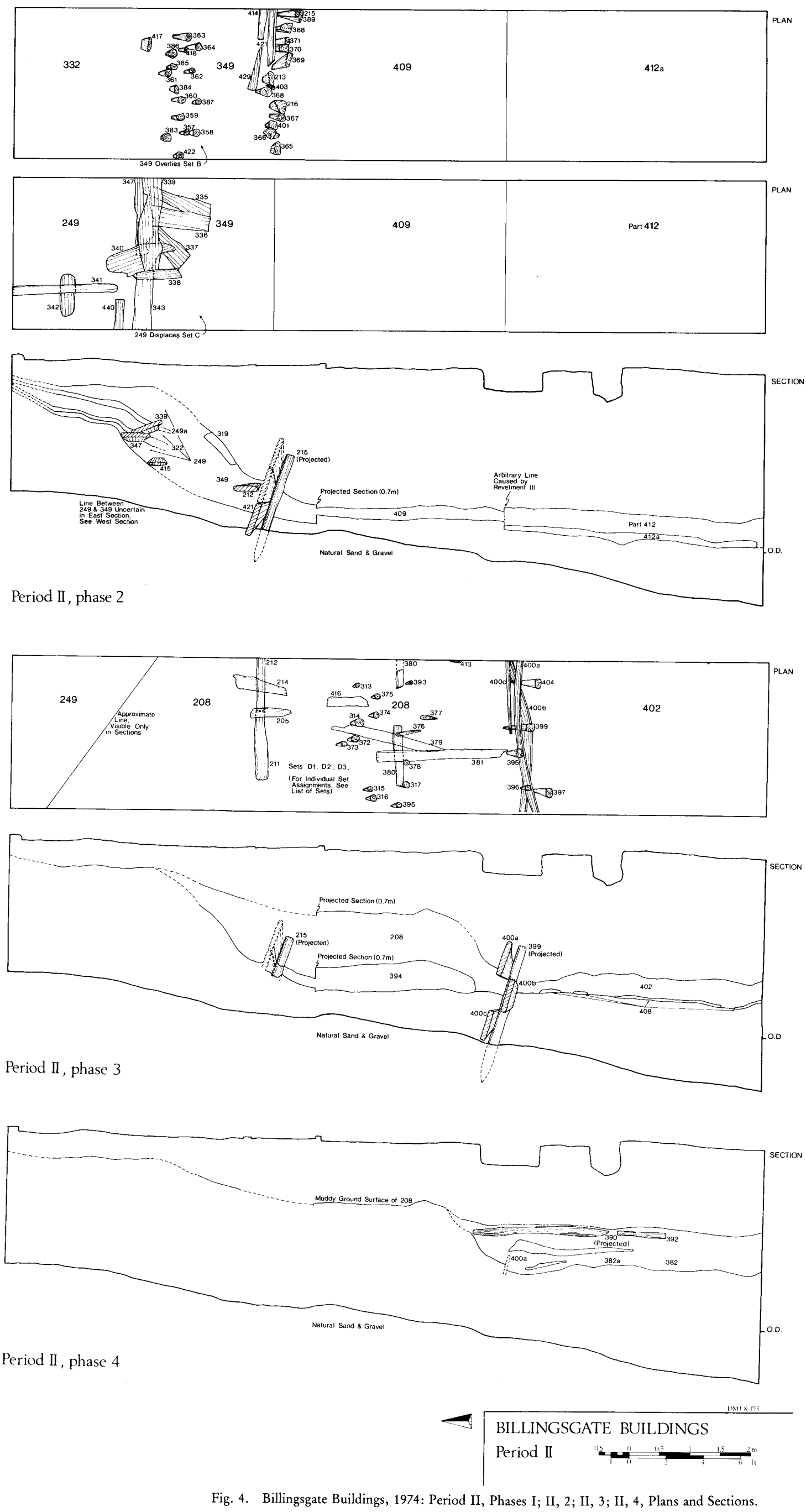
Period II, phase 2



Period II, phase 3



Period II, phase 1



Period II, phase 2

Period II, phase 3

Period II, phase 4

Fig. 4. Billingsgate Buildings, 1974: Period II, Phases I; II, 2; II, 3; II, 4, Plans and Sections.

Phase 4 (Fig. 4) *(c.* A.D. 125 – *c.* 160)

Revetment III, and the revetted 'terraces' in general were subsequently covered by a dump or dumps of sand and gravel with clay, mortar and charcoal flecks (382, 382a); some wood debris was also included (390, 391, 392). These layers were much thinner on the west side of the trench than on the east side, suggesting that the dumping was concentrated in an area to the east of the excavation.

A fourth revetment can be postulated south of revetment III for two reasons: the similarity of all the dumping behind and over all of the known revetments, and the flatness of the dumps south of and covering revetment III *(i.e.* 408, 402, 382, 382a), bringing the level up to that of revetment III *(i.e.* of layer 208).

More generally, it has been suggested that the tops of certain layers behind the revetments were cut-lines, and that parts of the layers were dug out to build the second and then the third revetment *(i.e.* layers 332, 349 and 208 were cut out before the second, third and 'fourth' revetments). But though this interpretation might be suggested by the tops of the respective layers in the east section (Fig. 10), it is not supported by the plan of the layers during excavation or by the tops of the layers in the west section. Dumping behind and off the end of or over an upright revetment would cause erratic sloping as is indicated in the two sections. An interpretation of cut-lines from two differing sections, which represent arbitrary slices through stratigraphy, and the heavy modern disturbance of the layers concerned must be inconclusive. It is, however, illogical to assume a more complicated explanation of human activity where an economic use of energy is indicated. To dig out a previous dump in order to build another revetment, only to dump back into the area just dug, is a waste of effort. If the result is to be a level surface the easiest and most economical way to do this is to build the revetment down the slope of the previous dumps or at the bottom of them and then to fill-in behind the new revetment.

Period III *(c.* A.D. 125 – after 160)

Separated as a later period are layers which were dumped or which accumulated over the layers of the revetment period. The range of the pottery dating for these layers may suggest a slow deposition.[8] During this period the area does not seem to have been built on, but the rubble in the layers suggests that buildings were close by.

Phase 1 (Fig. 5)

Dumping continued without a break; over the sand and gravel of the previous phase a layer of peat-like soil (334) was dumped, probably making the ground surface muddy and unstable.

Phase 2 (Fig. 5)

Counteracting the wet conditions of the previous phase, and of the ground surface north of revetment III *i.e.* layers 334 and 208 respectively), layers of drier materials were dumped or laid over the peat-like soil; a very thin layer of packed grey clay and sand (323) to the south, and a layer of grey clay and sand with crushed tiles and wood chips (207) to the north. Over the latter was a similar layer of packed grey clay and sand with an even concentration of wood chips throughout (204). No specific reason for laying these packed surfaces can be suggested, except perhaps to make the wet surface more stable underfoot. Modern features dividing the trench into north and south (223a-b) make it uncertain that any of these layers were the same, although their consistencies suggest that they were *(e.g.* layers 323 and 204).

Phase 3 (Fig. 5)

The ground surface at the south end of the site was made unstable again by more dumping of peat-like soil over the packed clay (288). This dumping may have been an effort to level off the slight decline still existing in the south end of the site. The samian from this layer suggests a date after A.D. 160, but within the 2nd century,[9] indicating that the packed dry surface was used for at least a few years before being covered.

(ii) ROMAN OR EARLY SAXON

Dating of Periods IV and V

The dating of Periods IV and V is very difficult within the limits set by the latest underlying layer (288, late 2nd century) and the overlying deposits of Period VI (11th-12th century). Only one layer of Periods IV-V contained a coherent group of pottery: 222, immediately overlying Period III deposits at the north end of the trench, produced pottery group Z, of 3rd-century date, with two Saxon sherds and possibly a Saxon shoe (from an equivalent layer, 248) which may either be intrusive or may indicate wholesale disturbance of the original deposits in the Saxon period. Layer 231 contained more of the 3rd-century material, but quite obviously as a result of the disturbance of 222. Other layers of Periods IV and V contained small and clearly

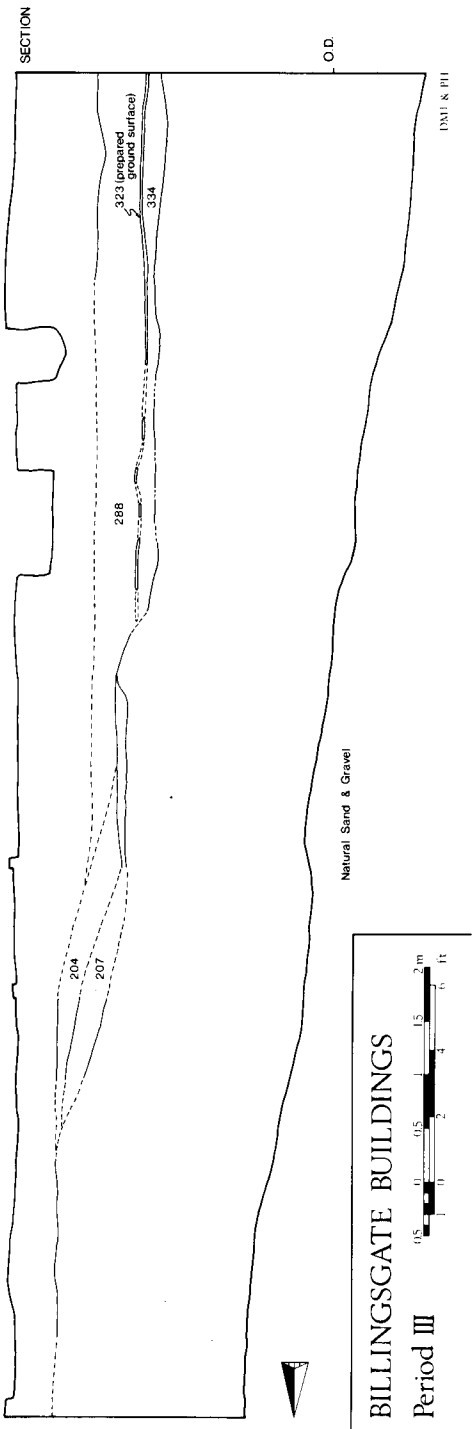


Fig. 5. Billingsgate Buildings, 1974: Period III, East Section.

residual pottery groups almost entirely composed of known 1st and 2nd-century types; none, in fact, need belong to the 3rd or 4th century. Additional Saxon sherds were found in 292, 203 and 202. Given that Periods IV and V lack late Roman material they cannot be confidently assigned to the Roman period, but on the other hand the very small quantities of Saxon material might well be intrusive, since the layers of Periods IV and V have been much disturbed by 19th and 20th-century activity. In these circumstances it would be misleading to assign layers and structures of Periods IV and V to any definite period between the 3rd and 10th century on archaeological evidence alone, although it is tempting to associate some of the deposits with others of similarly indeterminate late Roman or Saxon date found away from the waterfront, and more recently at the Milk Street and General Post Office, Newgate Street sites in 1975-7.

Period IV (indeterminate date between *c.* A.D. 200 and late Saxon period)

In Period IV new attempts were made to stabilise the wet condition of the ground surface at the south end of the site and possibly to build on it. The Roman coarse wares from the layers of this period include 2nd and in one instance 3rd-century sherds. However, one sherd found in an accumulation layer (292) is likely to be mid/late Saxon, the modern disturbances on the site make it possible that this sherd is intrusive (see Period VIII below).

Phase 1 (Fig. 6.1)

The peat-like layer of the previous phase (layer 288) was cut by a shallow trench or 'scoop' (287b); modern features have destroyed the northern edge of this ditch, but its southern edge was distinct. Into this ditch round oak and birch piles were driven into the peat-like soils until only the tops of the piles could be seen (set E).[10] Filling the ditch, and wedged between the tops of the piles, were irregular shaped ragstone blocks (287) and a filling layer of loose crumbly grey-black clay with a large proportion of pottery, tile, wood, bone and shell between the ragstones (287a). If there was an earlier fourth revetment to the south of revetment III, as suggested above, this ragstone and pile feature may have been the first attempt to use the 'terrace' for a purpose other than dumping.

In the course of discussion of this feature several interpretations have been suggested: that it was a riverside 'causeway'; that it was a wall, only the foundations of which were left; that it was a building platform. The evidence which remained is inconclusive.

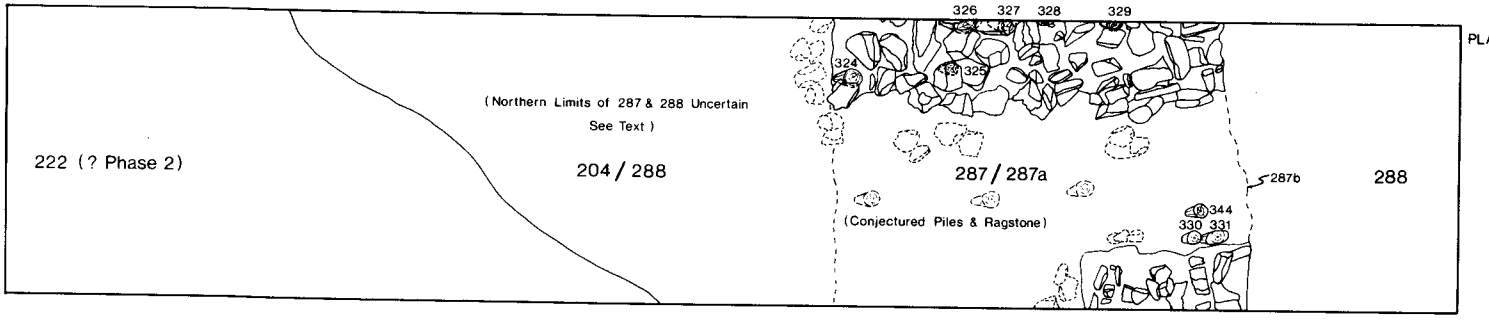
Interpretation of this feature as a 'causeway' is assuming too much from a 2.5m patch of ragstones, cut through the middle by a sewer trench (see Period VIII, below). If the feature was the wall of a building, then a corresponding wall must be to the south rather than to the north of it, unless the 'room' of which it was a part was only about 2m wide; the modern sewer trench would have removed a northern wall on the east side of the trench only, and no wall foundation or other evidence of a wall was found on the west side (see Period VIII and Fig. 8). If the feature was part of the riverside wall[11] a peculiar bowing or V-shaped indentation of the riverside wall must be assumed when linking the feature with the nearest other sections of the riverside wall to the east and west of the site.[12] This feature did not seem to be as substantially built as other sections of the riverside wall (see Note 1).

The final suggestion, that the feature was a platform, is supported by two points: although the northern edge of the feature was not established, its surviving width seemed too wide for a wall alone; and it would be a natural culmination of the terracing process to build a platform directly over the unstable, boggy ground of the previous phase (layer 288).

Phases 2 and 3 (Fig. 6.2)

Sealing the ragstone and pile feature were two very thin layers of grey sand and clay (292) and yellow sand and clay (282/286). These layers extended only over the area of the ragstone blocks and included very large proportions of chalk and flint, and pottery, tile and amphorae sherds. The extent of these layers suggests that only a little of the ragstone feature's northern edge was destroyed by modern features: both layers appeared to be accumulated surfaces rather than dumps, and are probably evidence of the use of the platform.

At the northern end of the site, overlying the last layers dumped behind revetments II and III (layers 249 and 208) and the packing layer of Period III (207), was a layer of crumbly soil and yellow clay (222 including 311). Stratigraphically, the deposition of this layer corresponds to the activities described in phases 1-3 above. However, two sherds from the layer may be Saxon; a leather shoe may also be Saxon.[13] Given the severe modern disturbances on the site (see Period VIII) it is possible that all three of these items are intrusive: the digging of the modern basement on part of the western side of the trench cut directly into layer 222. Whether or not the sherds are intrusive there is probably a discontinuity at the northern end of the site, and a



Period IV, phase 1

Fig. 6.1 Billingsgate Buildings, 1974: Period IV, Phase I, Plan.

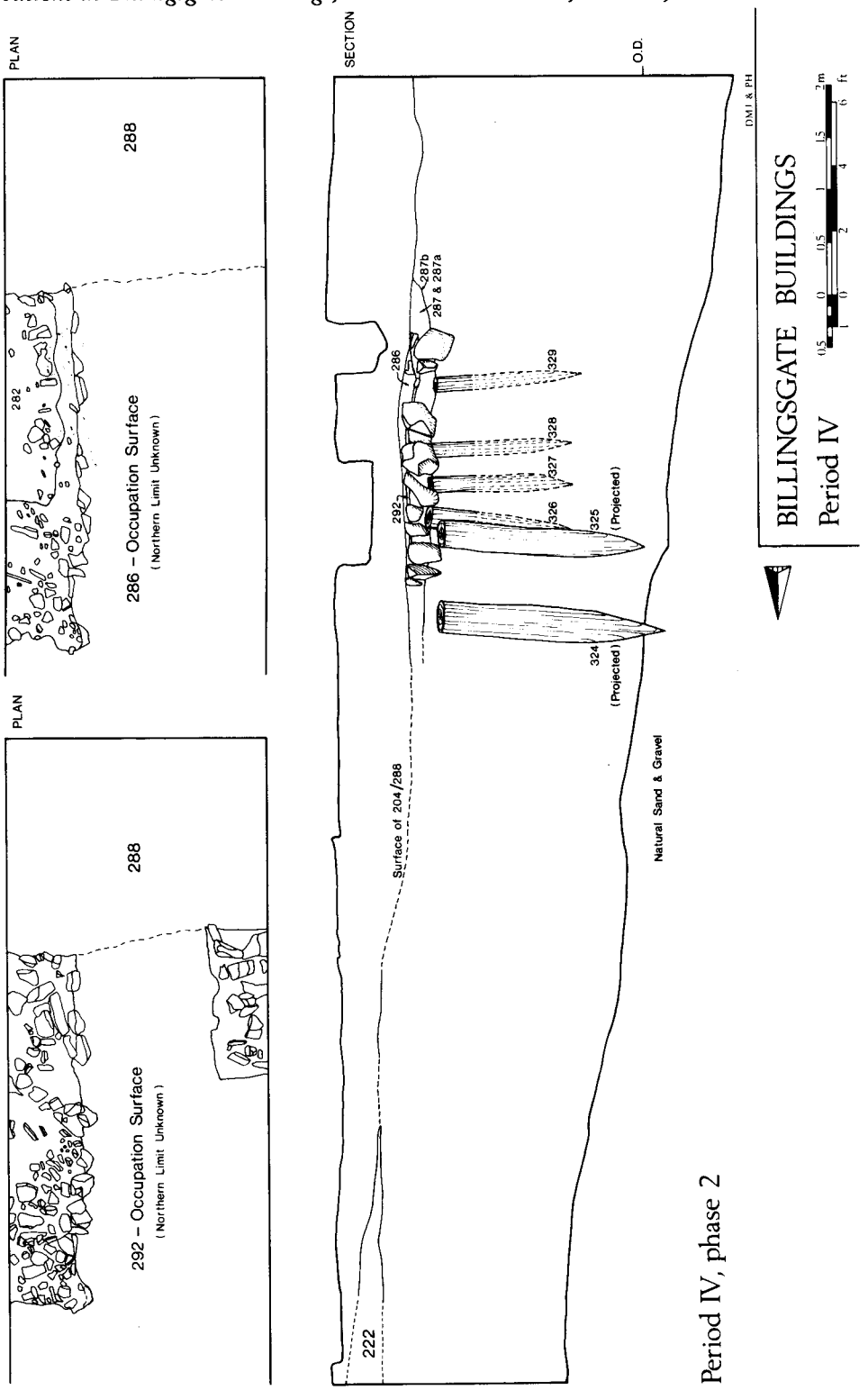


Fig. 6.2 Billingsgate Buildings, 1974: Period IV, Phase II, Plan and East Section.

period of one or more centuries with no deposition (there is no evidence that deposition occurred but was later excavated).[14]

Period V (indeterminate date between *c.* A.D. 200 and late Saxon period)

Use of the platform of Period IV ended when layers of soil and building rubble covered the entire site, including the platform and its associated surfaces. The pottery was as difficult to interpret as that from Period IV.[15]

Phase 1 (Fig. 7)

Thick layers of crumbly soil and mottled grey-green-yellow clay covered both the northern and southern areas of the site (231 and 279), and included various isolated layers of similar materials (203, 280, 285, and 289) (see list of layers at end for detailed descriptions). All these layers appear to have been dumped onto the site and included large amounts of charcoal, mortar, tile, chalk and flint pieces, and other building rubble as well as pottery. Although modern features cut the trench into north and south, the similar consistencies of these layers suggest that they are the same (particularly layers 231 and 279).

Dumping continued on the south end of the site, covering part of the previous dump (279) with a further layer of sandy soil and clay, and building rubble (202), including a dense band of mortar and tile and a large amount of ash and charcoal flecks; the last inclusions suggest the demolition of a burnt structure.

Phases 2-3 (Fig. 7)

Two pits (276b and 287b), both with single fills of brown clay-like soil (276a and 278a) including small amounts of pottery, tile, bone and shell, were cut into the rubble layer (279) at the south end of the site. Both of the pit fills had been disturbed by modern features, but part of one of the pits (276a-b) was sealed by the layers of phase 4 (below): part of the other pit (278a-b) was sealed beneath concrete, but there were no cut-lines of the pit above the base of the concrete either north or south of it. Both pits thus appear to be contemporary.

Phase 4 (Fig. 7)

The last Roman layers on the site overlay the rubble dumps of phase 1 at the south end of the site. Modern disturbances removed both the tops of the layers where they occurred, and all of the layers elsewhere on the site. What remained was a crumbly dark brown clay-like soil with large amounts of domestic rubbish (250-251). No separate layer 251 was found on the west side of the trench and the division into two layers on the east side is dubious. The modern basement foundations and sewer pipe trench destroyed most of these layers, leaving only small patches on the east and west sides of the trench. Six stake-holes filled with decayed wood and soil (set F1), penetrated these layers. Of what structure the stakes were a part, or their date, is unknown; they form no coherent pattern in plan and were all that remained on site of a late Roman or early post-Roman feature. The tops of the stake-holes were sealed by the final modern layer (200).

Two similarly enigmatic sets of stake-holes (sets F2 and F3) penetrated the rubble layers (222 and 231) in the north half of the site. One set (F2) formed a rough right angle and may have been part of a rectangular or square structure; the other set (F3) formed a crescent-shaped cluster. With no other evidence associated with these stake-holes – the remainders of whatever structures they belonged to were destroyed by the 19th-century basement – their meaning is obscure. The tops of these stake-holes were also sealed by the modern layers (200 and 201).

Finally, several wooden uprights, all sealed in Roman layers, cannot be included with confidence in any of the structures described above: 242, 244, 318, 348, 405, 417, 419, 420, 437 and 438.

Modern building destroyed most of all post-Roman features and layers: only the bottoms of three features remained.

(iii) SAXO-NORMAN (11th-12th century)

Period VI

Phase 1 (Fig. 8)

A pit (232b) lined with stakes interwoven with branches (set G) was dug into the Roman rubble layers at the north end of the site. Only a few segments of this wicker-work were left intact, as the remainder was cut away by the well pit of phase 2 (below). There is insufficient evidence for dating this pit, but the use of part of the pit in digging the well suggests that it was still open when the well was dug. What remained of the fill

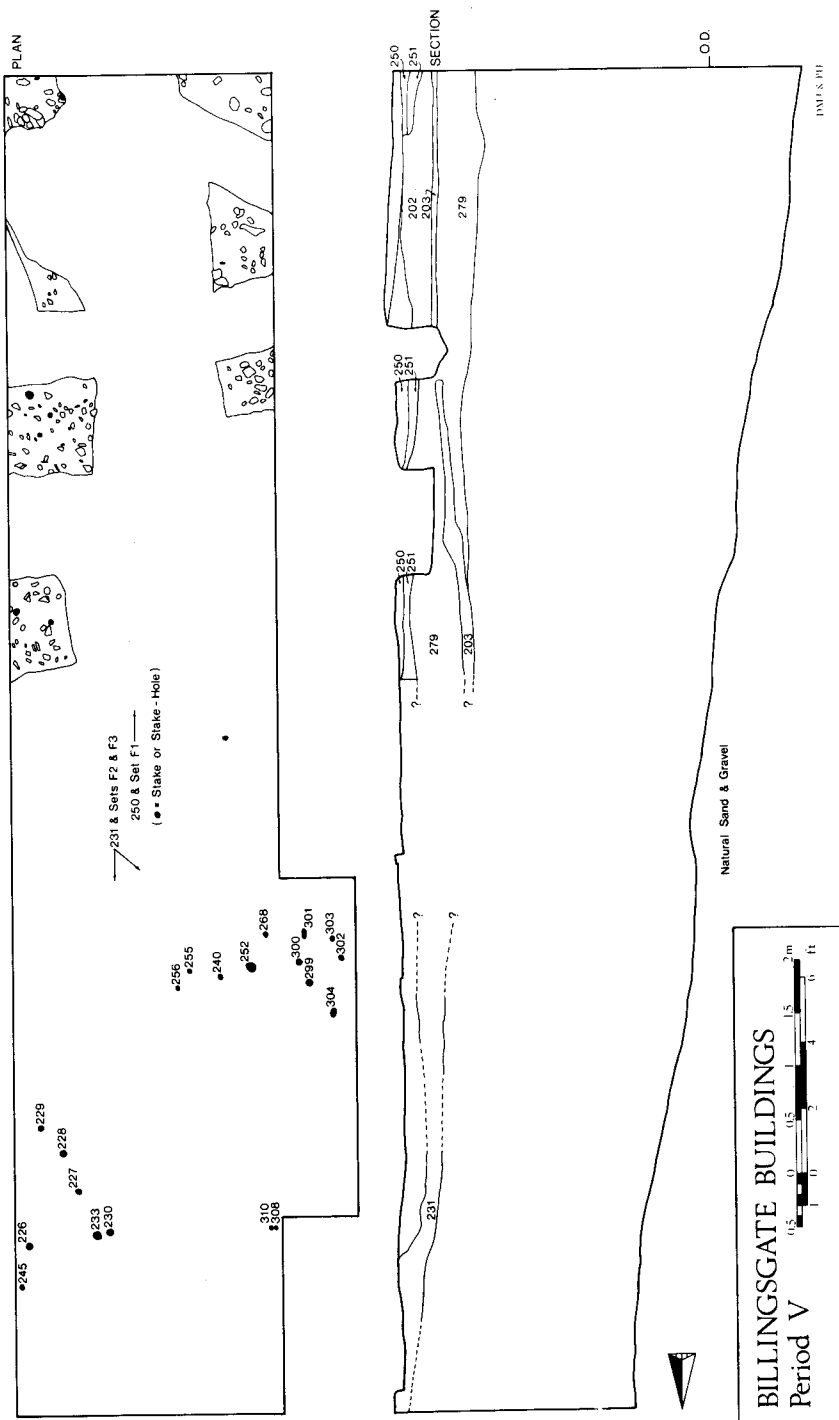


Fig. 7. Billingsgate Buildings, 1974: Period V, Plan and East Section.

(232a) of the pit was a blue-grey clay with ragstone and tile inclusions. Several analogous pits with similar wicker-lining have been excavated in London, but their use is uncertain.[16]

Phase 2 (Figs. 8, 9)

In the 11th century a well, only the bottom of which remained, was dug and built in the north-east half of the wicker-lined pit of phase 1. A new pit was dug (270b), cutting into the north-eastern half of the earlier pit; four posts (set H1) were set into this new pit, forming a rectangle; each post was rectangular in section with semi-circular grooves (in profile) running down the two adjacent sides which faced *into* the rectangle formed by the posts. Three of these remained *in situ* (in the north-west, south-west and south-east corners), and had raggedly broken tops, but the fourth had been removed, presumably by modern builders, leaving only a modern fill of soil and mixed pottery and rubble (293). Into the grooves of the posts planking was set in clinker-fashion (set H2) forming the sheathing of the well. A black, sandy clay (270a) was then dumped into the gap between this sheathing and the sides of the well pit; included were abraded Roman pottery, tile, bone, shell and wood fragments, as well as an 11th-century rim sherd.[17]

Phase 3 (Fig. 8)

Evidence of the use of the well consisted of a thin layer of fine silt (321) in the bottom of the well: there is not enough evidence to establish the length of time the well was in use.

Phases 3-4 (Fig. 8)

During the use of the well or ending its original function several dumps were deposited into the well. The several dumps included a wet, dark brown peat-like clay with some gravel and many oyster shells (320), a similar, black fill (306), a very coarse sand, almost gold in colour (291) and a grey-black clay with intertwined segments of branches (275), deposited in that order. Included in the first of these fills (320) were remains of rope fibre and wooden slats of a bucket; some of the slats had bored holes or holes and wooden pins at the ends, indicating the bucket's construction. Also found in this first dump fill was half a quern stone.[18]

The pottery in these fills does not provide enough evidence to suggest an individual date of deposition for each fill. However, two sherds of the same pot were found in the bottom fills (320 and 306) and a "Stamford-like" sherd was found in the top fill (275). All of the pottery in general suggests that the well was filled in during the 11th-12th centuries.

Further evidence of the later uses of the well or of its abandonment was destroyed by modern building (see Period VIII).

(iv) MEDIEVAL, POST-MEDIEVAL AND MODERN

Period VII (12th-13 centuries) (Fig. 8)

Only the bottom of one medieval feature remained beneath the modern basement floor. This was an irregular-shaped pit (224b) and its fill (224a), about one third of whose plan and contents were excavated in the north-east corner of the site. The fill of the pit consisted of a dark, reddish-brown, clay-like soil including many shells and bones and several pieces of wood debris (set K). Around the edge of the pit were five stake-holes filled with decayed wood and short segments of pointed stakes (set J); all were round in section with diameters between 50 and 90mm. All were broken, presumably by modern disturbance. The depths of the stake-holes were not more than 490mm. Pottery from the pit fill includes sherds from the 12th and 13th centuries, indicating that the pit was filled, and probably used, within that period.

The positions of the stake-holes following the line of the edge of the pit suggest that the pit was wicker-lined, as does analogy with other medieval wicker-lined pits excavated in London (see Note 16) although no remains of wicker were found here. There is no evidence of the original use of this pit, but the possibility of wicker lining suggests a storage pit; the final use of the pit was apparently as a rubbish dump.

The destruction by modern building of the post-Roman layers, referred to above, and the shallowness of the stake-holes around the pit indicate that only a small part of the pit remained undisturbed.

Period VIII (19th (possibly late 18th) – 20th centuries) (Fig. 8)

Two short segments of a late 18th or early 19th-century brick wall ran across the southern part of the trench (243a). The wall was built by digging a shallow slot (243b), laying a foundation course of ragstone blocks, and then bricks. The bricks were hand-made and had similar proportions and dimensions to modern bricks; they were set in a yellow mortar. Only parts of two courses of bricks remained on the east side of the trench and only the ragstone foundations on the west side: the evidence was not sufficient to determine the bonding method.

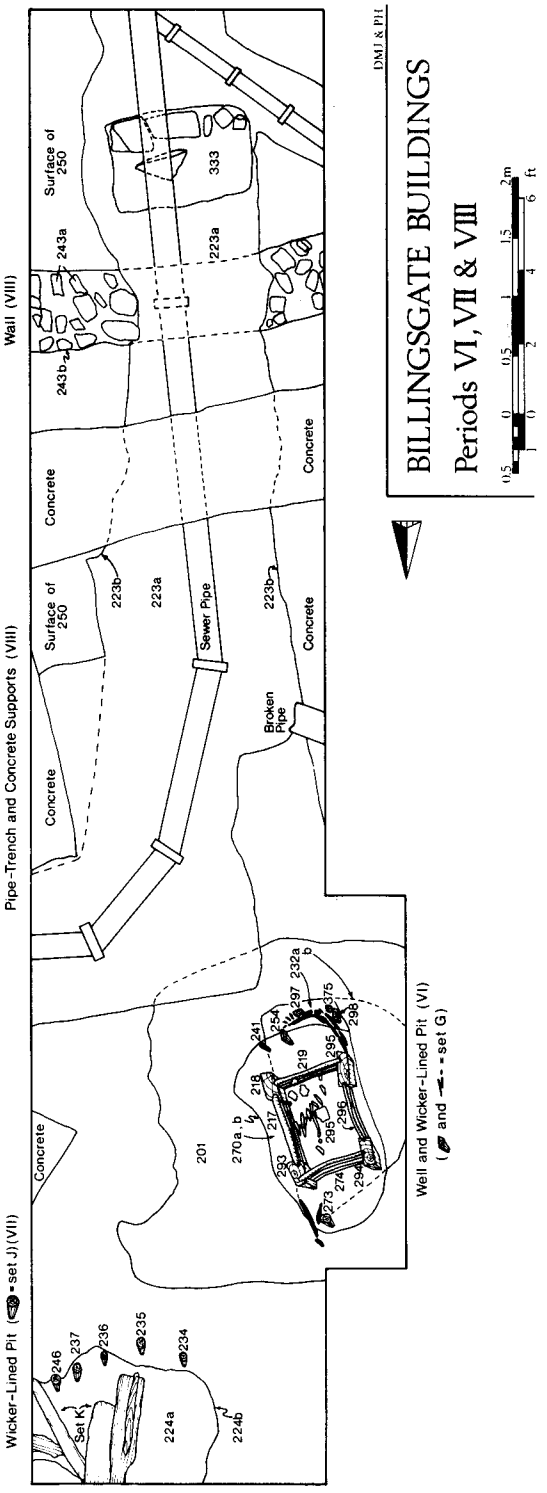


Fig. 8. Billingsgate Buildings, 1974: Periods VI, VII and VIII, Plan.

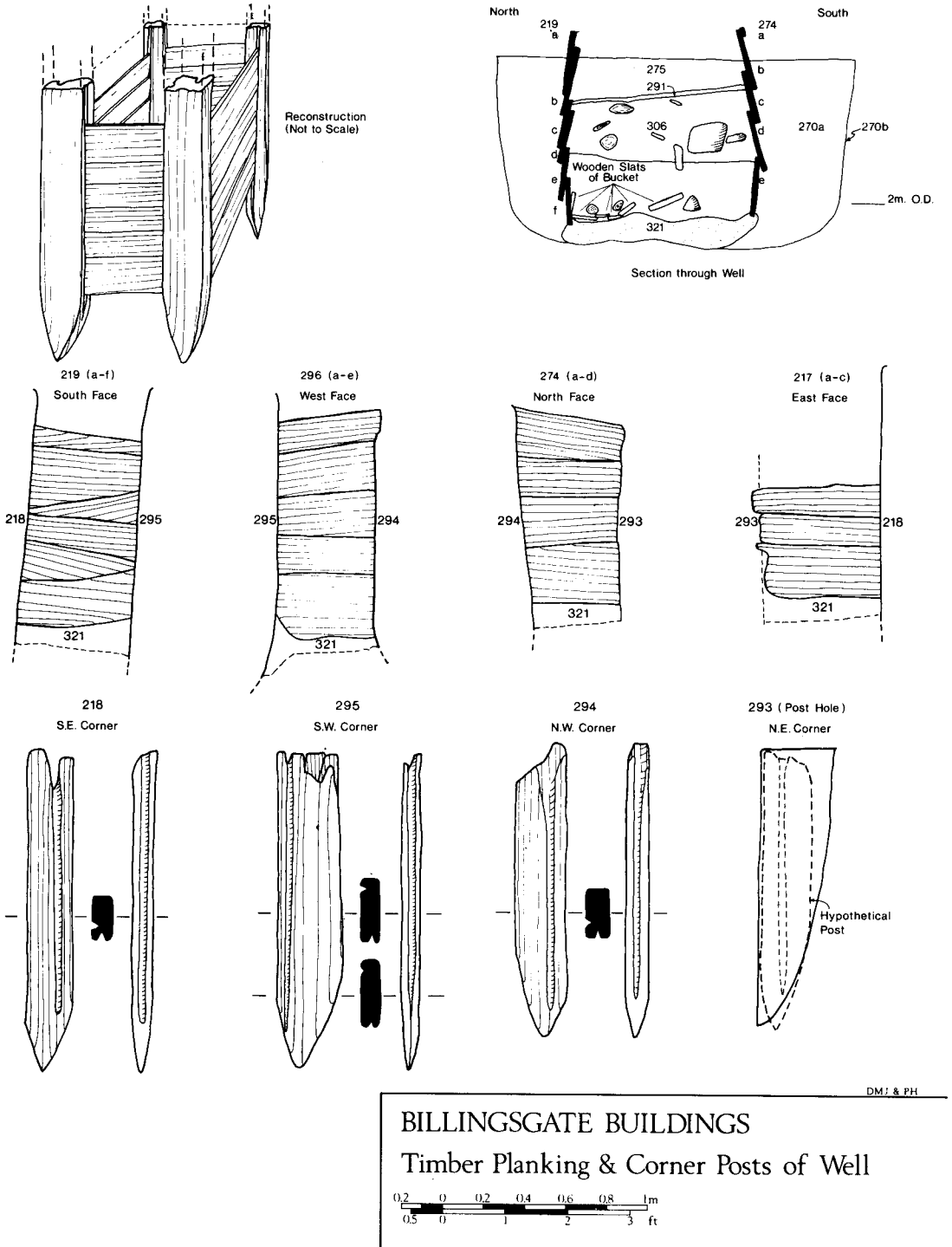


Fig. 9. Billingsgate Buildings, 1974: Timber planking and corner posts of well.

Cutting through this wall and down into the layers and features of Period IV was a sewer pipe trench, probably laid late in the 19th or early 20th century (223b). An irregular pit (333) at the south end of this pipe trench cut down into the topmost layers of Period II, phase 2, and was filled with ragstone blocks identical to those of the platform of Period IV. The pipe trench had been back-filled with crumbly brown soil and rubble, including pottery of all periods; the sewer pipe itself was clay, and rested on a cement base. The irregular pit with ragstones appears to have been the trench diggers' method of getting rid of the blocks encountered in cutting through the platform of Period IV.

Several concrete building supports set into deep pits (221) cut through all layers down to the natural gravel. These were probably laid when the modern (19th century?) basement was built. A general levelling layer of loose brown soil, building rubble and artefacts of all periods overlay the entire site immediately beneath the basement floor (200, 257). Over the Saxo-Norman well of Period VI were two layers of soil and wood dust (309 and 201) confined to the area around the top of the well; presumably this material was the destroyed remains of the rest of the well.

(c) DISCUSSION

There is evidence for three distinct periods of activity in the Roman layers and features of the site.[19] Thereafter there are only isolated post-Roman features. The very slight evidence from the first of these periods, just after the middle of the 1st century A.D., suggests that the area was little developed and regarded mainly as an open area on the river bank where casual dumping was thrown, and where there was perhaps some building in wood.

In the second period, during the last quarter of the 1st century to about the mid 2nd century AD, the evidence of the three revetments and their associated layers suggests a greater degree of local settlement and a need to control the slope of the river bank by levelling it off behind revetments. Assuming it to be unlikely that domestic rubbish would have been carried far for disposal, there were possibly dwellings nearby. The closeness of the probable site of the Roman bridge[20] supports this supposition. Further controversy exists over the locations of the north and south banks of the Thames in Roman periods. There were no water-laid deposits on the site (see Environmental Report by George Willcox), indicating that it was not on the river frontage but on the foreshore, high enough up to be unaffected by tides. While future excavations may make the Billingsgate Buildings site more important in this controversy, and make it necessary to reconsider the deposits, the small size of the site and the apparent lack of even circumstantial evidence bearing on these controversies make further speculation impossible.

In the third period, in about the mid 2nd century, the need to keep the area level and clearly defined seems to have lapsed, although there is circumstantial evidence for a fourth revetment south of revetment III on the site (see Roman Period II, phase 4, above). The consistencies of the materials dumped behind revetment III and over it would have made the ground surface very muddy in a damp British climate, especially along the river bank. The use of the area thus seems to have reverted to one of dumping, although more concentrated than before.

A fourth use of the area seems to have arisen after the 2nd century but before the late Saxon period. A new effort was made to stabilize at least part of the prevailing wet ground surface. The extent of the ragstone blocks and foundation piles is not known, but the effort taken to lay such a substantial foundation may indicate more than just a localised levelling. There is not enough evidence to suppose that a building stood on the ragstone platform but it is hard to image that such effort was made merely to secure the ground

surface. The two thin layers of accumulated soil and domestic rubbish on the ragstones also suggest that it was heavily used. The small area excavated and the heavy disturbance of modern times preclude further interpretation.

At some time during or after the 3rd century, large amounts of building rubble and associated domestic refuse were dumped over the whole site. The area, it seems, had reverted again to open ground where the results of probable nearby demolition were dumped.

There are several parallels to timber posts and planking and to the technique used in revetments I, II and III found on other London sites. In general, this technique of "camp sheathing" appears to have been a Roman method of retaining soils in many different situations.[21] Of particular interest are the similar revetments on either side of King William Street, to the west of the site.[22] Unfortunately there is only a general 1st-century date for one of these sites, although the excavations uncovered much more of these features on these sites. If the sheathing on the King William Street sites is of the same date as the revetments on the Billingsgate Buildings site, it is possible that both were linked as a continuous river slope revetment and ground levelling. However, without excavations in the intervening ground between Botolph Lane and Pudding Lane, a link must remain speculative.

Similarly, there are also parallels to the ragstone and pile platform. Unfortunately these are also undated or only as generally dated as the feature on Billingsgate Buildings. These parallels were far more extensive than the small platform found on this site.[23] In particular, the steep slope between Queen Victoria Street and Upper Thames Street, to the west on the opposite river end of the City to the site, involved a large-scale double terrace.[24] All of these parallel examples, of ragstone or chalk blocks founded on piles, are west of London Bridge, far to the west of the site. With no known parallels in the immediate vicinity of the site, it cannot be assumed that the platform at Billingsgate Buildings was other than a local one. There is no evidence of how far to the east or west of the trench the platform extended, but the southern edge is clear in plan and section, and the northern edge cannot have extended beyond the modern concrete support which destroyed it on that end, as there are no ragstones or piles north of the concrete (see Fig. 10).

(d) ACKNOWLEDGEMENTS

The author would like to thank the following people for their help in the excavation and interpretation of this site: (excavation crew) Andrew Boddington, Charles Hill, Gustav Milne, Chrissie Milne, Ian Nickols, Peter Taylor and David Torreggiani; (for help in interpretation) David Browne, Hugh Chapman, Chris Green, Ruth Morgan, Clive Orton, Michael Rhodes, John Schofield and George Willcox; Vanessa Mead and Paul Herbert assisted with the production of the drawings.

FOOTNOTES AND REFERENCES

1. C. Hill, 'The Roman and medieval defences' *Antiq. J.* 57 (1977) 44-51 and *The Roman Riverside Wall and Monumental Arch in London,* London Middlesex Archaeol. Soc. Special Paper No. 3 (1980); P.R.V. Marsden 'The riverside defensive wall of Roman London' *Trans. London and Middlesex Archaeol. Soc.* 21 (1967) 149-156; T. Tatton-Brown 'Rescue excavations on the old Custom House site: Part 2: Roman' *London Archaeologist* 2 (1974) 155-159; M. Wheeler *Roman London, Royal Commission on Historical Monuments in London, 3* (London 1928) 93-4.
2. In this report: Period=the time span for the completion and use of two or more related events; Phase=the time span of a single event or time of use.
3. See groups U, V, W, X, Y, Z in the Roman pottery report by Chris Green, pp. 39-79.
4. See list of timber sets, p. 20.
5. See timber report by Ruth Morgan, pp. 28-32.
6. See groups V, W, X in Roman pottery report by Chris Green, pp. 39-79. Much of the pottery from 394 and 208 joins (C.M.G.).
7. See group X in Roman pottery report by Chris Green, pp. 39-79.

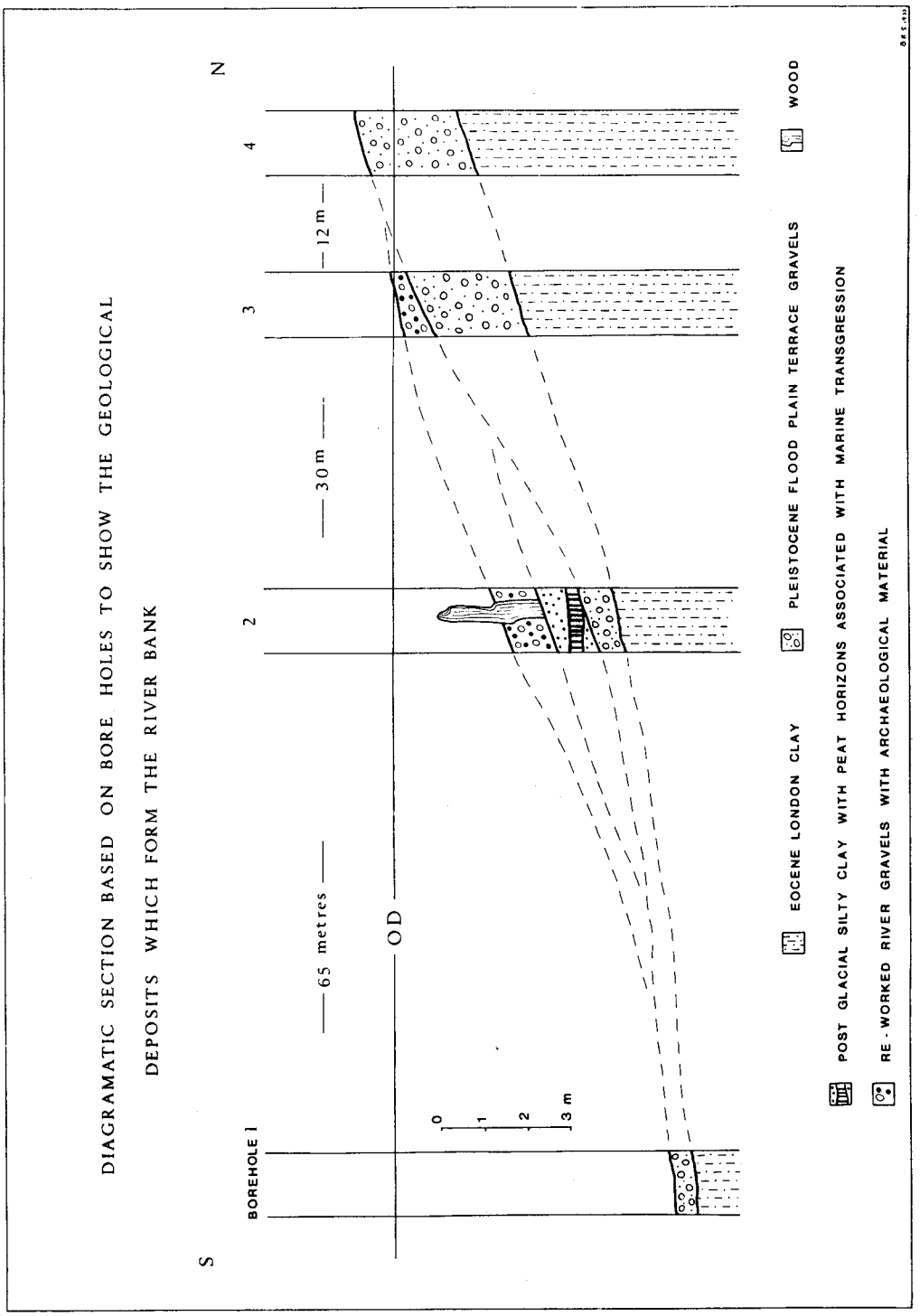


Fig. 10. Billingsgate Buildings, 1974: Diagramatic section based on bore-holes to show the geological deposits forming the river bank.

8. See groups X and Y in Roman pottery report by Chris Green, pp. 39-79.
9. See group Y in Roman pottery report by Chris Green, pp. 39-79.
10. Although this ditch shows in both the east and west sections, there were no piles in the west section. There was a scatter of piles with similar O.D. levels across the trench.
11. Suggested as a possibility by Brian Hobley and John Schofield in 'Excavations in the City of London: First interim report, 1974-1975' *Antiq. J.* 57 (1977) 34.
12. R. Merrifield *The Roman City of London* (London 1965), Gazetteer entries 311 and 354, p. 285 and 295 respectively; and map.
13. See Saxon pottery report and Leather report by Michael Rhodes, pp. 139-141.
14. See pottery group Z in Roman pottery report by Chris Green, pp. 72-3.
15. See Roman pottery by context, p. 40.
16. W. F. Grimes *Excavation of Roman and medieval London* (London 1968) 132-133 and Fig. 29 on p. 146, 160-161 and Plates 70-71; more recently on the Department of Urban Archaeology's site at Milk Street (S. Roskams and J. Schofield, forthcoming).
17. For details on medieval pottery see the report by Clive Orton, pp. 142-3. There are no known parallels to this well in London: the wood of the well has been preserved and re-assembled for permanent exhibition, in the Museum of London's "Dark Age" gallery. The author would like to thank Mr. John Clark and Mr. Arthur Trotman of the Museum of London for the work involved in preserving and displaying the well.
18. See special report on the quernstone by Michael Rhodes, p. 144.
19. E. C. Harris 'The stratigraphic sequence; a question of time' *World Archaeol.* 7 (1975) 109-21.
20. While current thinking is that the Roman bridge was located beneath the medieval bridge, the controversy is not settled. On the site of the Roman bridge, see R. Merrifield and H. Sheldon 'Roman London Bridge: A view from both banks' *London Archaeologist* 2 (1974) 183-191; T. Dyson 'The 'pre-Norman' bridge of London reconsidered' *London Archaeologist* 2 (1975) 326-327; and the New Fresh Wharf excavation report (forthcoming).
21. See for instance: *J. Roman Stud.* 19 (1929) 200-201; *London Archaeologist* 3 (1976) 3-7; *Trans. London and Middlesex Archaeol. Soc.* 28 (1977) 14-26.
22. R. Merrifield *op. cit.* in note 12, Gazetteer references 260, 304, 306, 308, pp. 269, 283-4; Wheeler *op. cit.* in note 1, 97, 143, 145-147, Plate 55 and p. 132-134, Fig. 50; *J. Roman Stud. loc. cit.*
23. R. Merrifield *op. cit.* in note 12, Gazetteer references 109, 110, 111, 112, 113, 114, 115, 116, 120, 121, 261, 277, 278; p. 220-225, 269, 275.
24. P.R.V. Marsden *op. cit.* in note 1, 151-153.

(e) SUMMARY LISTS

(i) Lists of sets of posts, piles, planks, wood debris and stakes.

I 337, 339, 340, 343, 347, 350-356a, b, c, 410, 411, 415 (Revetment I).
II 213, 215, 216, 365-371, 388, 389, 401, 403, 414, 421, 429 (Revetment II).
III 396-400a, b, c, d, 404 (Revetment III).
A 424-426, 431, 432, 434-436 (top sealed in layer 423, terminate in natural).
B 357-364 (tops sealed in layer 322); 383-387, 418, 422 (tops sealed in layer 349).
C 335-343, 347, 415, 440 (sealed within layer 249).
D1 205, 211, 212, 214, 379-381, 416 (horizontal timbers sealed within layer 208).
D2 372-378, 395 (upright timbers sealed within layer 208, except timbers 376, 377 and 378 which terminate in layers 409, 423 and 427 respectively).
D3 313-317, 375, 393, 413 (upright timbers sealed in layer 204, or 207, or 222 and terminating in layer 208).
E 324-331, 344 (tops sealed in layer 287a).
F1 263-267 (tops sealed in layer 200, terminate in layer 250/251).
F2 226-230, 233, 245 (tops sealed in layer 200, terminate in layer 222 or 231).
F3 240, 252, 255, 256, 268, 299-304 (tops sealed in layer 201, terminate in layer 222 or 231).
G 241, 253, 254, 269, 273, 297, 298, 345 (wicker sealed in 232a – pit-fill; tops of wicker stakes sealed in 201, terminate in 232a).
H1 NW-294, SW-295, NE-293, SE-218 (corner posts of well, sealed by 201).
H2 N-274a-e, S-219a-f, E-217a-g, W-296a-e (planking of well, sealed in well backfill 270a, well fills 321, 320, 306, 291, 275, and tops in 309).
J 234-237, 246 (tops sealed in layer 200, terminate in layer 222 or 231).
K 238, 239, 258, 271, 272 (sealed in pit-fill 224a).

(ii) List of layer descriptions

200 Building rubble; brick, concrete, brown soil (Modern).
201 Brown organic soil with clay and wood chips and sawdust (Modern).
202 Sand and brown soil with clay, charcoal, ash, flint, tile, mortar flecks (Indeterminate late Roman or Saxon).
203 Dark grey clay with sand and charcoal, bone and flint pebbles (Indeterminate late Roman or Saxon).
204 Dark grey clay and mortar, compacted *(c.* A.D. 125-160).
205 Wood.
206 = 204.
207 Grey clay and sand with wood chips and tile flecks, compacted *(c.* A.D. 125-160).
208 Black-brown organic soil with pockets of grit, shellfish, or clay *(c.* A.D. 125-160).
209-210 = 208.
211-219 Wood.
220 = 201.
221 Modern concrete with light-brown sandy clay and building rubble around edges (where holes were dug to pour the concrete). (Modern).
222 Dark grey sandy clay with concentrations of charcoal and tile flecks (Indeterminate late Roman or Saxon).

223a Loose grey-brown soil with clay and mixed building rubble; concrete base for clay sewer pipe (Modern).
223b Cutline for sewer trench (Modern).
224a Red-brown organic soil and clay with shell, bone and wood debris (12-13th century).
224b Cutline of pit (12-13th century).
225 = 222.
226-230 Wood, rotted wood.
231 Yellow-brown hardpacked soil and clay with sand, mortar, tile and charcoal flecks (Indeterminate late Roman or Saxon).
232a Blue-grey clay with ragstone and tile fragments (Fill of 232b).
232b Cutline of pit (11-12th century).
233-242 Wood, rotted wood.
243a Ragstone (one course) and red bricks (handmade; parts of two courses); brown soil around ragstones and bricks (Modern).
243b Cutline of wall trench/slot (Modern).
244-246 Wood, rotted wood.
247 = 223a.
248 = 222.
249 Hardpacked, yellow-brown clay with grit (*c.* A.D. 100-125).
249a Sandy, grey clay with charcoal flecks (*c.* A.D. 100-125).
250 Red-brown loose soil and clay (Indeterminate late Roman or Saxon).
251 Red-brown loose soil and clay with oyster shells, flints, bone, ragstone, chalk, pot and tile concentrated throughout (Indeterminate late Roman or Saxon).
252-259 Wood, rotted wood (259 is wooden bowl, see special report).
260-261 = 201.
262-268 Wood, rotted wood.
269 Grey-black clay and wicker-work.
270a Black, sandy clay (Fill of 270b).
270b Cutline of pit for well (11-12th century).
271-274 Wood.
275 Grey-black clay with intertwined branches (11-12th century).
276a Brown soil and clay (Fill of 276b).
276b Cutline of pit (Indeterminate late Roman or Saxon).
277 Wood.
278a Brown soil and clay (Fill of 278b).
278b Cutline of pit (Indeterminate late Roman or Saxon).
279 Grey clay and loose soil with grit, charcoal flecks and building rubble (Indeterminate late Roman or Saxon).
280 Grey clay with tile, mortar and charcoal flecks (Indeterminate late Roman or Saxon).
281 Wood (debris).
282 Black clay, sand and charcoal (Indeterminate late Roman or Saxon).
283-284 = 286.
285 Black clay, sand and charcoal (Indeterminate late Roman or Saxon).
286 Yellow clay and loose soil with sand, chalk, flint, ragstone and tile rubble throughout (Indeterminate late Roman or Saxon).
287 Ragstone blocks (Indeterminate late Roman or Saxon).
287a Grey-black loose clay with wood chips, bone and shell throughout (Indeterminate late Roman or Saxon).
287b Cutline of shallow ditch or "scoop".
288 Grey-brown clay and soil (*c.* A.D. 160-200).
289 Grey-brown gritty clay with building rubble flecks (Indeterminate late Roman or Saxon).
290 = 289.
291 Yellow-gold, very fine gravel (or coarse sand) (11-12th century).
292 Fine grey clay with angular ragstone, chalk, flint, tile, pot, bone and amphorae (Indeterminate late Roman or Saxon).
293 Dark brown loose soil (Modern).
294-304 Wood.
305 = 286.
306 Black peat-like clay with gravel (11-12th century).
307-308 Wood, rotted wood.
309 Grey-brown clay and sand with wood chips (Modern).
310 Wood.
311 Stiff yellow-brown clay, with some grit and tile and mortar flecks (Indeterminate late Roman or Saxon).
312 Yellow-brown clay and soil with chalk and ragstone.
313-318 Wood.
319 Smooth white clay (*c.* A.D. 100-125).
320 Brown peat-like soil with gravel (11-12th century).
321 Fine grey sand/silt (11-12th century).
322 Grey-black sandy clay and gravel (*c.* A.D. 100-125).
323 Light grey clay, compacted (*c.* A.D. 125-160).
324-331 Wood.
332 Grey-green sand and gravel (*c.* A.D. 70-100).
333 Grey-black loose soil and building rubble, and ragstone blocks (Modern).
334 Brown organic soil (*c.* A.D. 125-160).
335-345 Wood.
346 = 334.
347-348 Wood.
349 Grey-black clay and sand with shellfish and bone (*c.* A.D. 100-125).
349a Light blue-grey clay (*c.* A.D. 100-125).
350-381 Wood.
382 Grey sandy clay with flint pebbles, mortar and tile flecks (*c.* A.D. 125-160).
382a Fine black sand (*c.* A.D. 125-160).
383-393 Wood.
394 Brown peat-like soil with oyster shells, twigs and leaves (hedge cuttings) (*c.* A.D. 125-160).
395-401 Wood.
402 Grey-brown sandy peat-like soil (*c.* A.D. 125-160).
403-405 Wood.
406 Grey-black peat-like soil with clay and sand (*c.* A.D. 60-70).
407 = 333.
408 Dark-brown organic soil clods/turves.
409 Brown organic soil (*c.* A.D. 100-125).
410-411 Wood.
412 Grey sand and gravel (*c.* A.D. 70-100).
412a Fine black sand and gravel (*c.* A.D. 100-125).
413-422 Wood.
423 Grey sand and gravel (*c.* A.D. 70-100).
424-426 Wood.
427 Grey sand and gravel (*c.* A.D. 70-100).
428 = natural sand and gravel.
429 Wood.
430 Same as 412.
431-432 Wood.
433 Same as 412.

434-438 Wood.
439a Light brown clay, sand and gravel (Fill of pit 439c).
439b Loose grey sand and gravel (Fill of pit 439c).
439c Cutline of pit (*c.* A.D. 60-70).
440 Wood.

(iii) Summary of Periods and Phases

Period & phase	Approximate dating	Contexts included; pottery groupings U-Z	Associations & characters of deposits and structures
Roman I	*c.* AD 60-70	406, 439a, b, c (All=U)	Layer, pit and fills, timber structure (?) (set A). Three separate events, relative chronology and use/function unknown.
Roman II, 1	*c.* AD 70-100	332, 427 & 423, 433, 430, part 412 (All except 412=V)	Revetment I (set I) and its deposits.
Roman II, 2	*c.* AD 100-125	349, 349a & 319; 249, 249a & 322; 409, 412a, remainder of 412. (All except 412 & 412a=W) (Pottery from 412 & 412a=VWX)	Set of piles (B); Revetment II and its deposits; partial destruction of Revetment I (set C)
Roman II, 3	*c.* AD 125-160	394, 208, 408, 402 (All=part of X)	Revetment III (set III) and its deposits; wood debris (sets D1 & D2) and possible wooden structure (set D3).
Roman II, 4	*c.* AD 125-160	382 & 382a (Both=part of X)	End of use of revetments.
Roman III, 1	*c.* AD 125-160	334 (=part of X)	Further dumped material.
Roman III, 2	*c.* AD 125-160	323, 204, 207 (All=part of X)	Attempt to consolidate ground surface.
Roman III, 3	*c.* AD 160-200	288 (=Y) (probable discontinuity)	New dumping, ending use of manmade ground surface.
(Roman or Saxon) IV – at south end of trench			
(Roman or Saxon) IV, 1	indeterminate late Roman or Saxon	287, 287a, 287b (grouped by context)	Foundation piles (set E) set into shallow ditch, and ragstone platform.
(Roman or Saxon) IV, 2-3	indeterminate late Roman or Saxon	292, 286 & 282 (grouped by context)	Accumulated surfaces.
(Roman or Saxon) IV – at north end of trench – discontinuity (?)			
	indeterminate date after 3rd century	311,222 (222=Z)	Dumped material.
(Roman or Saxon) V – throughout trench			
(Roman or Saxon) IV, 1	indeterminate date after 3rd century	279, 231, 203, 280, 285, 289, 202 (grouped by context)	Rubble dumps, destruction.
(Roman or Saxon) IV, 2-3	indeterminate date after 3rd century	276a, b & 278a, b (grouped by context)	Contemporary pits.
(Roman or Saxon) V, 4	indeterminate date after 3rd century	250,251 (discontinuity)	Layers possibly associated with stake structures: F1 (south end of trench), F2 & F3 (north end of trench).
Saxo-Norman VI, 1	11th-12th centuries AD.	232a, b (Set G)	Wicker-lined pit.
Saxo-Norman VI, 2	11th-12th centuries AD.	270a, b (Set H1-H2)	Construction of well.
Saxo-Norman VI, 3	11th-12th centuries AD.	321	Silt deposited during use of well.
Saxo-Norman VI, 4	11th-12th centuries AD.	320, 306, 291, 275	Fill during use and/or end of use of well.
Medieval VII	12th-13th centuries AD	224a, b, (sets J and K)	Wicker-lined pit filled with rubbish.
Modern VIII	19th (possibly 18th) to 20th centuries	243a, b; 223a, b; 333, 293, 201, 309, 221, 200, 257	Isolated features and layers: modern wall, pipe trench, well destruction, concrete building supports, basement excavation.

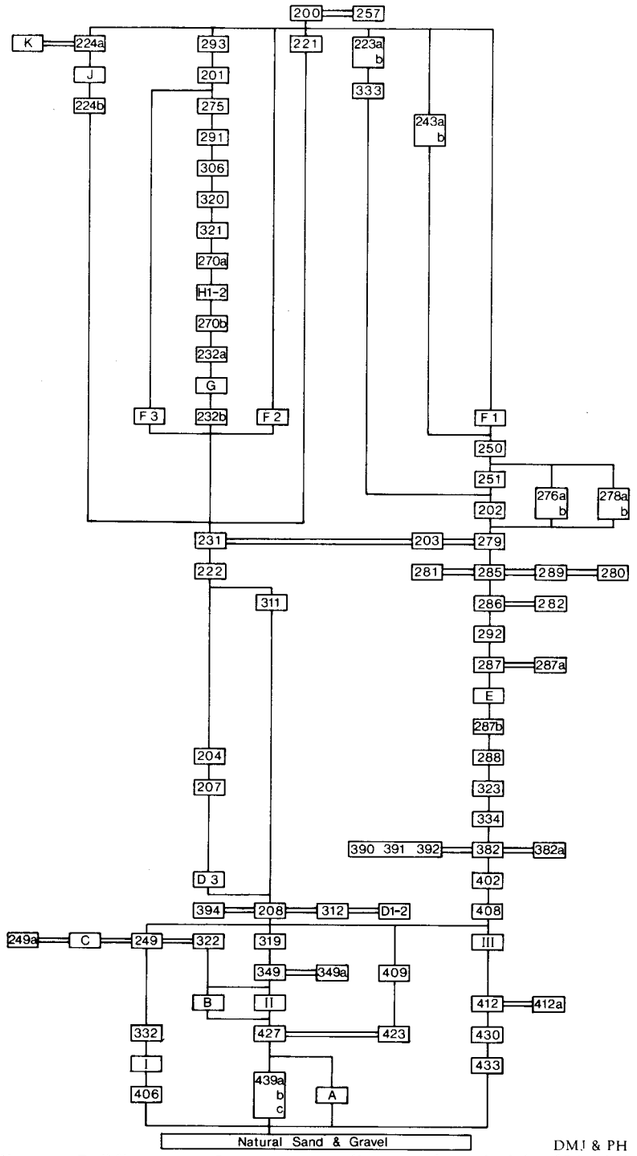


Fig. 11. Billingsgate Buildings, 1974: Layer sequence diagram (after principle of Harris[19]) I-IIIm A-K set numbers (for timbers, stakes and debris, see p. 20)

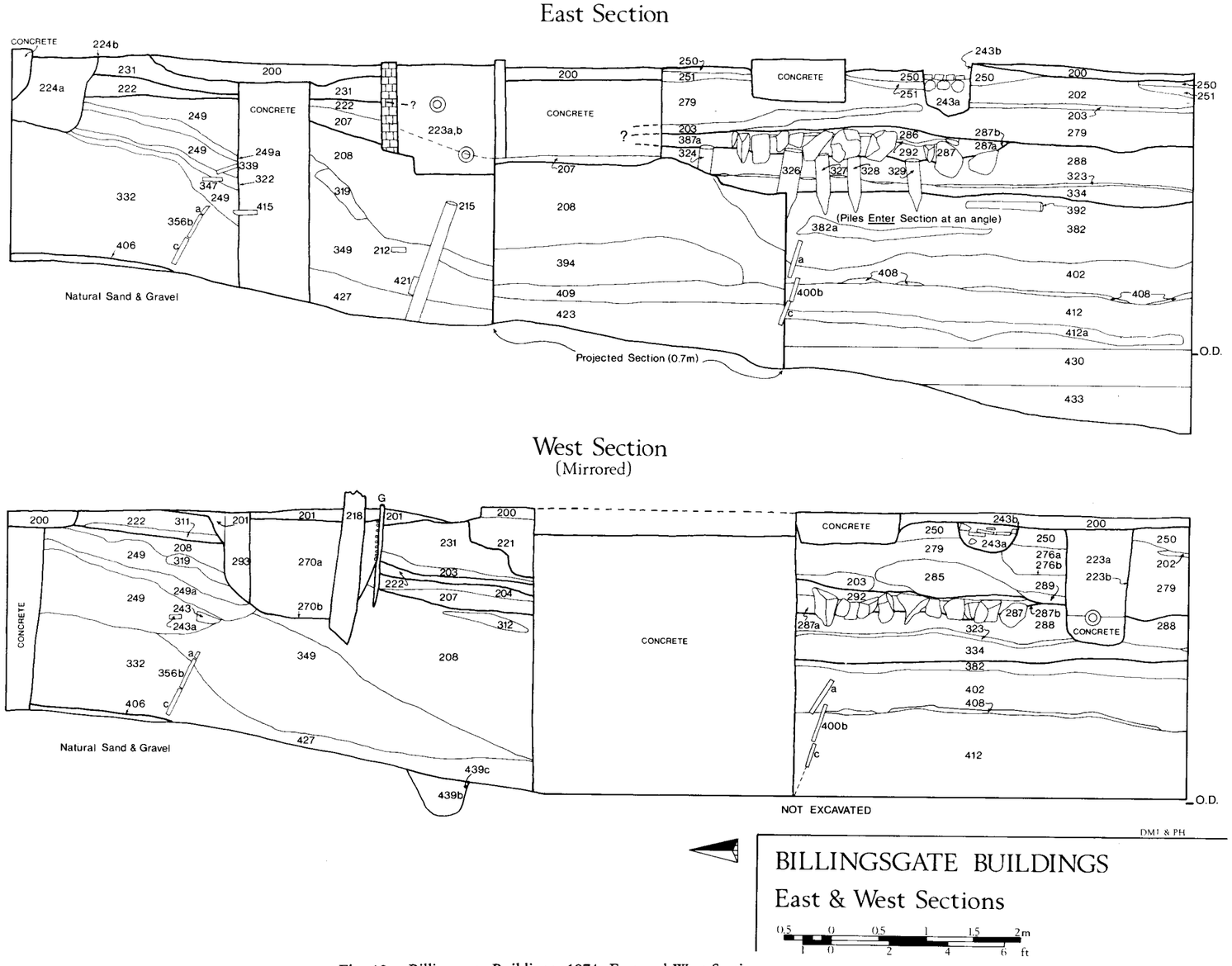


Fig. 12. Billingsgate Buildings, 1974: East and West Sections.

PART II

II ENVIRONMENTAL REPORTS

(a) ENVIRONMENTAL EVIDENCE

by G. H. Willcox

The Natural Deposits and the Influence of the River

Eocene London Clay forms the solid geology, and beneath the site its surface slopes in a southerly direction towards the channel eroded by the Thames. This channel was cut during the latter part of the last glacial phase and has since been partially aggraded by more recent deposits. This aggradation is typical of the lower Thames estuary which has been progressively flooded by the sea over the last 10,000 years.

Information (kindly supplied by Terresearch Limited) from commercial borings made to investigate the underlying geology prior to construction work, has been used to reconstruct the recent geological history of the site, and Fig. 12 shows a schematic reconstructed section running across the site north to south and extending out into the present channel of the River Thames. Borehole 1 to the extreme south was sunk from a jetty which projects into the present channel; the boring cut down through the Pleistocene Flood Plain Gravels into the north side of the channel in the London Clay. To the north, Borehole 2 is of particular interest, because the sequence of deposits located here, which lie just south of the site is representative of the post-glacial deposits of the Thames estuary as seen at other exposures (see Akeroyd 1966). The sequence runs as follows; the eroded surface of the London Clay is overlaid by gravels (possibly re-worked) of the Flood Plain Terrace. Above this lies a deposit of silty clay which is interrupted by peat horizons. This deposit, known from many areas in the Thames estuary, is associated with the post-glacial eustatic marine transgression, while the peat horizons represent land surfaces indicative of an interruption in this general trend. At other sites these horizons have been dated by carbon 14 and pollen analysis (Akeroyd *ibid.*), but no correlation between these horizons is available. The level at which they occur does not seem a good criterion for correlation, but the peat located in Borehole 2, being at such a low level must be seen as prehistoric. The silty clay terminates in what may be an erosion surface in Borehole 2, over which lie re-worked river gravels which in part contain archaeological material of Romano-British date as seen from the timber in Fig. 15. Boreholes 3 and 4 were from the immediate area of the site and show a continued rise in the level of the London Clay, over which lie the Flood Plain Terrace gravels exposed by excavation, and, of course, a thick stratum of archaeological deposits.

The position of the site in relation to the Thames is significant because although it straddles what one must assume was the pre-Roman and early Roman river bank, it lies today some 100 metres to the north of the present bank. Natural gravels on the site were reached at +0.80 m O.D. in the northern area of the trench and at −0.80 m in the south and it is probable, on the grounds of both physiographic and archaeological data from elsewhere in the Thames estuary, that the high water mark of the Thames would have reached this height during the early Roman period. Evidence for a strongly transgressive phase followed by a regressive phase for this period is forthcoming from work carried out by Greensmith and Tucker (1973, 200) in the outer Thames estuary. The present embankment of the river, 100 metres to the south, is built to a height of *c.* 5.5 m O.D. forming a very necessary barrier along the Thames to prevent large areas of Greater London from flooding at high tide. Between this embankment and the site lie à series of waterfronts, each successive structure reclaiming a small area of land from the Thames (Schofield and Harrison 1975, 53-61), but since flood prevention was important from the point of view of settlement, the embankments were built at progressively higher elevations to keep pace with the increasing level of the Thames (Willcox 1975, 290). The rise in high tide levels of the Thames since the Roman period has resulted from a rise in sea-level, subsidence of the land due to compacting of underlying deposits, and an increase in tidal amplitude caused by a narrowing of the channel by encroachments of dykes, wharves and embankments.

The revetments excavated at Billingsgate Buildings are among the earliest Roman structures associated with the river in the City, and the functional interpretation of these revetments is dependent on their relation

to the river, particularly to the Roman Thames high water mark. It is possible, on geological or archaeological grounds, that these structures were built as some form of revetment to form the actual bank of the river Thames. The horizontal timber planking and retaining upright posts were found to reach a height of +1.5m O.D. It is assumed that the height to which any waterfront structure is built will bear some relation to the usual (high tide) level of the water, though neither may be constant. However, it has been found that the surviving heights of contemporaneous waterfront structures, from different localities in London, usually fall within half a metre of each other and therefore can provide evidence for ancient river levels. Early revetments which are of similar construction, and which occur at similar levels to those at Billingsgate Buildings have been located in Southwark (Graham 1978). It would appear from this structural evidence that during the late 1st century and early 2nd century the high tide level of the Thames reached *c.* +1.5m +0.5m O.D. While this kind of evidence should be treated with caution, there is a body of more reliable evidence from work carried out by Greensmith and Tucker (1973, 199-200) on the Essex marshes, which substantiates the archaeological evidence. Here detailed changes in sea-level were traced from changes in deposition near the present coast showing that a strongly transgressive phase occurred during the last three millennia B.C. followed by a regressive phase during the first two centuries A.D. The structures at Billingsgate Buildings and Southwark would appear to have been constructed during the high sea-level phase when the Thames would have been under increased tidal influence. These structures could not have been in use for any great period of time, because as mentioned above, the 1st and 2nd centuries saw a rapid drop in sea-level which must have had a dramatic effect on the Thames estuary. The later Roman riverfront at New Fresh Wharf to the south of Billingsgate Buildings was built at a rather lower level. It is unlikely that the top of this waterfront was much above 0.5m O.D. At other sites of late 2nd and 3rd-century date along the Thames similar indications of a low river level have been recorded, for example at Custom House (Tatton-Brown 1974, 120), New Palace Yard (Evans, unpublished report), Brentford (Wheeler 1920, 20-30) and the Essex Marshes (Greensmith and Tucker 1973, 200). With the sea at such a low level it is unlikely that the Thames would have been tidal.

So far no mention has been made of the biological or lithological evidence because it must be realized that the majority of material was derived and cannot be used to reconstruct past ecological conditions. The degree of disturbance associated with a site such as this will become clear below.

The Archaeological Deposits

Deposition of all layers appears to have been entirely artificial. A rapid build-up of material, particularly at the southern end of the site where three metres of material accumulated during the first hundred years of occupation, presumably represents an attempt to level the area and make the river frontage more accessible. Material had apparently been brought from areas away from the site to be dumped, thus most identifiable remains, be they pottery, plant or animal, are derived and therefore not indicative of the local environment. The high percentage of residual pottery bears this out. The final phase of dumping at the opening of the second half of the 2nd century may be contemporary and associated with the construction of the formidable embankment found at New Fresh Wharf just to the south. The dumps associated with this period of local civil engineering, for example contexts 402, 382, 334, 323 and 288, represent levelling at the southern end of the site which probably took place over a very short period of time. Some of these layers contained occasional finds of aquatic plants, e.g. *Ranunculus Batrachium* sp. and mollusca, e.g. *Theodoxus fluvitalis* which indicates that some of this material may have come from near the river. Again the layers beneath these dump deposits to the south (contexts 430 and 433) contained predominantly terrestial organisms of allochthonous origin, yet the occasional aquatic organism e.g. *Planorbis* sp. could, particularly in the early deposits, have been brought in during high water (seeds of *Juncus* sp. were very common in context 439). But the scarcity of abraded pottery, freshwater mollusca, and clean sorted fluviatile material usually associated with foreshore deposits indicates that dumping of derived material was a fairly rapid process.

The latest Roman levels on the site are of late 2nd-century date and are overlaid by mid Saxon material separated by a gap of five hundred years. There are two possible explanations for this discontinuity. Firstly, that the area was abandoned and uninhabited during this period, which is improbable on archaeological grounds, and would allow time for the formation of a soil profile which was not seen in the section. Secondly, that deposits were removed either by man, or by natural erosion due to river action resulting from an increase in high water mark of the Thames by the Saxon period. Levelling of the area and removal of material, perhaps associated with the construction of the causeway or wall (see Fig. 10) would seem to be the most likely explanation. Preservation of organic remains was poor in these upper levels because of their position above the usual level of the watertable, and those remains which did survive were likely to have been derived from earlier Roman levels.

The Organic Remains

Remains of subfossil organisms were recovered using two separate methods. One involved taking five kilogram samples which were soaked in a fifteen per cent solution of hydrogen peroxide to disaggregate the clay and humic colloids. The material was then washed through a tower of sieves down to 300 microns, and the material retained on the sieve was then sorted for identifiable remains. In addition, large samples of up to 50 kilograms were wet-sieved on a 1 mm sieve submerged in water, so that the flotant element, charcoal and various organic remains were caught in a series of sieves. The material retained on the submerged 1 mm sieve was dried and sorted for identifiable remains of small mammals, cultivated seeds, fish bones and small finds.

Seven layers were sampled from the main sequence in the southern end of the site, but only one representative layer (430) is reported upon in detail because, as already noted, the majority of finds from these deposits were derived and therefore any indicator fossils will be of allochthonous origin and not representative of the local environment. This is true of cultivated plant remains and animal bones, which in this situation cannot be used for interpretation of local activities on, or even near, the site. However, the presence of cultivated plants in dated deposits is significant in relation to the history of plant husbandry for the early Romano-British period (see below). Fig. 13 gives the list of plant remains identified from context 430 (nomenclature follows Tutin *et al* 1964-1976). It was noted above that this layer was subject to river action, which may account for the presence of certain species, e.g. *Potamogenton* sp., yet the majority of plants are entirely terrestrial and were introduced when the deposit was laid down, i.e. dumped. No sampled deposit indicated purely river-laid deposition. The marsh species could have been growing locally, though they may have been brought in either by man or river action.

The list of plants which may represent some seventy species can be divided into several different groups: those specific to marsh and river bank habitats, which here make up about fifteen per cent; the ruderals, which can be divided into arable weeds and plants of waste places (these have little use as environmental indicators but make up some sixty per cent); and the food plants which together with those which have other economic uses, represent about twenty five per cent. However, since one is dealing with derived deposits and thus derived plant remains it is perhaps more relevant to look at the list in terms of the plants' means of dispersal, yet this cannot always be determined and often one is left with a choice of alternatives. Perhaps the most significant aspect of plant remains from a site such as Billingsgate Buildings is, firstly, the presence of economic plants, for example, food plants, dye plants and rare plants, and, secondly, the presence of species relevant to the history of the flora of Britain: here corncockle *(Agrostemma githago)* and dyer's rocket *(Reseda luteola)* are significant examples.

Fig. 13. Billingsgate Buildings, 1974: Plant remains from Context 430, 5 kg sample treated with H_2O_2, sieved to 300 microns.
(F=food; E=economic; M=marsh or hydrophyte; R=ruderal).

Latin Name	English Name	Plant type	No. of specimens
Juglans regia L.	Walnut	F	1 frag.
Corylus avellana L.	Hazelnut	F	frags.
Morus nigra L.	Common mulberry	F	2
Ficus carica L.	Fig	F	100+
Urtica urens L.	Small nettle	R	4
Polygonum sp.		R	10
Bilderdykia convolvulus (L.) Dumort	Black bindweed	R	1
Rumex sp.		R	10
R. acetosella L. agg. type	Sheep's Sorrel	R	100
R. acetosa L. type	Sorrel	R	54
Chenopodium bonus-henricus L.	Good King Henry	R	1
C. murale L.	Nettle-leaved goosefoot	R	1
C. album L.	Fat hen	R	9
stellaria cf. *media* (L.) Vill	Chickweed	R	1
S. graminae L.	Lesser stitchwort	R	31
cf. *Cerastium*	Chickweed	R	2
Agrostemma githago L.	Corn cockle	R	1
Silene sp.		R	3
S. alba (Miller) E.H.L. Krause	White campion	R	3
S. dioica (L.) Clairo	Red campion	R	6
Ranunculus acris/bulbosus/repens type	Buttercup	R	100+
R. cf. *sardous* Crantz	Hairy buttercup	R	1

R. flammula L.	Lesser spearwort	M	6
Papaver sp.	Poppy	R	5
Reseda luteola L.	Dyer's rocket	R.E	12
Rubus fruticosus agg.	Blackberry	F.R	75
cf. *Potentilla* sp.	Cinquefoil	R	+
P. *erecta* (L.) Rausch	Common tormentil	F	12
Maloid sp.	Apple type	F	3
Prunus spinosa L.	Sloe	F	10
Prunus domestica L.	Plum	F	1
Prunus cf. *cerasus* L.	Cherry	F	7
Linum usitatissimum L.	Cultivated flax	E.F	2
Vitis vinifera L.	Grape	F	1
Chaerophyllum sp.	Chervil	R	1
cf. *Aegopodium podagraria* L.	Ground elder	R	1
Cariandrum sativum L.	Coriander	F	11
Anethum graveolens L.	Dill	F	5
Apium type			2
Apium graveolens L.	Celery	R	47
cf. *Petroselinum crispum*	Parsley	R	9
cf. *Turgenia latifolia* L. Hoffm.	Greater bur-parsley	R	
Daucus carota L.	Carrot	R	3
cf. *Cuscuta* sp.	Dodder	R	2
Labiatae spp.			11
Prunella vulgaris L.	Self-heal	R	16
Mentha type	Mint	M	3
Galeopsis sp.	Hemp-nettle	R	
Solanum nigram L.	Black night-shade	R	2
cf. *Odontites verna* (Bellard) Dumort	Red bartsia	R	1
Sambucus nigra L.	Elderberry	R.F	7
Bidens cernua L.	Nodding bur-marigold	M	1
Cardus sp.	Thistle	R	2
Cirsium sp.	Thistle	R	1
Centaurea cf. *scabiosa* L.	Greater knapweed	R	1
Leontodon autumnalis L.	Autumnal hawkbit	R	2
Picris sp.	Ox-tongue	R	4
Crepis sp.	Hawksbeard	R	2
Potamogenton sp.	Pondweed	M	3
cf. *Erniophorum* type	Cotton-grass	M	2
Scripus type	Club-rush	M	13
Eleocharis sp.	Spike-rush	M	71
Carex spp.	Sedge	M	17

The species lists from other layers have not been included because they do not add any further information. It is worth mentioning that a thin stratum of structured peat (layer 408) consisted almost entirely of partially decomposed remains of sedge foliage, that is, a member or members of the Cyperaceae.

The silica bodies and their distribution were of a type commonly found in species of many genera including *Carex, Cladium, Mariscus,* and *Scirpus* (kindly identified by the Royal Botanic Gardens, Kew). This would suggest that large quantities of this material were being brought in for some purpose, for example, for packing or thatching. This plant material may have been collected from areas of marsh which abounded both east and south of the City. Only a solitary unidentified seed was recovered, which suggests that the material was cut early in the year.

The Cultivated Plant Remains

Because of the nature of the archaeological deposits it is necessary to bring all finds of cultivated plants together in one group, in this case, from deposits containing pottery assigned to the first half of the 2nd century, though residual material from the 1st century cannot be excluded. Carbonized remains of cereals are excluded from this list, since these were few and will be published at a later date together with similar finds from a number of other sites in the City.

Regarding the list as a whole (see Fig. 14), most of these plants have been adequately described and documented elsewhere (Willcox 1977). The quantities of seeds, nuts and fruit stones recovered bear little or no relation to the economy of Roman London. However, the number of exotic species present among this group is relevant and perhaps emphasizes the cosmopolitan nature of the City at this relatively early date. Some of these plants could have been imported from abroad, others would have been grown fairly locally, still others were merely gathered from the wild but appear to be the least represented among the food plants recovered at Billingsgate Buildings.

Latin name	English name	No. of identifications
Pinus pinea L.	Stone pine	9 bracts, 1 nut
Juglans regia L.	Walnut	5 frags
Corylus avellana L.	Hazelnut	31 frags
Fagus sylvatica L.	Beech nut	1
Morus nigra L.	Black mulberry	9
Ficus carica L.	Fig	100+
Maloid sp.	Apple, pear	4
Prunus spinosa L.	Sloe	9
P. domestica L.	Plum	4
P. cf. *avium* L.	Gean cherry	2
P. cf. *cerasus* L.	Cultivated cherry	50
Linium usitatissimum L.	Flax	3
**Vicia faba* L.	Celtic bean	1
Vitis vinifera L.	Grape	19
Coriandrum sativum L.	Coriander	10
Anethum graveolens L.	Dill	6

*carbonised specimen.

Fig. 14. Billingsgate Buildings, 1974: List of cultivated and food plants from deposits of the first half of the second century.

Conclusion

The site of Billingsgate Buildings must have been located on what was the early Roman river bank in this part of the City, but the ancient land surface had either been stripped in antiquity or was not recognized during the excavation (possibly context 406 represents a remnant of this). Since occupation of the site, artificial factors dominated the deposition of strata making any environmental interpretation futile. It is probable that the only major structures on the site, that is the revetments, were near, but not immediately adjacent to the river. These remains indicate that the river level reached about +1.5m in the first part of the 2nd century and evidence from elsewhere would seem to agree with this. The rich assemblage of plants recovered from context 430 was of botanical interest and serves to illustrate that, combined with evidence from many more sites, a more detailed understanding of changes in the flora should be forthcoming. Remains of plants which are of economic importance to man are a special case. Their presence alone is significant and has some bearing on the social and cultural affinities of Roman London.

(b) TREE-RING ANALYSIS OF TIMBER FROM BILLINGSGATE BUILDINGS, LONDON

by Ruth Morgan

The artificial terraces of Trajanic date were supported by wooden piles and timber of various types. In an attempt to identify at least the relative time lapse between the construction phases of the three revetments, and if possible the absolute date of construction, sections of many of the timbers were cut for tree-ring examination. By measuring and comparing the varying widths of the annual rings of trees, it is possible to show which timbers are contemporary, and in certain circumstances to date them absolutely using a reference curve of the tree growth pattern of known date against which they may be matched.

Dendrochronological dating is limited mainly to oak wood *(Quercus)* because of its life span and availability, and also because of two structural advantages. Firstly it is a ring-porous wood, with zones of large spring vessels separated by dense summer wood, the two parts forming the annual ring; so the ring boundaries are very clear. This type of structure also allows the determination of the season in which the tree was cut, from the stage of formation of the outermost ring below the bark, where present; for example, the presence of only a spring vessel zone means that the tree was cut in about June. The second major advantage is that oak has a living sapwood zone around the circumference of the trunk which is very distinct, and which maintains a width of about 25 rings in a mature tree, or proportionately less in an immature one. If the entire sapwood remains on a timber from an archaeological context, we can determine the year of felling by the date of the outermost ring; if one sapwood ring remains, we can estimate the year of felling as being about 25 ± 5 years later. If no sapwood remains, we cannot estimate the year of felling at all, and an unknown time lapse exists between the last remaining ring and the time of felling and use, since any amount of heartwood may also have been lost. So the presence of sapwood is crucial to both relative and absolute dating if any degree of accuracy is to be achieved.

Sections were sawn from thirteen of the revetment timbers – 6 from revetment I, 2 from revetment II, 3 from revetment III and 2 from other contexts (see Fig. 16). All were of oak. Because the wood was waterlogged and the sapwood in particular was quite soft, freezing allowed the surface to be consolidated for cutting or planing to expose the wood structure for examination and ring-width measurement. The plotted ring-width curves for each timber were compared visually and by computer to determine their relationship to each other.

The five piles from set B and revetment I (354, 360, 362, 364 and 410) proved to be a homogeneous group of roundwood piles cut to length and sometimes cleft without further treatment of the surface – the bark still remained on them. To them can be added pile 326 which, although associated with a later Roman ragstone platform, is identical in every respect, including its ring-width pattern (see below), suggesting either re-use or fortuitous association. The six piles were all about 200mm in diameter and had been cut from fast-grown trees 40 to 50 years old with 14 to 19 sapwood rings (excepting 360 with only 26 rings of which 8 are sapwood). The preserved bark and the absence of dryness cracks suggests that the wood was used in a green condition; in five piles the outermost ring below the bark was completely formed, indicating winter felling, but the outer ring of pile 354 consisted of spring vessels only. This tree had evidently been cut in summer, perhaps in haste.

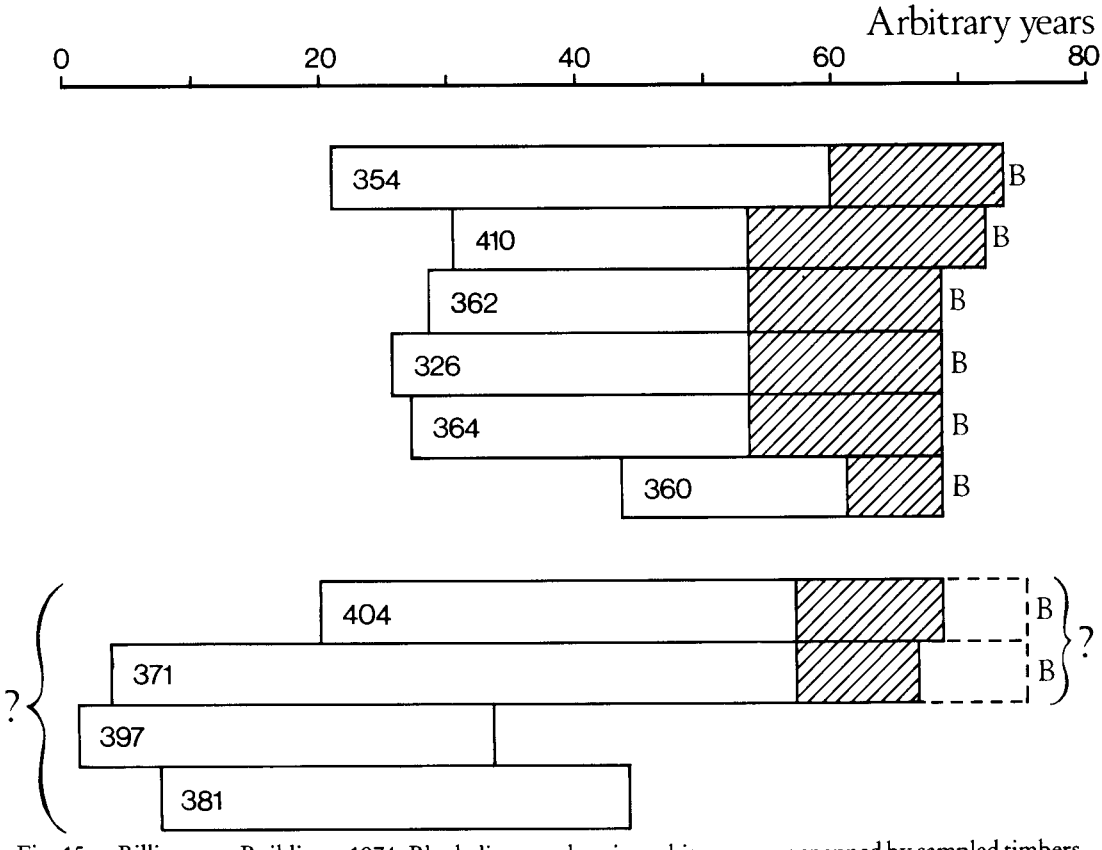


Fig. 15. Billingsgate Buildings, 1974: Block diagram showing arbitrary years spanned by sampled timbers.

NO.	CONTEXT	NO. OF RINGS	NO. OF SAPWOOD RINGS	DIMENSIONS cm.	CROSS-SECTION
326	Pile of foundations beneath ragstone platform	43	16	radius 8.5	
354	R I	53	14	22 x 20 radius 10	
356	R I	68	–	33 x 6 radius 20	
360	Timber Set B	26	8	radius 10	
362	Timber Set B	41	16	radius 10	
364	Timber Set B	42	16	radius 10.5	
371	R II	63	11	17 x 13	
381	Part of second support "raft"	36	–	15 x 10 radius 11	
388	R II	121	–	17.5 x 16	
397	R III	37	–	17 x 16 radius 12.5	
399	R III	139	–	15 x 13	
404	R III	49	13	18.5 x 13	
410	R I	42	19	radius 10	

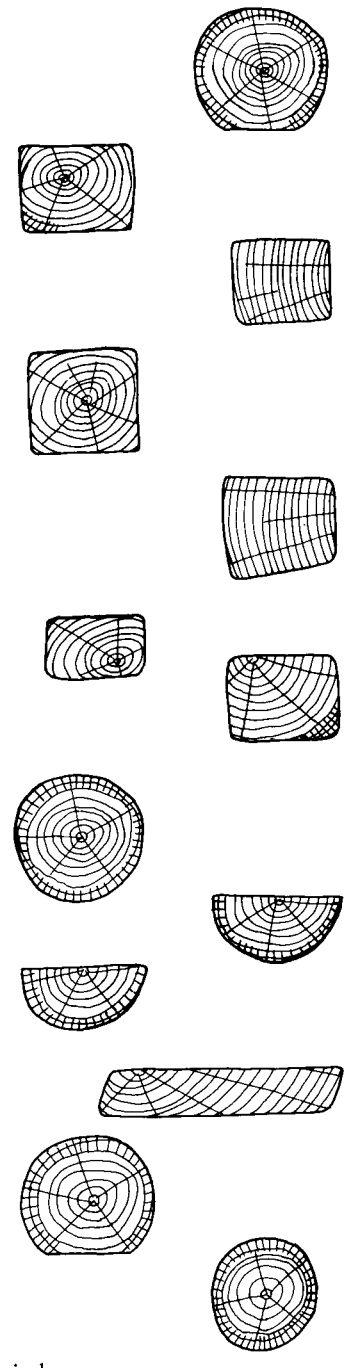


Fig. 16. Billingsgate Buildings, 1974: Details of sampled timbers

The ring-width patterns of all 6 piles are almost identical and some of them may have come from the same tree; but not all, because they were not all cut in the same year. 360, 362, 364 and 326 form a group cut together in the same year, while 410 was cut in the winter three years later and 354 was cut in the summer of the following year (see Fig. 15). The two latter lie to the north of the group of piles (set B) and part of revetment I.

The ring-width patterns of these young piles are not sufficiently long to be suitable for absolute dendrochronological dating with any degree of certainty, so there is no possibility of dating the construction of the terraces by means of them; their value lies only in internal relative dating.

In addition to this group of piles apparently cut specifically for the purpose of forming a terrace, there are a number of other timbers from the three revetments which, by the variety of shape and size, suggest the possibility of reuse of any timber available at the time. They include quartered and halved trunks, planks and finely squared beams from large slow-grown oaks of suitable type for dendrochronological dating i.e. over 50 narrow but sensitive annual rings. The three timbers which fall into this last category (356, 388 and 399) will be discussed separately below, since the absence of sapwood and the narrower rings make it impossible to link these timbers from mature trees to the young wide-ringed examples already mentioned.

Sapwood remained on two timbers 50-60 years old from this varied group (371 and 404), which allowed them to be compared to the revetment I piles; the growth patterns proved to be similar but not sufficiently long to be certain of their contemporaneity. Their suggested positions in relation to the revetment I piles are shown in the Figure with their approximate date of felling –in the absence of the bark or obvious bark edge, this is an estimate based on the number of sapwood rings remaining and on the age of the tree. The estimated felling year suggests they are more or less contemporary with piles 354 and 410 and probably not more than about five years later.

Into this group are also tentatively fitted two timbers with about 35 rings and no remaining sapwood (381 and 397). Their growth patterns are very similar to each other – they may have come from the same tree – and also perhaps to the early rings of the other timbers as shown in the Figure. They may be contemporary but any evidence for this has been removed along with at least 20 or 30 of their outer growth rings.

Finally, there are the three timbers with longer series of growth rings suitable for dendrochronological dating. These posed a problem in that all had had a considerable and incalculable amount of outer wood, both sap and heartwood, removed during conversion, and were therefore of unknown date both in relation to each other and to the site. Timber 356 had wide annual rings, while 388 and 399 came from two slow-grown oaks with narrow rings, of a quality much sought after by medieval times. The careful conversion of these timbers compared to the roundwood piles and squared beams suggests that the support of a terrace was not their original purpose, and it seems likely that they had been re-used from another context and were thus earlier than the construction of the revetments.

The greater number of annual ring-widths allowed computer comparisons to be made, which suggested that they may have been growing over the same period of time, though the similarity is not great, and it is impossible to say whether they were felled at the same time in the absence of sapwood. In the best positions of match, their final measurable rings lie within 15 years of each other suggesting that contemporaneous felling was the case. Attempts to date these curves either relatively or absolutely have so far been unsuccessful due to the absence of comparative material. Assuming the revetment period to date to the late 1st and early 2nd centuries A.D., the loss of all the sapwood and some heartwood, combined with the possibility of re-use, may mean that the final rings lie early in 1st century A.D. and that the ring-width curves actually span the first century B.C.

The German tree-ring reference curve extending back from the present day to before 700 B.C. has not yet been published in full (Hollstein, 1967); the only other comparative data is the 282 year mean curve for the Roman waterfronts of the Thames at New Fresh Wharf and Seal House (Morgan, 1977), as yet undated but probably extending back from around A.D. 150. A tentative match occurred with the early part of this curve, but not of sufficient quality to be certain of their relationship in time; it may be that the two sources of timber were distant or the overlap too short. With additional tree-ring work on Roman and pre-Roman timber, it may be possible in the future to assign calendar dates to each annual ring of the Billingsgate Buildings timbers, but for the moment they must remain floating in time.

Tree-ring examination of the timbers thus suggests that some trees were especially felled for the manufacture of piles, at least to support revetment I, while in other cases timbers cut for a variety of purposes

were used. The evidence also tentatively points to the three revetments having been constructed within a few years of each other, but this is supported by only one timber from each of the two southern revetments. It is hoped that the longer curves from the three timbers of mature oak, one from each revetment, can be dated absolutely in the future, and will at least give a *terminus post quem* to the date of construction of the revetments.

PART III

III THE FINDS REPORTS

Edited by Michael Rhodes

With contributions by Philip Armitage, Donald Bailey, Hugh Chapman, Graham Cowles, Geoff Dannell and Grace Simpson, John Evans, Chris Green, Donald Harden, Mark Hassall, Joan Liversidge, John Llewellyn-Jones and Celia Pain, Amanda McIlwain, Ralph Merrifield, Louise Miller, Merrill Morgan, Clive Orton and Alwyne Wheeler and notes supplied by Francis Dimes, Kay Hartley, Peter Marsden, David Moore, Jennifer Price and Valerie Rigby.

INTRODUCTION

by Michael Rhodes

Despite the small scale of the excavations at Billingsgate Buildings and the insubstantial nature of the structures which they revealed, the length of this report on the finds gives some indication of the exceptional richness of the deposits encountered. Apart from the top-most layers, the site was waterlogged and, as on other medieval and Roman waterfront sites in London, objects of wood, leather (and on this site even a painted inscription, No. 37) have survived, in addition to the more common sorts of archaeological finds. These other finds are also exceptionally well preserved (although the pottery and bone are stained) allowing a more detailed consideration than might otherwise have been possible. Nonetheless the lengthy nature of this report also arises from an absence of analytical studies in many of the areas with which it is concerned and the need to include so many basic descriptions of (hitherto unpublished) London pottery fabrics and other types of find, may be taken as an evidence of the vast potential for research still to be found in the mass of previously-collected London material in the collections of the Museum of London and the British Museum.

The finds have been studied as a primary means of dating the stratigraphy as well as for their intrinsic interest. The dating rests almost entirely upon the pottery, although, for the Roman period at least, this is broadly confirmed by other types of material, notably the glassware, one of the coins and the leather footwear. There have been three main problems in providing accurate dates for the stratigraphy and hence for the other artefacts. The first arises from disturbances to the site prior to the excavation proper and the difficulties involved in defining some of the wetter layers which resulted in the need to dig in arbitrary levels and not according to their true stratigraphy. This means that their dating cannot be defined as closely as might otherwise have been possible. A second problem has arisen from the unequal size and, in some cases, the rapid succession of the layers, which has made it difficult to detect seriation in the pottery assemblages (p. 39). The layers of each period and phase have been grouped together for dating purposes accordingly, and consequently the finds which are not closely datable on independent typological evidence have been dated according to the phase and not to the

layer from which they were derived. A final problem arises from the large amount of residual pottery contained in each group. This implies that many of the other finds may also be residual and for this reason where an object has come from a layer dated for example *c.* A.D. 100-125, the phrase "not later than *c.* A.D. 125" has been used to summarise the dating evidence.

Most of the excavated finds have been studied and are included, in detail or summary form as appropriate, in this report. The principal exceptions are the Roman ceramic building-materials, pieces of *opus signinum* and shellfish (which were counted and almost all discarded on site), some highly corroded and unidentifiable Roman metal finds, a large number of very tiny fragments of Roman glass, a few fragments of charcoal and some very insignificant post-medieval pot-sherds, iron nails and fragments of clay tobacco-pipe.

No demonstrably pre-Roman finds were made, although a scatter of human skeletal material from mainly Roman levels was recovered (see Morgan p. 164) which, if it came from disturbed burials, is likely to be of prehistoric origin as cremation was the usual Roman custom prior to A.D. 150 (R.C.H.M., 1928, 30). With this in mind it is interesting to note that a riverside burial of iron-age date was recently discovered at the Tower of London (Parnell, 1977, 97). Alternatively the remains could be from unofficial Roman graves or have been included in material redeposited from the riverside (the bones of the occasional victim of drowning, murder or skirmishing must have been washed onto the banks from time to time).

The principal Roman features related to the artificial terracing of the river bank in the later 1st to mid 2nd centuries. Virtually all the layers are of redeposited material which, with the finds they contained, originated away from the area of the trench; probably from an area of the Roman city to the north of the site. The material includes a wide range of artefacts broadly typical of the Roman city, suggesting that the region did not have a highly specialised function. Fragments of building tiles (Nos. 697-708), *opus signinum* (No. 696) *tesserae* (Nos. 688-689) and window glass (Nos. 426, 434 and 437) provide ample evidence for substantial buildings in the area from the same date. The fragments of wall-painting (Nos. 694-695), decorative stone wall (?) – inlay (Nos. 690-692) and some slight evidence for a decoratively-striped tile roof (p. 136) show that these were structures of some style, although an abundance of *silica* bodies (p. 27) suggests that there may have been additional buildings with thatched roofs. The nearest known Roman building, represented by a ragstone and tile wall, and a hypocaust, lies some 50m to the west of the site, beneath Pudding Lane (see Merrifield, 1965, Gazetteer No. 314).

As usual the most common type of Roman find was the pottery, of which the site produced 275kg (610lb, see p. 39). This consists mainly of pot-sherds from vessels associated with the transportation, storage, cooking, serving and eating of food-stuffs. A large number of *amphorae* from the Mediterranean region are included. There are fragments of Spanish *amphorae* used to carry sea-food (Nos. 6-11 and 37), particularly *garum* (a fermented fish sauce), others used for olive oil for cooking and lighting (Nos. 1-3) and Italian *amphorae* used for wine (Nos. 15-20). Some of the storage jars (Nos. 295-298) may have been used for carrying salt. The diet of Roman Londoners is also indicated by a variety of nuts, fruit-seeds and vegetable seeds (pp. 26-28), by a cheese-press (No. 247), by four quernstones (Nos. 681-684) used to grind flour, and the

bones of marine fish, estuarine fish (p. 161), goose, domestic fowl (p. 163), ox, sheep, horse, goat and pig (p. 149).

Domestic life is represented by a large number of objects for personal ornamentation or of specifically cosmetic use (Nos. 440, 456-458, 460, 462, 466, 468, 469, 474-479, 678, 687 and 693) and by leather clothing (?) cut for re-use (see Nos. 494, 499, 505, 507 and 509) and a large number of men's, women's and children's shoes of indoor and outdoor types (pp. 99-128). Other household objects include ceramic lamps (Nos. 415-421), a bone hinge (No. 491), a fragment of wooden furniture (?) (No. 670), some scraps of leather which may have been from upholstery (Nos. 494 and 505), needles (Nos. 448-455, 480-485) and spindles (Nos. 486, 671-673).

1st and 2nd-century London seems to have evolved a large number of small-scale work-shops. These are indicated here by a plasterer's (?) tool (No. 472), a copper implement of unknown use (No. 466), many pieces of leather waste (pp. 95-99), evidence for shoe-making and repairing (p. 128), slaughteryard debris and evidence for horn and bone-working (pp.151-2), lead waste and evidence for bronze working (Nos. 679-680) and stone hones (Nos. 685-686).

Civil life is represented by the writing tablets of a legal nature (Nos. 666 and 667) and evidence for local trading is found in the arm of a balance (?) (No. 464) and the ceramic food-containers some of which have the weight or volume of their contents written on the outside (Nos. 37 and 709-711). The imported pottery indicates extensive trade-links with Gaul and the Mediterranean region and the quantity suggests that London was a centre for redistribution (p. 77). The straw indicated by silica remains (p. 27) may have been used as packing for these commodities. The fruit and seed remains (pp. 26-28) provide further evidence for the cosmopolitan nature of the city at this time. Methods of transport are shown by the iron rim of a cart-wheel (No. 473), by the bones of ox, horse and pony, and by the jaw of what seems to be a mule; the first indication of the occurrence of this animal in Roman Britain.

Recreational activities are represented by two gaming counters and a die (Nos. 487-489) and ample sport would have been found in hunting game animals and in fishing, as evidenced by the bone remains. Both dogs and cats were kept as pets or for practical purposes (pp. 154-5).

The Saxon pottery is of limited value apart from its use as another indication of middle and late Saxon occupation in this area of the city; the leather object (No. 721) is of greater interest. The finds from the Saxo-Norman well are important as, apart from pottery, relatively few finds of this date have been recovered. Of particular interest are a quernstone (No. 743), some fuel ash slags (Nos. 730-733), a piece of bast-fibre rope (No. 741), a nearly complete wooden bucket (No. 738) and a small glazed vessel of the Stamford/Winchester tradition (No. 723) which, since it appears to be a waster, may represent a local attempt to produce this sort of pottery. The biological remains include a large number of oyster shells showing the method by which they were forced open, the bones of domestic animals, freshwater fish and marine fish, some of which must be taken as evidenced for deep-sea fishing (p. 162). The other post-Roman finds are unremarkable.

After an explanation of the methods used to study the pottery, the reports are grouped in four main sections dealing with the Roman, Saxon, Saxo-Norman and Early Medieval, and Later Medieval and Post-Medieval periods. The bone reports are added as

appendices. Every individually-described object and illustrated pottery-form is given a Catalogue Number and these are also used for the illustrations. A Museum of London group-accession number, prefixed by the letters E.R. (Excavation Register) is given with the layer (or Context Number) of each group of finds. Accession Numbers of individual finds are given in brackets. These are in two parts, the first half being the E.R. Number of the group to which each belongs. Where finds are catalogued by layer, a probable date for the deposit is given in italics at the top of the group.
(All the finds are now in the Museum of London).

INTRODUCTION TO THE POTTERY REPORTS

by Clive R. Orton

The pottery has been sorted and classified according to the system developed for use in the Department of Urban Archaeology (see Rhodes, 1977a or Orton, 1977b). In this system each fabric is given a code, which is used for sorting and cataloguing sherds. Reference specimens are kept in the Fabric Type Series and reference descriptions in the Fabric Description Index.

The pottery is listed by context, fabric code and vessel form on Pottery Summary Sheets. Quantities are recorded in terms of number of sherds, rim- and base-equivalents (Orton, 1975), number of vessels (implicitly, and as far as it is possible to do so), and weight. Drawings of examples of form types are kept in a Pattern Book. The basic but unpublished record thus consists of (i) Fabric Descriptions; drawings of form and decoration types (common to all sites) and (ii) Pottery Summary Sheets (unique to each site), and can be sorted to provide statistical and other information as required.

Following the recommendations of the Ancient Monuments Board Committee for Rescue Archaeology (1975), this record is seen as the *Level 3 Report*. The *Level 4 Report* (published here) contains (i) a description of the methods employed (see below), (ii) generalised descriptions of fabric groups, which correspond either to known wares or homogeneous groupings of fabrics of unknown source, known collectively as Common Names. These groupings, and not the individual fabrics, form the basis of the *Level 4 Report*, (iii) specific descriptions of particularly interesting fabrics, (iv) tables showing quantities of pottery present, by Common Name and context or phase, (v) illustrations of form and decoration types, and tables relating them to the Common Names, (vi) discussion of dating, source and function of the pottery, and other points of interest. In general, there are no individual descriptions of illustrated sherds, since illustrations can easily be linked to the general descriptions, which contain at least as much information about individual sherds as conventional pottery descriptions. Descriptions of individual sherds are, however, available on request, as is a more detailed discussion of the methods employed.

The pottery-fabric descriptions used in this report and in the *Level 3* record of the finds are based on visual and tactile examinations of surfaces and fresh breaks, both in the hand and using a binocular microscope at 20X magnification. The following characteristics are recorded: colour, hardness, feel, visual texture, inclusions, surface treatment, slip and glaze (if any). The conventions used for describing these characteristics are as follows:

(i) *Colour:* Munsell colour names and numbers are used. The colour of the core is always given, followed by the colour of the margin(s) (if different from the core) and the surface(s) (if different from the margins). Mixed colours are indicated by a solidus (/) – e.g. "red/brown", while partial colours (e.g. a core that fades out in places) are enclosed in brackets, e.g., "(grey) core, red margins" means that the grey core fades out in places, leaving an entirely red section.

(ii) *Hardness:* terms used are:
soft: can be scratched with a fingernail;
hard: cannot be scratched with a fingernail;
very hard: cannot be scratched with a knife;
fairly hard: fabrics on the hard-soft border.

(iii) *Feel:* basic terms used are:
harsh: feels abrasive to the finger;
rough: irregularities can be felt;
smooth: no irregularities can be felt;

two other terms which can be used are soapy and powdery. All refer to a surface in its basic state (e.g. without burnishing, which is described separately).

(iv) *Visual Texture:* terms at present used to describe a freshly broken section are:
subconchoidal: breaks somewhat like glass or flint;
smooth:flat or slightly curved, no visible irregularities;
fine irregular: small, closely-spaced irregularities;
irregular:larger, more widely-spaced irregularities;
hackly: large and generally angular irregularities;
laminated: "stepped" effect.

Descriptions refer to the section as seen by the unaided eye: for smooth fabrics, it is useful to add the texture as seen at 20X magnification (e.g. "smooth; irregular under lens"). The above terms are under review and may be revised in future reports.

(v) *Inclusions:* identification is based on Peacock's algorithm (Peacock, 1977d, 30-2). A magnet is used to identify inclusions of iron ore and dilute hydrochloric acid to identify limestone, shell, etc. Colour is given when necessary – Munsell colour names are used, plus the terms clear (transparent, no intrinsic colour) and colourless (transparent or translucent, taking up colour of clay matrix to some extent).

Frequency of inclusions is indicated on a three-point scale – abundant, moderate or sparse.

Size of inclusions: the terms used are based on the U.S.D.A. standard sizes for sand grains (Limbrey, 1975, 26a) and are as follows:
very fine: up to 0.1mm;
fine: 0.1 to 0.25mm;
medium: 0.25 to 0.5mm;
coarse: 0.5 to 1.0mm;
very coarse: larger than 1.0mm.

Coarser inclusions are given to the nearest mm. The predominant size range is given: ranges in which lesser proportions are present are shown in brackets.

Sorting: indicates the homogeneity (in size) of the inclusions. Well-sorted grains are all about the same size, ill-assorted grains are not.

Rounding: terms used are:
angular:convex shape, sharp corners;
sub-angular: convex shape, rounded-off corners;
rounded: convex shape, no corners;
irregular: convex/concave shape;
flat: two dimensional shape.

(vi) *Surface Treatment:* terms used are:
Wiped, smoothed, burnished, knife-trimmed, fingered, throwing marks.

(vii) *Glaze:* the extent, colour and finish are described. Terms used for extent are: all-over, areas, zones (i.e. areas with horizontal upper and lower edges), patches, streaks, runs, dribbles, spots.

Colour: the *apparent* colour (i.e. as actually seen) is given, except that obviously clear glazes are described as clear. Colourants in the glaze, and effects of inclusions in the clay, are described where possible.

Finish as seen at 20X is preferred to an unaided description, Terms used are: lustrous, glossy, dull, sparse, pitted, crazed, smooth, thick, thin.

(viii) *Slip:* the convention is used that large zones of slip are a fabric characteristic but details are dealt with as decoration. Terms used are therefore:
(for extent): all-over, zone (plus location on vessel), see decoration.
(for finish): continuous, sparse, smooth, lumpy, thick, thin, micaceous, iron-rich.

(1) ROMAN

(a) POTTERY

by Chris Green

Introduction

Despite its relatively small size and the heavy modern disturbance encountered in most layers, the Billingsgate Buildings site produced a large quantity of stratified Roman pottery. In all, over 275 kgs (about 610 lbs) were recovered from deposits of Roman date, the great majority of it belonging to the period *c.* A.D. 70-160.

The layers and features in which the pottery was found have been described in the excavation report, from which it will be clear that many of the deposits were dumped in rapid succession. This, and the fact that individual layers tended to be of very unequal size, has prevented the very detailed chronological seriation that it was originally hoped the site would provide. Since systematic work on the pottery soon showed that useful statistical series were not to be expected from the comparison of the material from the individual layers recognized on site, all the definite Roman contexts which produced pottery and layer 222 (ER 4008) have been amalgamated for the purpose of this report to form six pottery groups, U-Z, as shown in Fig. 17. This procedure produced more coherent results. It will be seen that groups U (especially), Y and Z are scarcely of a reliable statistical size, and can only be used to provide information about pottery types appearing or disappearing in the earliest and latest contexts. Group W, consisting of 11 kgs of pottery, is also probably statistically unreliable. Unfortunately by far the largest pottery producing layer, 412/412a, is known to span a considerable period of revetment dumping, even though little internal stratification was apparent, and is therefore termed Group VWX in parallel with the better stratified groups.

Since the deposits appear to represent rubbish dumping (possibly of material used well away from the site), it would be hazardous to attempt any extrapolation from the pottery to the nature or 'function' of the site.

All the pottery from the layers and features listed in Fig. 17 was studied, and catalogues of all the material from them are available at the Department of Urban Archaeology. Certain types, notably the Dressel 20 amphorae, vessels from the Brockley Hill-Verulamium region, and "greyware" body sherds, received rather summary treatment because of their sheer quantity, the likelihood of a poor return for the effort involved, or an unusual degree of mudstaining *in situ*. Otherwise the sherds were examined in fresh fracture at x20 magnification, as outlined in the introduction to the pottery reports. The descriptions below summarize and group the fabrics isolated in the course of the study, using identity of source wherever possible as the main criterion.

Unless otherwise stated, fabrics are fairly hard and fracture irregularly, are "self-coloured" (*i.e.* the margins and surfaces are the same colour as the core), and have no obvious surface treatment other than a normal "wet hand" finish produced on the wheel. Handbuilt vessels are specifically mentioned as such. Terminology is defined in the introduction to the pottery reports (above), but inclusion angularity is abbreviated to A, SA and R (angular, sub-angular and rounded). "Silt-size" particles are those at the limits of visibility with the methods of examination used here – i.e., *c.* 0.05 mm and less in diameter. Descriptions follow the order: colour, hardness, fracture (if not irregular), feel (if diagnostic), inclusions, matrix (if diagnostic), surface finish and decoration. *Aspects found to be of particular help in recognizing and characterizing a type are italicized.*

The quantities present are indicated as a percentage of all pottery (including samian) from groups V to Z, and as a percentage of each group. Only the presence or absence of a type is recorded for group U, not necessarily significantly since the group is so small. The measure used to calculate the quantities is the "vessel equivalent" (Orton, 1975), *i.e.* the proportion of the rim recovered, where a whole vessel equals 1.0, and 90° of a rim equals 0.25. Where a fabric is present, but there are no rim sherds, this is indicated as 'sherds present'. Percentages are given however small the value, but it must be emphasised that values of *c.* 1% or less are little more than an indication of rarity. The total weight (all groups) is given in kgs or gms, but further use of weight as a statistical measure is only made where it appears significant.

Illustrations are at the standard $\frac{1}{4}$ scale (with any details at $\frac{1}{2}$), with the exception of the smaller finewares ($\frac{1}{2}$ scale, details actual size), amphora and mortarium stamps ($\frac{1}{2}$), and reconstruction drawings (shown in frames at half the scale of the adjacent drawings).

There is no doubt that a good deal of the pottery from each group is residual (see the introduction to the samian report, below), while other pottery types are too uncommon to occur in each group, regardless of their contemporary use. Instead of a strictly chronological presentation, therefore, the following order is

Pottery group	Period or phase in excavation report	Contexts included	approx. date A.D.	Weight (kg)	Vessel equivalents (see below)
U	I	406, 439	*c.* 70	1.8	1.0
V	II 1	332, 423, 427, 430, 433	*c.* 70-100	74.2	63.5
W	II 2	249, 319, 322, 349	*c.* 100-125	10.9	13.4
X	II 3 & 4, III 1 & 2	204, 207, 208, 323, 334, 382, 394, 402, 408	*c.* 125-?160	81.3	80.9
VWX	II 1 & 2	412, 412a	pre-100 to post 125	99.1	98.6
Y	III 3	288	*c.* 160-190	3.5	9.1
Z	part of IV	222	early-mid 3rd century *or* disturbed in Saxon period	6.3	6.6
				277.1	273.1

Fig. 17. Billingsgate Buildings, 1974: Contexts comprised in the pottery groups U-Z.

adopted: I, types first appearing in groups U-Y; II, types confined to group Z; III, selected material found only in post-Roman deposits. The following rather arbitrary order is applied within these broad chronological divisions: imported amphorae, wheelmade coarsewares, handmade coarsewares, and finewares.

I POTTERY TYPES FOUND IN GROUPS U-Y

THE IMPORTED AMPHORAE

Dr. David Peacock has patiently provided most of the amphorae identifications, but the author is responsible for the final sorting and quantification of the different types. Use has been made of the following general sources: Peacock (1971, 1977a), Beltrán Lloris (1970) and Vegas (1973). Since the weight of whole amphorae is often known, and will lie within relatively small limits for a given type, a breakdown of the weight between groups V to Z is given where significant (the total weight of each pottery group must be kept in mind). In many cases the amphorae showed some signs of internal pitch or resin coatings to make them non-porous, but no trace of any contents survived.

1-3 *Dressel 20 globular amphorae* (Figs. 18 and 23). Here, as elsewhere in Britain, the commonest amphora of the later 1st and 2nd centuries A.D. *Thick-walled, usually coarsely-tempered sherds, often with a tendency to laminate; the round handles and spherical body shape are characteristic,* but confusion with *Camulodunum 185a* (below) is possible. (The reconstruction is based on a Flavian example from the Tower of London; Excavations by the Department of the Environment, 1976). Body colour is usually yellow-buff or grey (occasionally with red-brown margins), with yellowish or off-white surfaces (sometimes slipped), but the present examples are badly mudstained. Hard; fairly clean, irregular or laminar fracture, very rough feel, abundant inclusions of quartz, feldspar and *miscellaneous grey, brown and black rock fragments* (A or SA, <0.1–*c.* 1.0mm) with sparser limestone, red ironstone and fine mica in a lime-rich matrix. Made in the Guadalquivir valley of southern Spain (between Cordoba and Seville) and used for the transport of olive oil.

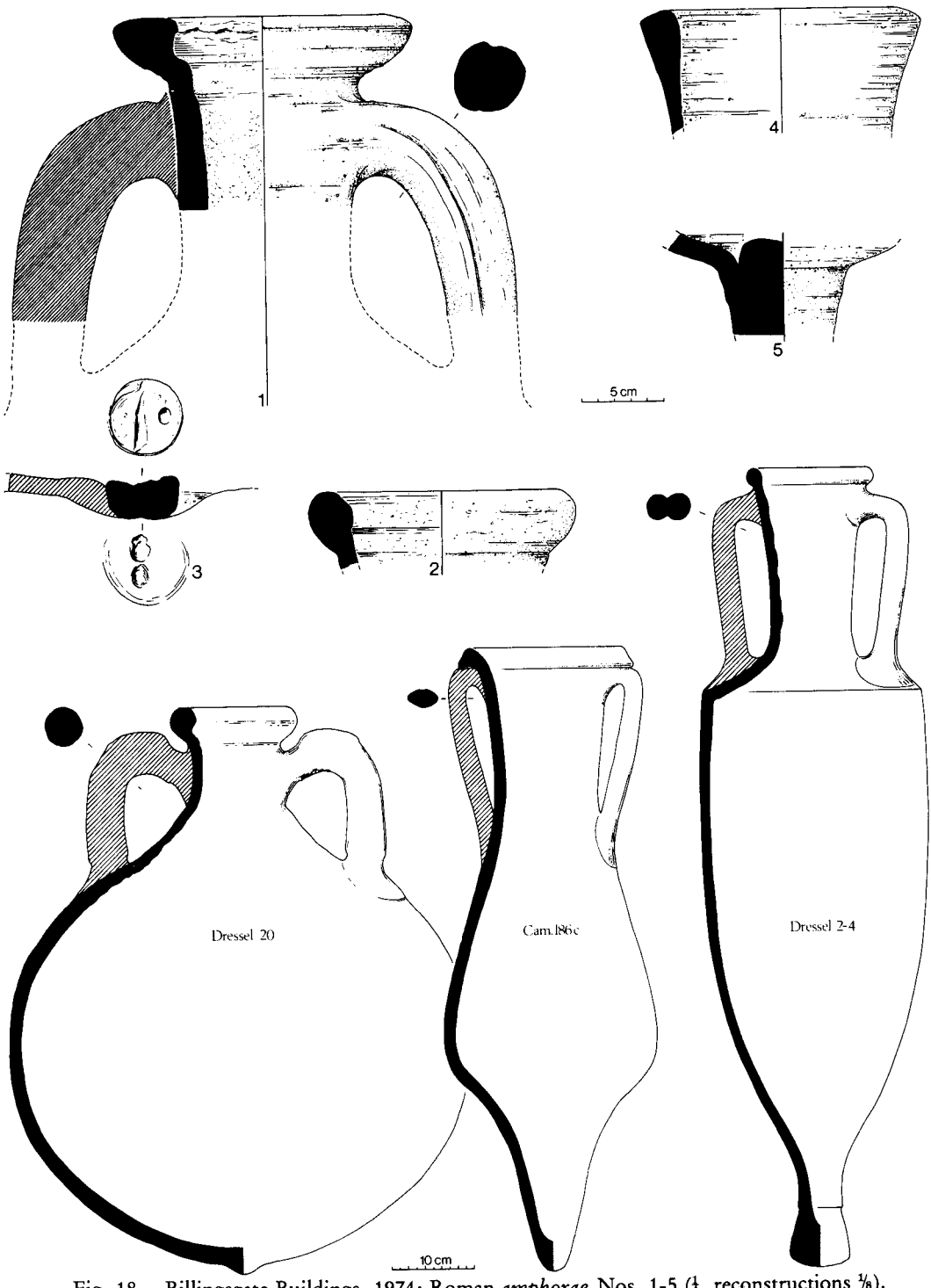


Fig. 18. Billingsgate Buildings, 1974: Roman *amphorae* Nos. 1-5 (¼, reconstructions ⅛).

The rim form is usually as 1; there is also an example of 2, a generally earlier rounded rim (from group V). 3 shows a typical plugged base, where the lower of the two hemispheres required to make these very large vessels was sealed after being drawn up on the wheel. See Peacock (1971, 170 and references given therein).

2.3% of all pottery, but disproportionately bulky–80.2 kg (about 175 lbs) was recovered: sherds present in groups U, W and Y, 3.4% of V, 1.1% of X, 2.7% of VWX, (6.3% of Z). By weight, 31.3% was from V, 3.2% from W, 26.8% from X, 36.6% from VWX, (0.9% from Y, 1.6% from Z). Here there is a slight concentration in Flavian deposits, but elsewhere in Britain Dressel 20 is very common in the 2nd century, and import continued into the 3rd century.

A1, A2 *Stamps on Dressel 20 amphorae* (Fig. 23). Both are on the side of the handle at its highest point. References are to Callender (1965).

A1 (E.R. 4082/433). MIM, close, if not identical to, *Callender 1114* (Callender Fig. 11, 16), apparently 1st century A.D. elsewhere (dated *c.* A.D. 30-80 or 90 by Callender). Context 430 (group V), Flavian or earlier.

A2 (E.R. 4078/180). PAR. *cf.* PAR.F *Callender 1280* (Callender Fig. 12, 27), and perhaps belonging to the group of stamps contracted from P.ANI.RUFI, although Callender does not state whether these stamps occur on Dressel 20. Context 412 (group VWX), Hadrianic or earlier.

4,5 *Camulodunum 185a* (Fig. 18). The form is illustrated in *Camulodunum* (Hawkes and Hull, 1947) and Peacock (1971, 168 and Fig. 35,5). *The fabric is not readily distinguishable from Dressel 20,* and some sherds of the two types may have been confused. Peacock *(ibid.)* suggests that they may have come from the same source.

Only 0.06% of all the pottery, comprising sherds from all groups (including U) except W and Y. Weight 0.3 kgs.

6-11 *Camulodunum 186* (Fig. 18 and 19). Where determinable, sherds of this form were of the later type *Camulodunum 186c* with a wide mouth and hook rim (reconstruction drawing, Fig. 18, from a Colchester specimen after Beltran, 1970), though 6 shows some elements of *C. 186b.* Bright colours (pink, yellow-buff, light yellow, orange, often with an off-white exterior); widely varying amounts of inclusions, chiefly quartz (SA or R, 0.3-0.5 mm, sometimes larger <2 mm), with some limestone (<0.5 mm, often subvisible) and *often sparser, but conspicuous, red ironstone* (<6 mm), particularly in vessels from the Cadiz area. *(Mica is rare or absent).* Made at a number of sites along the south coast of Spain and used to carry seafoods, particularly *garum,* the fermented fish sauce which, with wine and oil, formed a liquid medium for many Roman recipes. *Camulodunum 186* is common in London. (See Peacock, 1971).

0.21% of all pottery, distributed evenly throughout the main groups and present in U, though absent from Y and Z. Weight 8.0 kgs: 38% from V, 3.3% from W, 22.3% from X, 36.3% from VWX, and so probably in use in the earlier 2nd century as well as the Flavian period.

12,13 *Camulodunum 185b* (Fig. 19). Like *C. 185a,* scarce in London. Very few sherds were identified here (not all of them with certainty), but confusion is possible with *C. 186, whose fabric it closely resembles;* Peacock (1971) suggests that it has the same origin. One possible sherd (13) was distinctive in having roughcast grits of well-sorted quartz (SA, A, *c.* 1 mm) on the lower body, and more dark mica than is usual.

0.04% of all pottery, found only in groups X and VWX. Weight 0.1 kg.

14 *?Barcelona region, cf. Vegas' type 56* (Fig. 19). A single sherd, perhaps from Vegas' type 56 (Vegas, 1973, 139-141, Fig. 53), a form with a footring base and body not unlike that of Dressel 30 (*q.v.,* below). ?Barcelona region. Pale red-brown (2.5YR 6/8), hard, moderate to abundant inclusions of clear and milky quartz (SA or R, subsphaeroidal, <0.6 mm) with much sparser, very fine, shiny black particles, in a lime-rich matrix.

0.06% of all pottery. A single sherd from group V, weight 52 gms.

15-20 *Dressel 2-4: Koan amphorae* (Figs. 18 and 19). The form is somewhat variable; a general indication is given by the reconstruction drawing (Fig. 18, after a 1st century A.D. vessel from Heybridge, Essex, illustrated in Hawkes and Hull (1947, type 183b, Pl. 71). The most obvious characteristics are the 'D'-shaped rim, bifid handles, and "peg" base.

A variety of fabrics are present, all of Italian origin. The colour is brick-red, pink, pale orange, greyish-red or sometimes a drab pink-brown. The fabric is always hard, irregularly fractured (or subconcoidal in finer fabrics), and contains at least some limestone and mica, though quartz is not always visible. Of the 13 or so fabric varieties here, six additionally contained sparse to abundant *inclusions of black augite crystals,* and two resembled the Pompeian Red Ware fabric 1 from the Bay of Naples (see Peacock, 1977b, and below, type 303, for description). Inclusions are generally SA or A, <0.5 mm. These amphorae were used to carry wine (see Peacock, 1971).

0.07% of all pottery, found in all groups except Y and Z. The weight shows a significant distribution: total 4.2 kgs, 56.4% from V, 1.4% from W, 21.8% from X, 20.4% from VWX, suggesting a 1st-century date for most, if not all, of these imports.

Italian imitation of Rhodian amphorae (not illustrated). Represented by body sherds from a single, rather wide-bodied vessel. Bright orange-red (2.5YR 7/10), hard, rather splintery, with moderate amounts of quartz (? and feldspar), red-black ironstone and sparser limestone (all SA, >0.3 mm). There is a cream external slip. The fabric resembles that of some Koan sherds (see above). It is unusual to encounter such a small quantity of this type in comparison with its Rhodian counterpart (pers. comm. D. P. S. Peacock).

Group V only. Weight 0.2 kg.

21-28 *Dressel 30 amphorae* (Fig. 20). After Dressel 20, the commonest amphora type in London in post-Boudiccan times. The general form is shown in a specimen in the Museum of London (Acc. No. 25094); the rim is very variable, however, and another common form lacks the footring (see 26, and *cf.* Colchester type 188, Hull (1963, Fig. 102 and p. 182); also Gose (1950, type 432). There is a wide range of colours: light yellow, buff, orange, pink or light red, though the Billingsgate Buildings sherds are usually blackened by mud. The fracture is clean or subconchoidal. Inclusions are generally sparse or moderately abundant, and any of the following may predominate: white or cream limestone, soft red-black ironstone, quartz and occasional rock fragments (all SA or A, mainly <0.2 mm, rarely >0.4 mm), *while brown mica is always present. Body sherds are often thin, and may have a coarsely wiped surface reminiscent of stretched dough.* Produced in the south of France and used to carry wine.

Small seals (*e.g.* 28) found at Billingsgate Buildings are assumed, from their fabric and size, to have been used to close these vessels.

1.5% of all pottery: 2.7% of V, 2.4% of VWX. Seals and/or body sherds present in groups U, W, X and Z (absent from Y). Weight 19.9 kgs: 25.1% from V, 3.4% from W, 30.7% from X, 39.4% from VWX, 1.5% from Z, confirming Dressel 30's use into the Antonine period – in fact it is known to occur in London at least until the early 3rd century.

29 (Fig. 20). Possibly an unusual *Dressel* 30 rim, since the fabric is not readily distinguishable from the finer Dressel 30 fabrics, but the single sherd was recognised by Dr. Peacock as

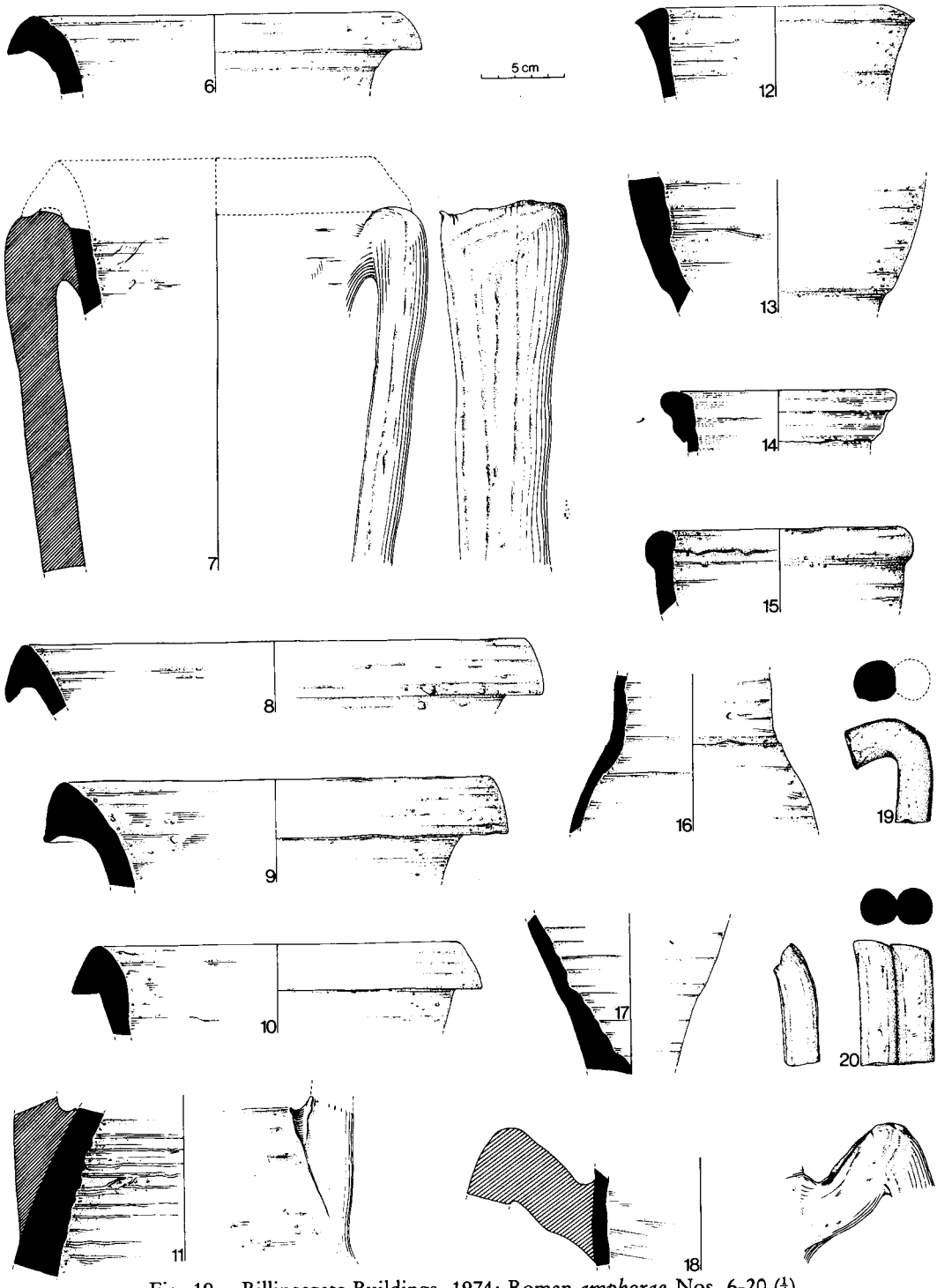


Fig. 19. Billingsgate Buildings, 1974: Roman *amphorae* Nos. 6-20 ($\frac{1}{4}$).

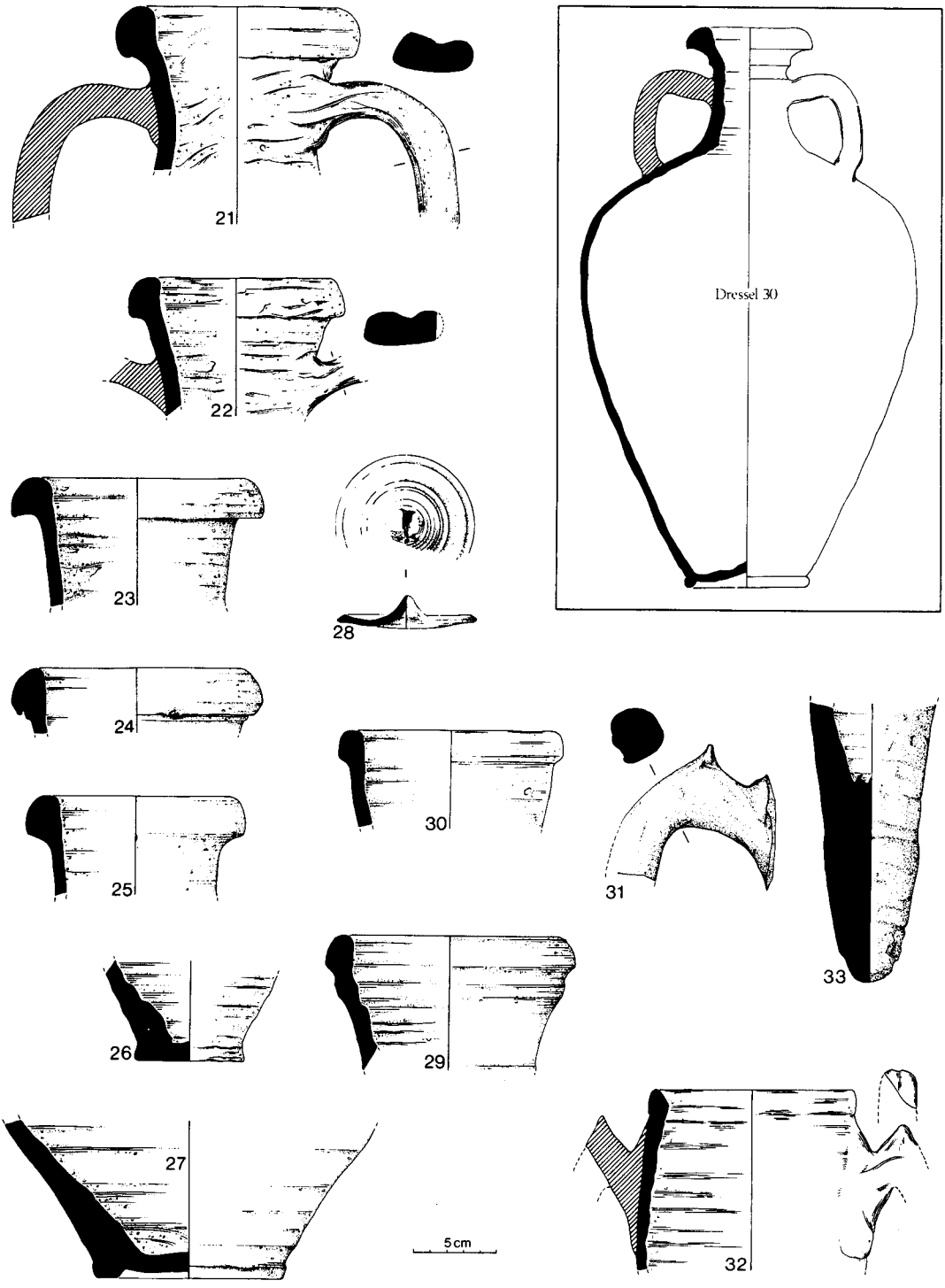


Fig. 20. Billingsgate Buildings, 1974: Roman *amphorae* Nos. 21-33 (¼, reconstruction ⅛).

a possible example of a type found at Novaesium (Neuss) (Filtzinger, 1972, Taf. 24, 8). The source of this type is unknown.

0.08% of all pottery – a single sherd from group VWX. Weight 0.1 kg.

30-33 *Rhodian amphorae (Isle of Rhodes)* (Fig. 20). Unusually well represented here, although accounting for only a very small percentage of the imported amphorae. The form is more or less slender, has a D-shaped rim and *peaked rod handles*. The commonest fabric is pale yellow, hard, and contains abundant inclusions of white limestone (R, 0.3-1.5 mm) and fewer, generally fine, inclusions identified by Dr. Peacock as *red splinters of baked serpentine* (A). Other fabrics were pink, finer, and contained less serpentine. Produced on the Isle of Rhodes; see Peacock (1971; a nearly complete vessel is illustrated on Fig. 35, 4).

0.13% of all pottery; sherds present in U, X and VWX (but absent from Y and Z), 0.3% of V, 1.1% of W. Weight 2.0 kgs, 76% from V, 2.6% from W, 5.2% from X, 16% from VWX, indicating a 1st-century date for most, or all, of the sherds.

34, 35 *Camulodunum 189 — "carrot amphorae"* (Fig. 21). Sherds of this type are immediately distinctive from its *very small size, tapering form, sandy fabric and the heavily rilled surfaces of most of the body*. Generally grey (sometimes with orange-brown margin(s)), usually hard but sometimes very friable, with fairly abundant inclusions of *well rounded quartz* and lesser quantities of more angular white limestone and red and brown ironstone (all 0.2-0.5 mm). *Mica is very sparse or more usually absent*. The furthest travelled of the Billingsgate Buildings imports, originating in Palestine (approximately 2,500 miles away by the shortest land and sea route). The cargo may have been a luxury food such as dates. See Reusch (1970); also Shackley (1975, 57-59), for the origin of the fabric components.

0.12% of all pottery: present in V and X (absent from U, Y and Z), 0.33% of VWX. Weight 0.3 kg: 23.7% from V, 32.3% from X, 44% from VWX. Well known as a 1st-century type, but the quantities here are too small to say whether import continued into the 2nd century.

Richborough type 527 (Fig. 21). The general form is illustrated (Fig. 21) from another London example (Museum of London Acc. No. 17416), but the rim varies; further examples will be published in the report on New Fresh Wharf, London (Green, forthcoming, a). The fabric is most distinctive: orange-pink (2.5YR 7/7) with an off-white exterior margin and surface, hard, very rough to touch. The most noticeable inclusions are *moderate quantities of clear vesicular volcanic glass (0.5-6mm) which have remelted during firing, liberating trapped gases and erupting at the surfaces*. Spherical limestone inclusions (<0.7 mm) are abundant, and black crystals of a ferro-magnesian mineral (SA, *c.* 0.5 mm), black ironstone (A or irregular, *c.* 0.5 mm), dark mica, a little quartz and very coarse-rolled brown-grey grits (4-7 mm) are also present. *The general quality of finish is very rough*. Richborough type 527 (Pearce, 1968, 119, Pl. 71) is apparently unknown outside this country, but its source is thought to lie in the Aegean area (pers. comm. D. P. S. Peacock).

Body sherds from group VWX only, probably representing a single vessel. Weight 0.2 kg. From evidence elsewhere in London a later 1st and 2nd-century range seems probable.

36-39 *Other amphorae from unknown sources* (Fig. 21).

36 Of uncertain form but with a widely everted neck (illustrated). Pale yellow (2.5YR 9/4) with abundant limestone grains (R and irregular, <2 mm, av. 0.6 mm), a few worn black ferro-magnesian crystals and sparse red ironstone (both 0.4-0.7 mm). Superficially the fabric resembles that of Rhodian amphorae. In addition to the neck sherd, fragments of three seals were found, apparently in this fabric. In shape and size they are very similar to the *Dressel 30* seals (28), but are clearly too small to have fitted 36.

Present in VWX (body sherds) and V (seals). Weight 0.8 kg.

37 *Cf.* Dressel form 28. A single sherd bearing painted inscriptions on the neck (ER 4007/277; illustrated). Mark Hassall reports that the two legible inscriptions, the first of which is above and to the right of the second, read:

a) I·L·AMANDI·V

b) G IIII C

The longer inscription cannot be matched in the unpublished Index of painted inscriptions on amphorae from Rome and Pompeii prepared by I. Marriott. The same index shows that the phase *Gari Flos* 'first quality fish sauce' is abbreviated to *G. Flos* and *G.F.*, so that inscription b) could conceivably stand for *G(ari) IIII C(ongii)*, '4 congii of garum', that is 13.13 litres, but this is less than would be expected of a full vessel. (See Plate 1).

Light grey with off-white exterior, interior yellowish (*cf.* 2.5Y 8/3), hard, with moderate amounts of angular quartz, limestone, and elongated/flat black/brown fine-grained rock fragments (all *c.* 0.3-1 mm). Source unknown; the form may be Dressel 28, a type with a flat base and "pulley" rim.

Group X only (single sherd). Weight 1 kg.

38 Badly mudstained but originally greyish-buff (2.5YR 7.5/4) or lighter, hard, clean fractured with a rough feel. The main inclusions are moderate amounts of SA limestone and white mica (< 0.2mm)with lesser quantities of miscellaneous SA orange-brown and R grey rock fragments (0.4-0.7mm) and SA/R quartz (silt size to 0.25 mm). Source and date unknown.

0.07% of all pottery (single sherd from group X). Weight 0.1 kg.

39 Shoulder and handle sherd from an unknown type – probably a vessel with a footring along the lines of *Dressel 30*. Interior orange-red (2.5YR 6/8), grading to a beige exterior (5YR 5/2). Hard, finely irregular in fracture, with moderate amounts of SA/A limestone and much sparser red grog, spheroidal black ironstone, quartz and white mica (all <0.5 mm).

Single body sherd from group VWX. Weight 0.1 kg.

A few other sherds from amphorae of unknown type, and some which are not definitely from amphorae, are not published here since there is no indication of their form.

THE OTHER COARSEWARES

40-45 *?Imported pulley-neck flagons* (Fig. 21). The largest reasonably coherent group of non-local flagons. The details of the fabric are variable and no identity of source is necessarily claimed. Though very susceptible to mudstaining, the colour was probably a greyish-yellow (*cf.* 10YR 7/1 or 2), or occasionally dull greyish-red; *hard, clean or subconchoidal fracture* (irregularities seen under lens) with a slightly rough feel. Though never very abundant, and *often sparse*, the following inclusions are usually present in varying proportions: *cream-coloured limestone* (SA, <1 mm, some is subvisible), red/black ironstone and quartz (both SA, generally <0.4 mm, occasionally 1 mm), usually with silt-size quartz and some sparse fine mica in the matrix. Virtually all the pulley-neck flagons from Billingsgate Buildings occurred in this group of fabrics (40-43), but there is one example with a plain rim (44). Other sherds show that the flagons possessed a footring (45).

Source unknown but perhaps continental; see also mortaria 46-52, below.

1.76% of all pottery; 1.8% of V, 1.2% of X, 2.7% of VWX (absent from groups U, W, Y and Z). Total weight 2.4 kgs. These statistics are difficult to interpret, but probably do little more than to confirm 1st century production.

Other flagons in various light-coloured fabrics (not illustrated). With the exception of Brockley Hill – Verulamium flagons

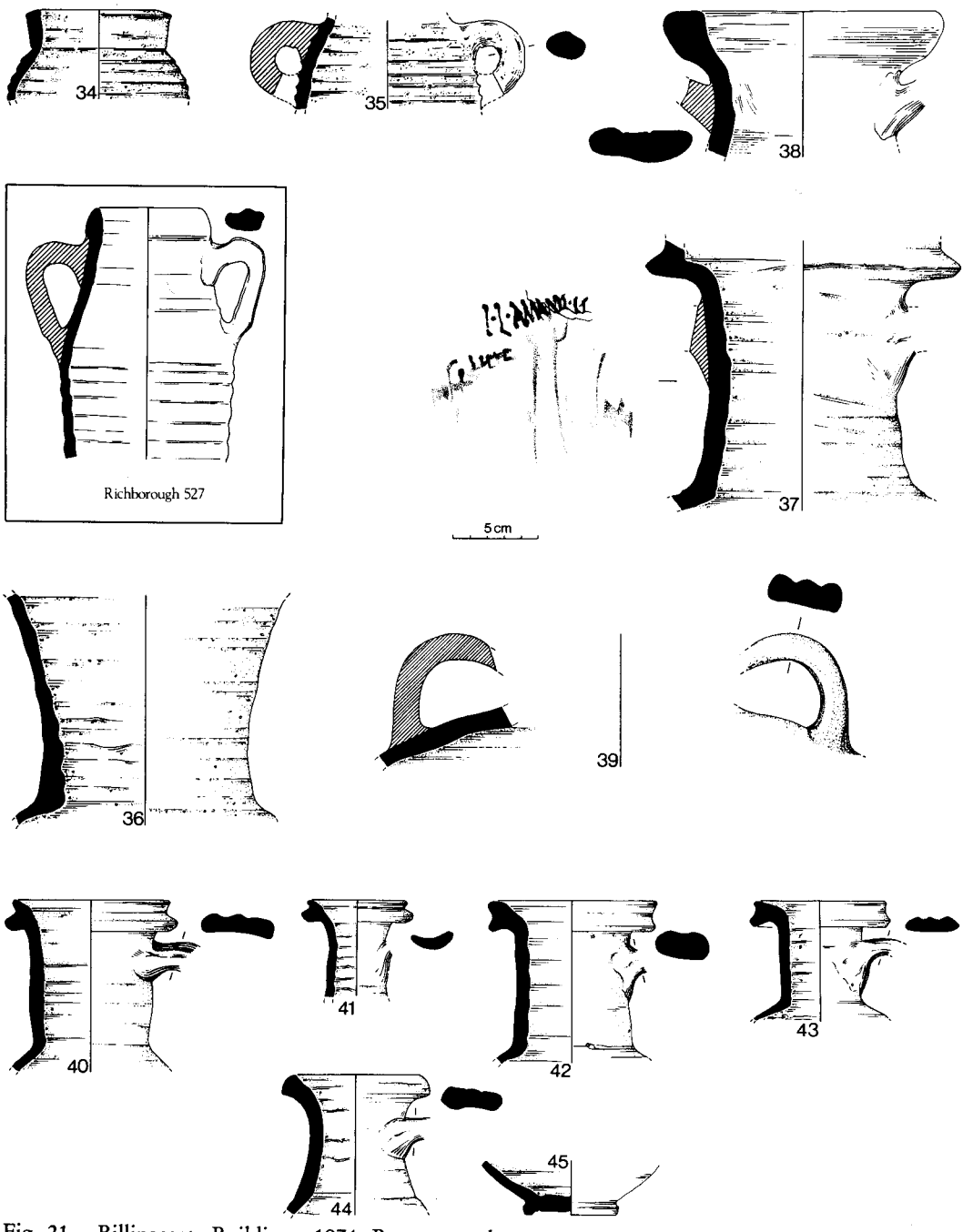


Fig. 21. Billingsgate Buildings, 1974: Roman *amphorae* Nos. 34-39 (¼, reconstruction ⅛); Roman coarsewares Nos. 40-45 (¼).

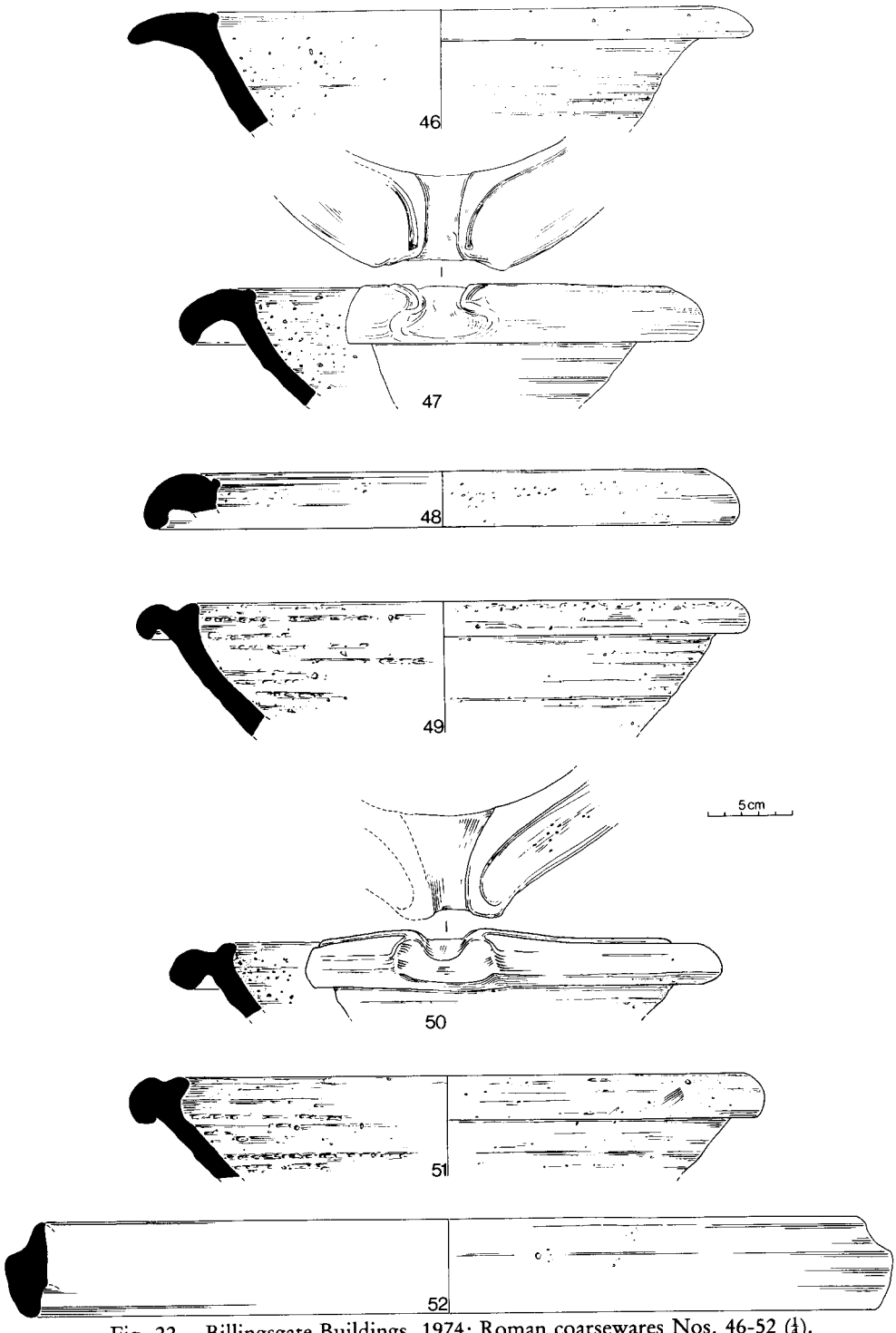


Fig. 22. Billingsgate Buildings, 1974: Roman coarsewares Nos. 46-52 (¼).

there were no other individual types in significant quantity, and no profiles can be reconstructed.

0.11% of all pottery. Weight 1.3 kgs.

46-52 *Mortaria from a source in south-east England or north-east Gaul:* Gillam form 238 *and allied types* (Fig. 22). These types have been described by Mrs. K. Hartley (Hartley, 1977) who has also commented on the form and date of the present examples; these comments are incorporated here. Oddly, none of the sherds are stamped, as some of the forms usually are elsewhere.

The fabric is variable in its details. Colour ranges from light yellow (7.5Y 9/2 – 10Y 9/2) to pink and orange-red (10YR 5/2 – 10YR 6/8); the surfaces of the sherds in question are invariably mudstained. In all cases the fabric is hard or very hard but *brittle, often subconchoidally fractured and splintery.* Quartz (SA, <0.25mm, occasionally *c.* 0.5mm) is moderately abundant, with lesser amounts of red or black ironstone (mainly SA, <0.5mm) and very sparse mica in a *matrix which normally contains subvisible limestone.* One sherd of a *Gillam form 238* contained a fragment of flint. Where retained, the moderately abundant trituration grits consist of crushed A and some SA grey or milky quartz and occasional limestone fragments <3mm in length. *Frequently the grits occur on the flange as well as the interior and have been applied to the turning vessel, plucking the surface.* The distribution suggests a source in south-east England, probably Kent, or on the other side of the Channel.

Typologically there is a development from *Gillam 238* (Gillam, 1970) with its distinctive flange and elegantly formed lip (46, 47) to vessels with a shorter flange (49-51). *Gillam 238* occurs throughout the second half of the 1st century while the shorter flanged vessels range from later Flavian to Trajanic in date. The Billingsgate Buildings deposits cannot confirm this from so small a sample, but there is a slight tendency for the earlier forms to be concentrated in group V (Flavian). A sherd from a very large mortarium of unusual form (52) may belong to this fabric group and Mrs. K. Hartley suggests a 2nd-century date for it, though unfortunately it was found in a post-Roman deposit.

A point of interest is the similarity in the hand specimen, and often under the lens, between these mortaria and the pulley-neck flagons described above (40-45). Also, although commonplace, the same inclusion types are present in each, and both contain much subvisible calcium carbonate in their matrices. There is thus a possibility that both types are the product of a single industry, especially since a number of 1st century potteries in Britain specialised in mortarium and flagon production to supplement the "native" range of bowls and jars.

0.85% of all pottery, predictably concentrated in Flavian

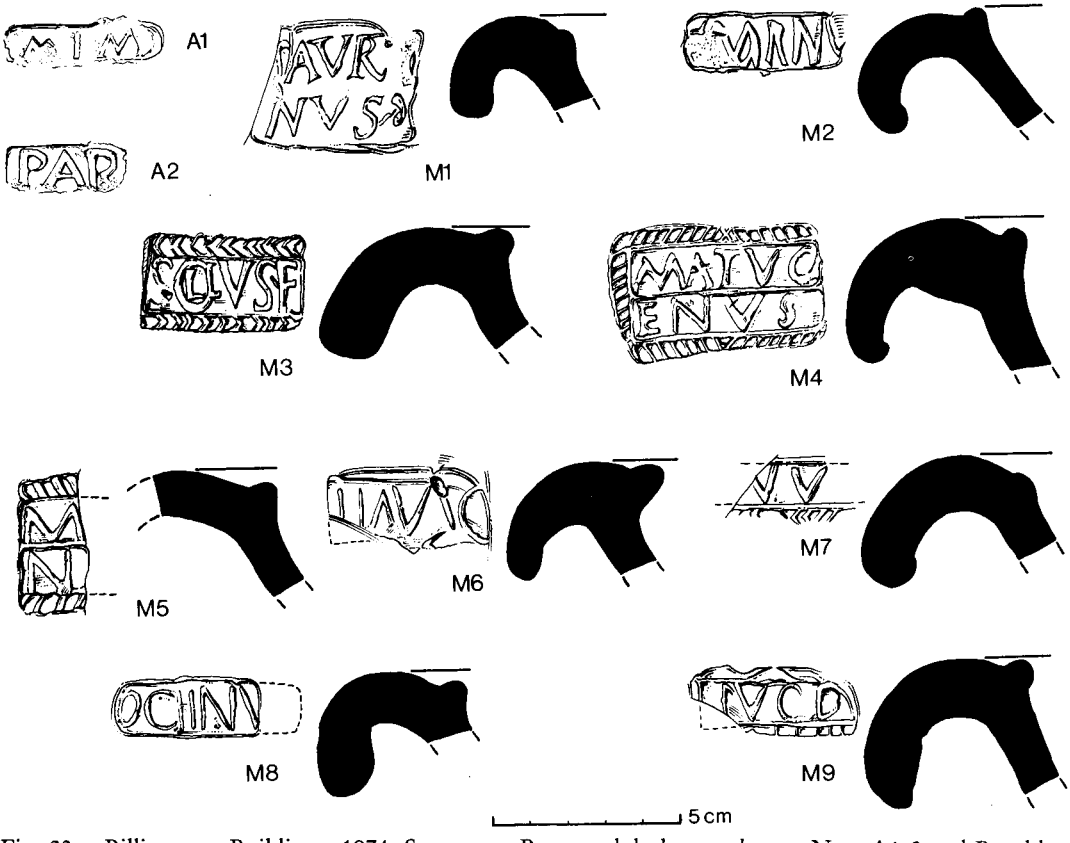


Fig. 23. Billingsgate Buildings, 1974: Stamps on Roman globular *amphorae*, Nos. A1-2 and Brockley Hill/Verulamium *mortaria*, Nos. M1-9 (½).

deposits: 1.7% of V, 0.2% of X, 0.9% of VWX, (2.3% of Z), absent from groups U, W and Y. Total weight 6.1kgs.

53-114 *The Brockley Hill-Verulamium industry* (Figs. 23-7). Kilns are known in this area of north Middlesex and south-west Hertfordshire at Brockley Hill (several excavated kilns), Radlett, Bricket Wood and Verulamium, all producing "white" bodied pottery whose fabrics are indistinguishable in the hand and are even difficult to differentiate in thin section (pers. comm. S. A. Mackenna). Undoubtedly other kilns remain to be discovered in this region. Three types of pottery are recognised from this source: a) and b) below, and the fine "ring and dot" beakers described with the other finewares (p. 72). For relevant kiln or waste groups see *e.g.* Richardson (1948), Castle (1972a, b; 1973a, b; 1976) (Brockley Hill); Saunders (1976) (Bricket Wood); Corder (1941) and Anthony (1968) (Verulamium).

53-106 a) *The Brockley Hill-Verulamium "white" wares* (Figs. 23-26). Ubiquitous in London from *c.* A.D. 60 to the mid/late 2nd century, and forming the largest coarseware group from any source at Billingsgate Buildings. The colour is white or off-white in general, but vessels may be pink *(e.g.* 2.5YR 8/4), cream (10YR 9/4), orange (5YR 6/12) or grey in whole or part. Often rather friable, laminar-irregular in fracture *(the irregularities have a "lenticular" appearance)*, rough to touch. Abundant inclusions of quartz (SA, 0.1-0.8mm), with much sparser ironstone (<1mm). *The matrix is extremely fine and smooth.* The mortaria are gritted (often not very heavily) with ill-sorted, crushed grey, white and sometimes red flint and a little white quartz, <3mm.

A wide range of forms was recovered. Problems of residuality make the earliest occurrence (or common occurrence) of a form the best guide to any changes in the Brockley Hill repertoire, but the nature of the Billingsgate Buildings stratigraphy requires that care should be exercised in using even this type of information. The general trends seem likely to be more reliable: mortaria, flagons, and amphorae predominate in 1st-century deposits (group V), and larger jugs and pitchers, and bowls, jars and their accompanying lids are rare before the 2nd century. *Tazze* and lamps are characteristic of 2nd-century deposits, but given the quantities involved this is probably not significant. These trends would support the impression of an initial concentration on those forms most essential to the finer points of Roman cuisine, with the later development of a much fuller range of products. The early demise of the industry is unexplained. Here the near absence of its products in groups Y and Z must indicate at least a severe decline by the last third of the 2nd century.

53-5 Mortaria. Present throughout this series, and all but one are of the form shown by 53 and 54 (55, from group X, is the only significant variation). The typically mid 2nd-century "wall-sided" forms from Brockley Hill illustrated by Suggett (1953, Fig. 4, M6; 1956, Fig. 2, M22, etc.) did not occur here.

M1-M9 *Stamps on Brockley Hill-Verulamium mortaria* (Fig. 23) by K. Hartley.

M1: SATVR[NI]/NVS (E.R. 4007/257) from context 208, group X; another example (E.R. 4055/432) from context 334, group X. Saturninus I, who worked at Brockley Hill (Castle, 1976, 216, Fig. 8, MS94-125, also MS126-7 for counterstamp). Active within the period A.D. 110-135+, as the present contexts suggest.

M2: MARNV[. . . (E.R. 4068/350) from context 394, group X. Marinus, who worked at Brockley Hill (Castle 1976, 218) within the period A.D. 80-120. See also M5.

M3: SOLLVS F (E.R. 4078/401) from context 412, group VWX. Sollus, from one of three known dies. Sollus probably worked at Brockley Hill in the period *c.* A.D. 70-100.

M4: MATVG/ENVS (E.R. 4076/241) from context 408, group X. Matugenus I, who worked at Brockley Hill, where one of his dies was discovered *c.* 1900 (Suggett, 1958). A prolific potter, whose work seems to be mainly Trajanic *(c.* A.D. 85-120) to judge from the absence of his stamps from Flavian forts in Scotland. (See also M7).

M5: M [. . ./. . . (E.R. 4072/402) from context 412, group VWX. Another die of Marinus, see M2 above.

M6: [Incomplete, uncertain reading] (E.R. 4080 /362) from context 423, group V. An unidentified potter. This die is also known at Colchester, Verulamium and Wroxeter (two examples each).

M7: . . .]NV[. . . (E.R. 4079/206) from context 412a, group VWX. Matugenus I, die as M4 above.

M8: DOIINV[S] (E.R. 4082/431) from context 430, group V. Doinus, of Brockley Hill (Castle, 1972), one of four known dies. Probably active A.D. 70-110, the present example is unlikely to be earlier than A.D. 80.

M9: LVGD [FEC] (E.R. 4083/385) from context 433, group V. One of the counterstamps of Albinus, whose work is known at the Brockley Hill, Bricket Wood and Radlett Kilns, and is indicated as the father of Matugenus (see M4) on the latter's counterstamps. LVGD must refer to a place Lug[u]dunum nearby. Evidence from various sites dates his activity to *c.* A.D. 60-95.

56-7, ?58, 59-61 Amphorae. The form may be a copy of Dressel 30. Present throughout the groups.

62-75 Flagons. Not surprisingly, the "Hofheim" type (62) is only found in 1st-century deposits of group V – it is known from the initial production at Brockley Hill (Castle, 1973a). Other types represented in Flavian deposits are the "multiple ring-neck" vessels, much the commonest of the whole series (64-9), "pinched" flagons (74-5) and type 70. Others (71-3) occur only in groups W, X and VWX but are in any case uncommon.

76-81, ?82-3 Pitchers and jugs are arbitrarily defined here, and some of the sherds may well be from flagons or small jars. All are represented by single examples, none of which came from wholly 1st-century deposits. 81 probably copies a metal jug.

84-9 *Tazze* formed a minor part of the assemblage. No examples were found in group V, but this may be due to the small size of the sample.

90 "Amphora-stopper" (so-called). The only such vessel from Billingsgate Buildings. A number of suggestions have been made as to their function, but they are most likely to have some votive significance. From group V.

91-3 Lamps/"lamp-holders". Two forms of open lamp, both heavily sooted in use. Occurrence as for *tazze.*

94-106 Bowls, jars and lids were relatively common, but occurred almost exclusively in groups X and VWX (a single lid was found in group W), so that an early 2nd-century date seems likely for most of these forms, However, the "grey" Brockley Hill-Verulamium fabric *was* produced in jar and bowl forms in the 1st century – see below.

Brockley Hill-Verulamium region "white" wares represent 17.5% of all pottery, more than for any other coarseware: sherds present in group U, 18.8% of group V, 11.0% of W, 13.8% of X, 23.3% of VWX, but merely present as body sherds in Y and Z. The mortaria are very evenly distributed, varying between 2.1 and 2.8 in the four main groups. Total weight 42.4kgs. Since only 54gms (2 ounces) were found in group Y, it seems likely that the kilns had virtually or entirely ceased production by the late 2nd century.

107-114 b) *The Brockley Hill-Verulamium "grey" wares* (Figs. 26-7). Despite external appearances, the fabric of these vessels is very close to that of the "white" wares, though invariably neutral (pale grey to white) in hue. The margins and surfaces are light grey to (more usually) dark grey and black, presumably as a result of firing in an intentionally sooty atmosphere. 111, a black-burnished ware form from group X, and 112, a bowl of unusual form, are additionally

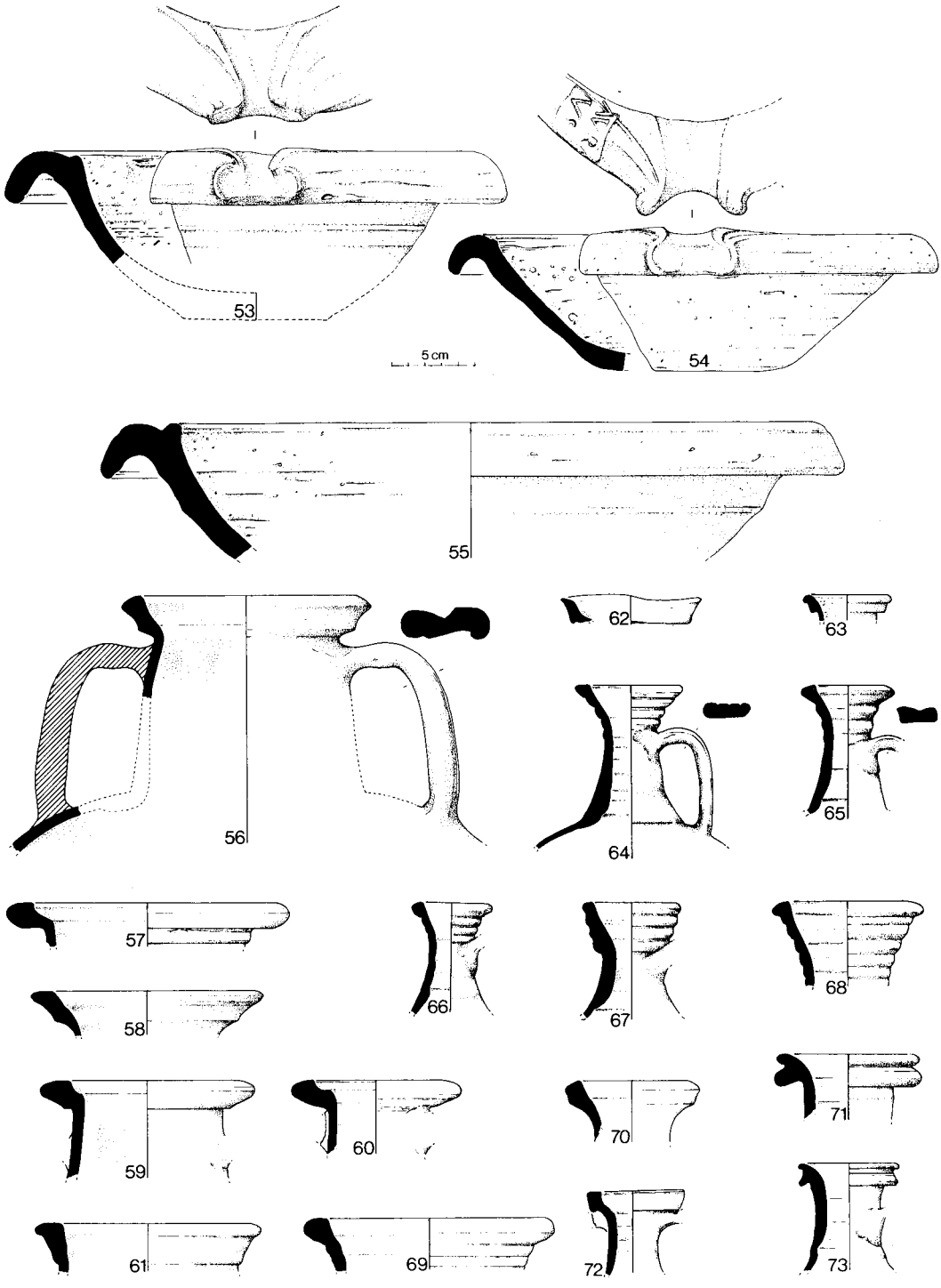


Fig. 24. Billingsgate Buildings, 1974: Roman coarsewares Nos. 53-73 (¼).

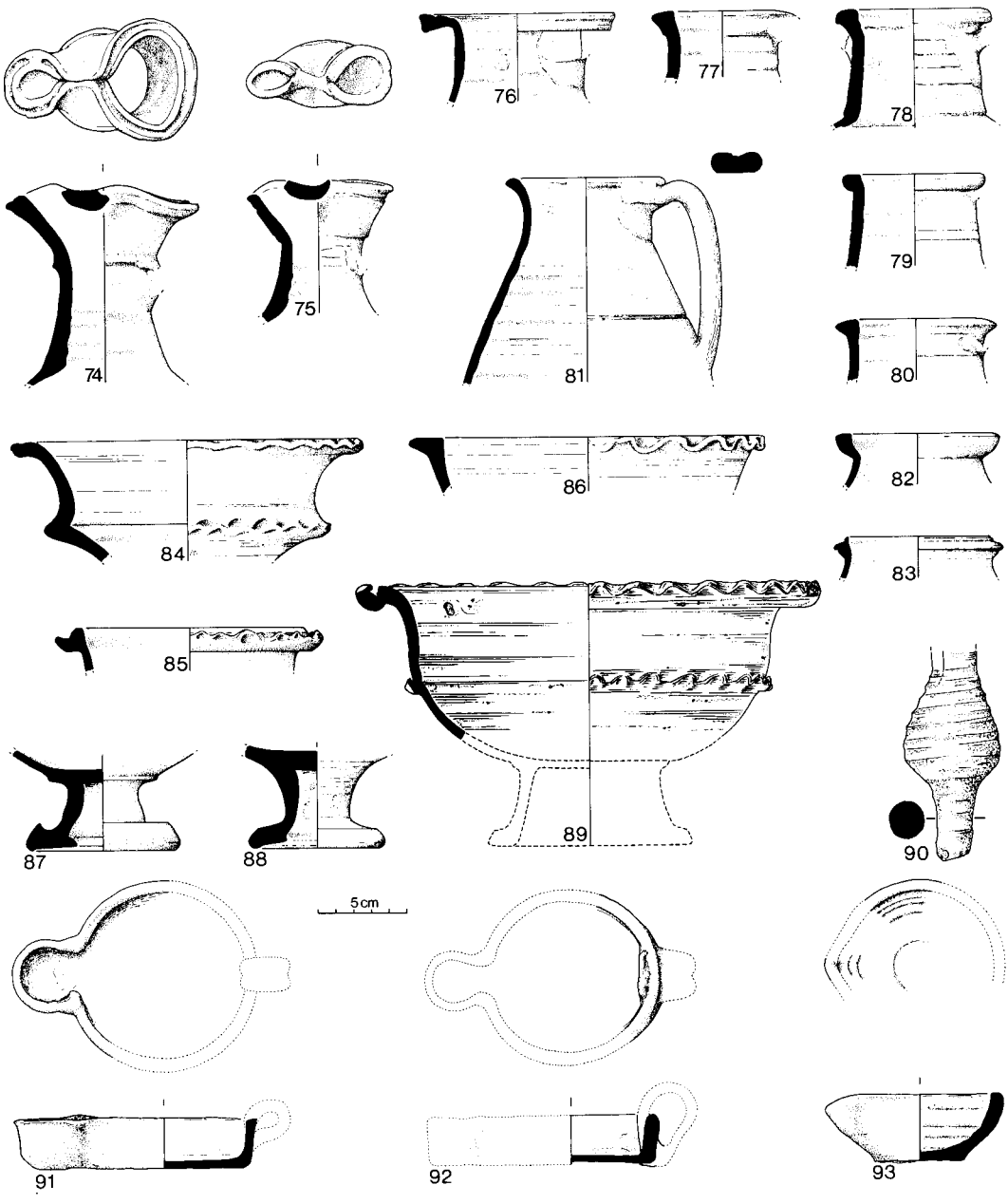


Fig. 25. Billingsgate Buildings, 1974: Roman coarsewares Nos. 74-93 ($\frac{1}{4}$).

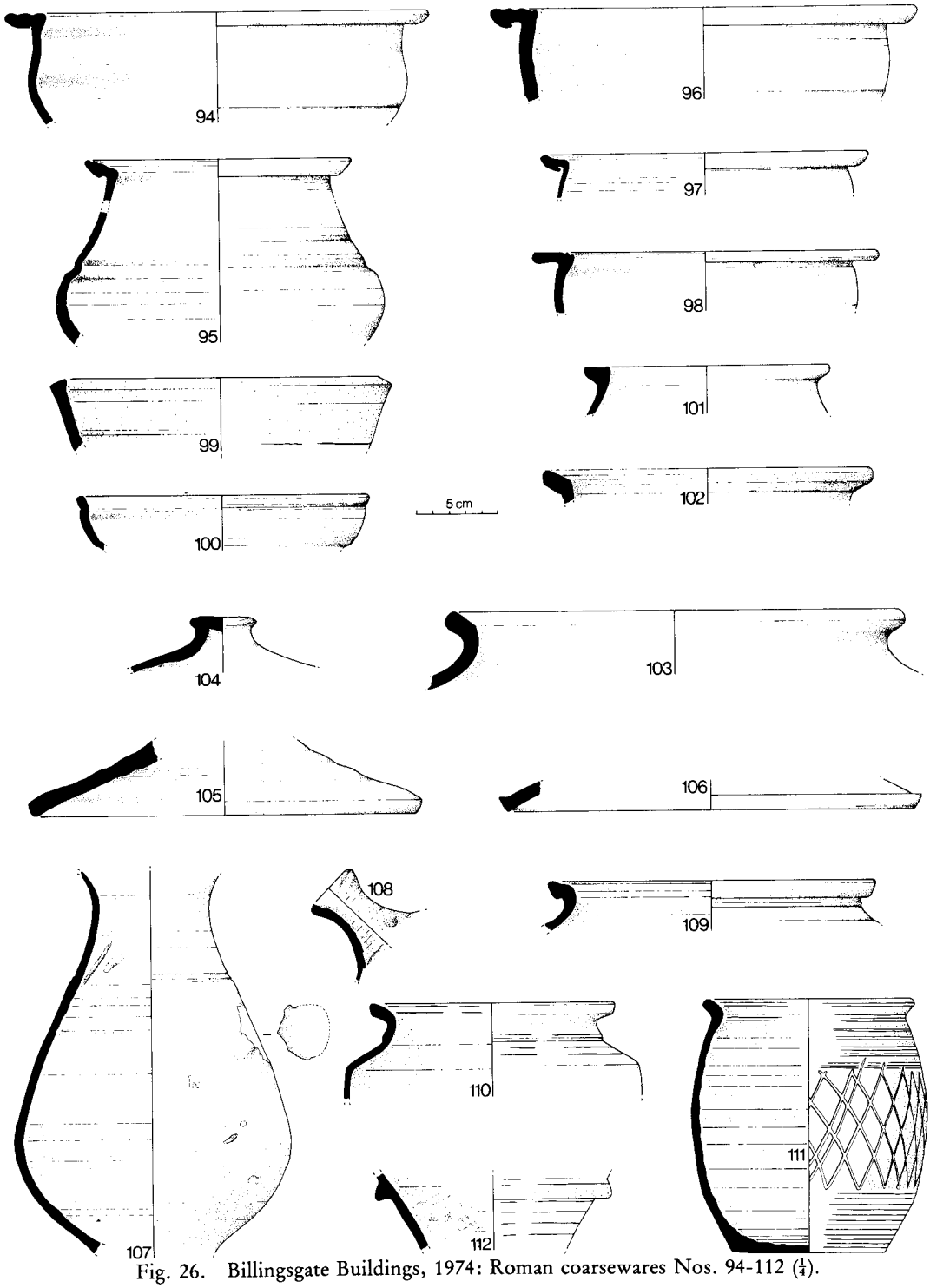


Fig. 26. Billingsgate Buildings, 1974: Roman coarsewares Nos. 94-112 ($\frac{1}{4}$).

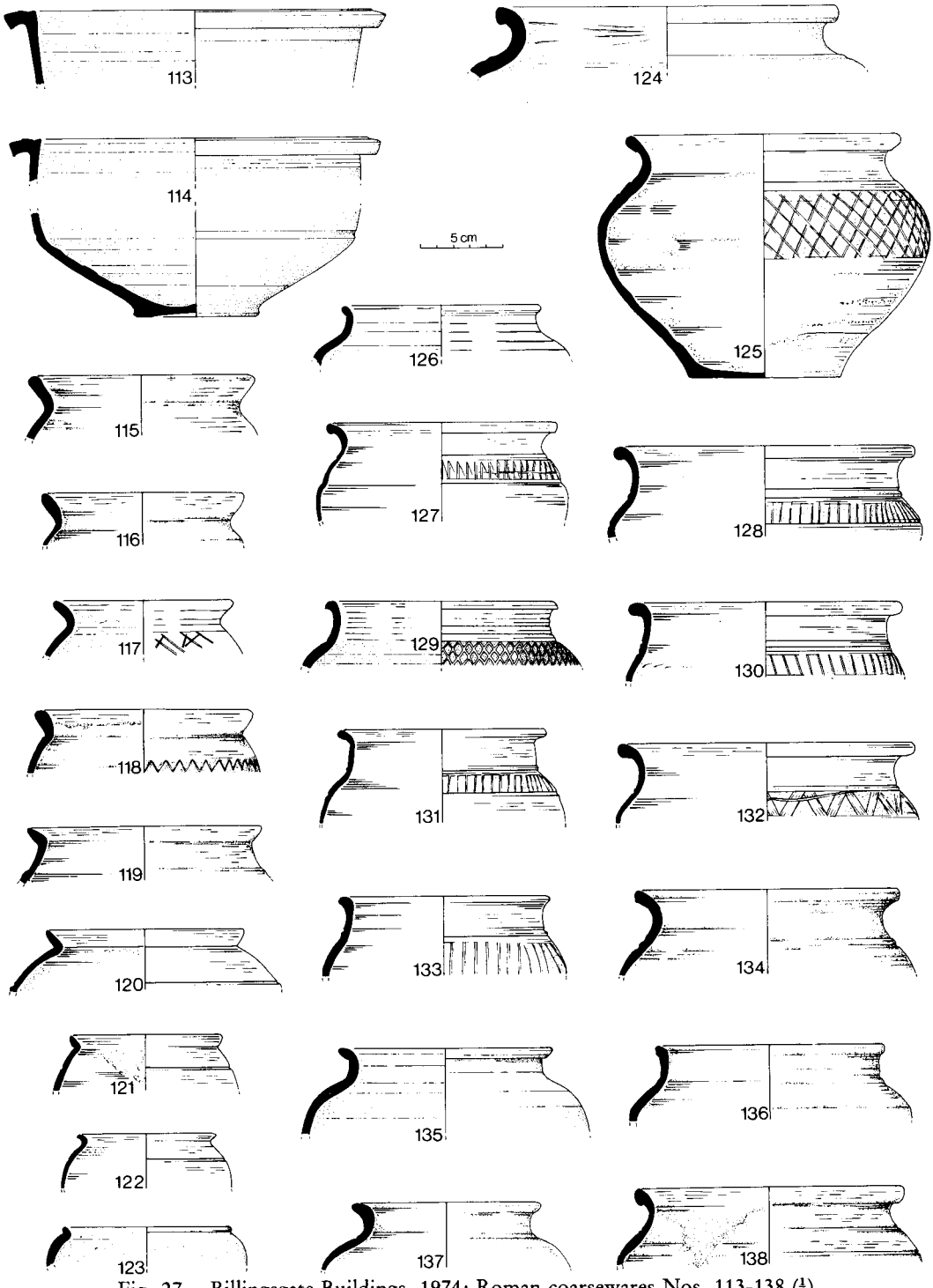


Fig. 27. Billingsgate Buildings, 1974: Roman coarsewares Nos. 113-138 ($\frac{1}{4}$).

burnished. With the exception of these vessels and 108, probably a spout, the forms would not be out of place in the "white" ware series.

2.1% of all pottery: 2.14% of V, sherds present in W, 3.7% of X, 1.3% of VWX, absent from U, Y and Z – indicating a similar date range to that of the "white" wares, as far as can be seen. Total weight 3.1kgs.

115-167 *Local greywares comparable to Highgate Wood products* (Figs. 27-29). Two broad fabric groupings are very similar to the pottery recently excavated at Highgate Wood (see Brown and Sheldon, 1974, for references throughout this section): a) sandy greywares, much the most abundant single greyware type at Billingsgate Buildings, and b) a small quantity of broadly similar bowls with additional grog tempering, clearly an earlier product. These types correspond to Highgate fabrics 'C' and 'B' respectively, but it is important to note that more than one kiln is involved, as has been shown from a thin-section examination of apparent Highgate products found in Southwark (pers. comm. S.A. MacKenna). That the Highgate kilns alone have been discovered in north London is no doubt simply due to the absence of 19th and 20th-century building on the site.

115-160 a) *The Highgate-type sandy "greywares"* (Figs. 27-8). There is a continuum of fabric types from sherds comparing very closely with sherds from Highgate Wood to more doubtful specimens showing some characteristics in common with the Highgate production, and any demarcation such as that made here is bound to be somewhat arbitrary. The typical fabric, closest to the kiln products, is grey (N5-6), usually with darker margins and contains abundant inclusions of very fine quartz (*c.* 0.1mm) with much sparser black ironstone and white mica of the same size. Occasionally larger sub-angular quartz inclusions (<0.5mm) are seen. The quality of finish is good and the exteriors are frequently burnished in broad zones. Sometimes a slip is suspected to be present (many Highgate Wood specimens are slipped), but the mudstaining of the present groups often makes this uncertain. Other fabrics, which tended to account for less than half the quantity of the 'typical' fabric, and bear less similarity to the kiln products, generally differed in possessing more frequent quartz inclusions of medium to coarse grade, and in less tangible aspects of appearance and "feel".

The material proves unrewarding from the point of view of typological development. Comparison of the 'typical' fabrics from groups V (later Flavian) and X (Hadrianic to Antonine) shows little variation in the range of forms that cannot be accounted for by the size of the sample, or residuality. However, jars of forms 115 and 117-8 are, not surprisingly, almost entirely a 2nd-century phenomenon, as are "poppyhead" beakers with more everted rims (e.g. 153).

'Typical' Highgate-type products accounted for 10.9% of all pottery: 8.2% of V, 11.1% of W, 12.7% of X, 11.6% of VWX, (5.1% of Y, 4.9% of Z (as the result of the presence of a single large sherd), not recognised in U). Weight 11.2kgs. This suggests production from at least the later Flavian period to the mid 2nd century, and perhaps lasting a little longer.

Other fabrics follow a similar pattern in the main groups, if the abnormally high figure for a single context in group W is discounted; 5.2% of all pottery: 5.6% of V, 13.8% of W, 5.6% of X, 4.2% of VWX (1.3% of Y, sherds present in Z but not recognised in U). Weight 4kgs.

161-167b) *Highgate-type sand and grog-tempered greywares* (Fig. 29). Sherds comparable with Highgate fabric 'B' were only recognised in bowl forms. The fabric resembles that of the 'typical' sandy greywares just described, with the addition of a moderate amount of red or grey grog (*i.e.* crushed pottery or baked clay (A, <2mm)); coarse quartz and burnt organics are sparse. Due to the coarse inclusions, the general finish of the pot is rather "lumpy", though the rims are burnished. As with the Highgate fabric 'C', comparison with the Highgate kiln waste is difficult since the Billingsgate Buildings sherds are much better preserved than the Highgate vessels, but the range of forms agrees quite well with Brown and Sheldon's (1974) forms 25-6 and 35-9. The Flavian date suggested by Brown and Sheldon would also fit the evidence obtained here, though of course the present sherds may be residual.

0.33% of all pottery, but strongly concentrated in Flavian deposits: 1.2% of V, 0.2% of VWX, absent from other groups. Weight 0.2kgs.

168-248 *Miscellaneous sandy fabrics from groups V-Y* (Figs. 29-32). These are presumably mainly local types which cannot be ascribed on the basis of fabric to the Brockley Hill-Verulamium or North London industries just described. In all cases the major inclusion is quartz, the usual accessories such as mica, ironstones and burnt organics occurring sparsely or not at all. With the exception of a handled bowl, the face urn and lamp chimney (205, 206 and 248, see below), the vessels are in reduced grey or dark grey colours. Descriptions of individual fabrics would be very lengthy since most occur as a limited number of sherds, and are in any case best examined in the original. As will be seen, many of the forms (*e.g.* 173-184, 208-212) are close to those produced at Highgate and in the Brockley Hill area, and no doubt were made at fairly local kilns. 191 is in the 'BB2' style. 188 seems, from the holes in its rim, to have been designed for suspension. Lids (232-246) are as usual undiagnostic, and are difficult to relate to the fabrics of the jars and bowls. 247 is the only example of a cheese press from the site.

205 The handled bowl. Though much stained the fabric was originally pale – either yellowish or very light grey. Hard but rather brittle, moderate quantities of inclusions – quartz, clear feldspar or another mineral, fine grained rock fragments and a little yellow grog and white mica (A, SA, R, 0.1-0.5mm, but grog <2mm), in a matrix containing much subvisible calcareous matter. Source unknown, single sherd from group V (Flavian).

206 The face urn is represented by a single sherd with an applied ear and a trace of a "funnel" at the side below the rim – this presumably allowed libations to be poured into the vessel. The use of face-jars is uncertain, since although many have been found containing burials (especially at Colchester), even more come from apparently non-funerary contexts (as here). The fabric is brick-red (10R 5/10), with moderate to abundant quartz inclusions (SA, <0.4mm), and sparser flecks of brown ironstone (<0.1mm). From group V (Flavian).

248 The "lamp-chimney". The conjectural reconstruction is broadly based on a Verulamium example (after Wheeler and Wheeler, 1936, 190-1), but forms vary considerably and a number of examples have a closed apex. Grey with grey-pink margains (2.5YR 5/8) and beige surfaces (10YR 7/2), hard, with abundant inclusions of quartz (SA, R, 0.2-1mm) and lesser amounts of red ironstone, some sparse pale grey and a very coarse flint inclusion. The matrix is very fine and smooth. This may be a coarse and impure version of the Brockley Hill-Verulamium white fabric. The apertures are knife-cut. "Lamp-chimneys" are of unknown use, but wheel-thrown examples unlikely to have been roof furniture. They are uncommon but widespread in Britain, and occur in a variety of wares (often tile fabrics). (See Lowther (1934)). The single sherd is from group X.

Miscellaneous sandy wheel-made fabrics account for 15.6% of all pottery (32kgs). Its distribution in the various groups is not significant.

249 *Jar tempered with grog and igneous/metamorphic rock* (Fig. 32). It is uncertain whether the vessel is hand- or wheel-made. A very distinctive fabric: brown/buff with dark grey surfaces

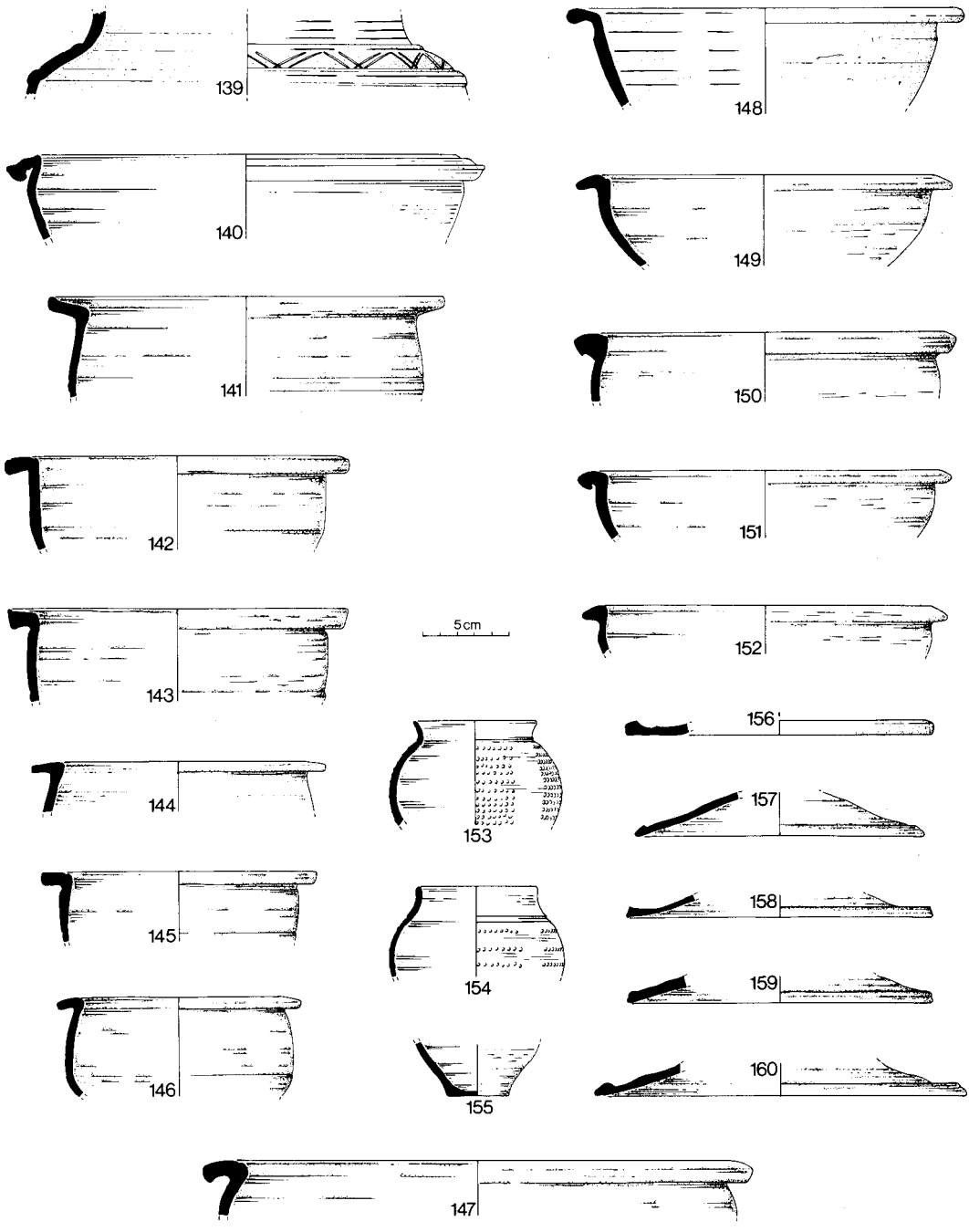


Fig. 28. Billingsgate Buildings, 1974: Roman coarsewares Nos. 139-160 ($\frac{1}{4}$).

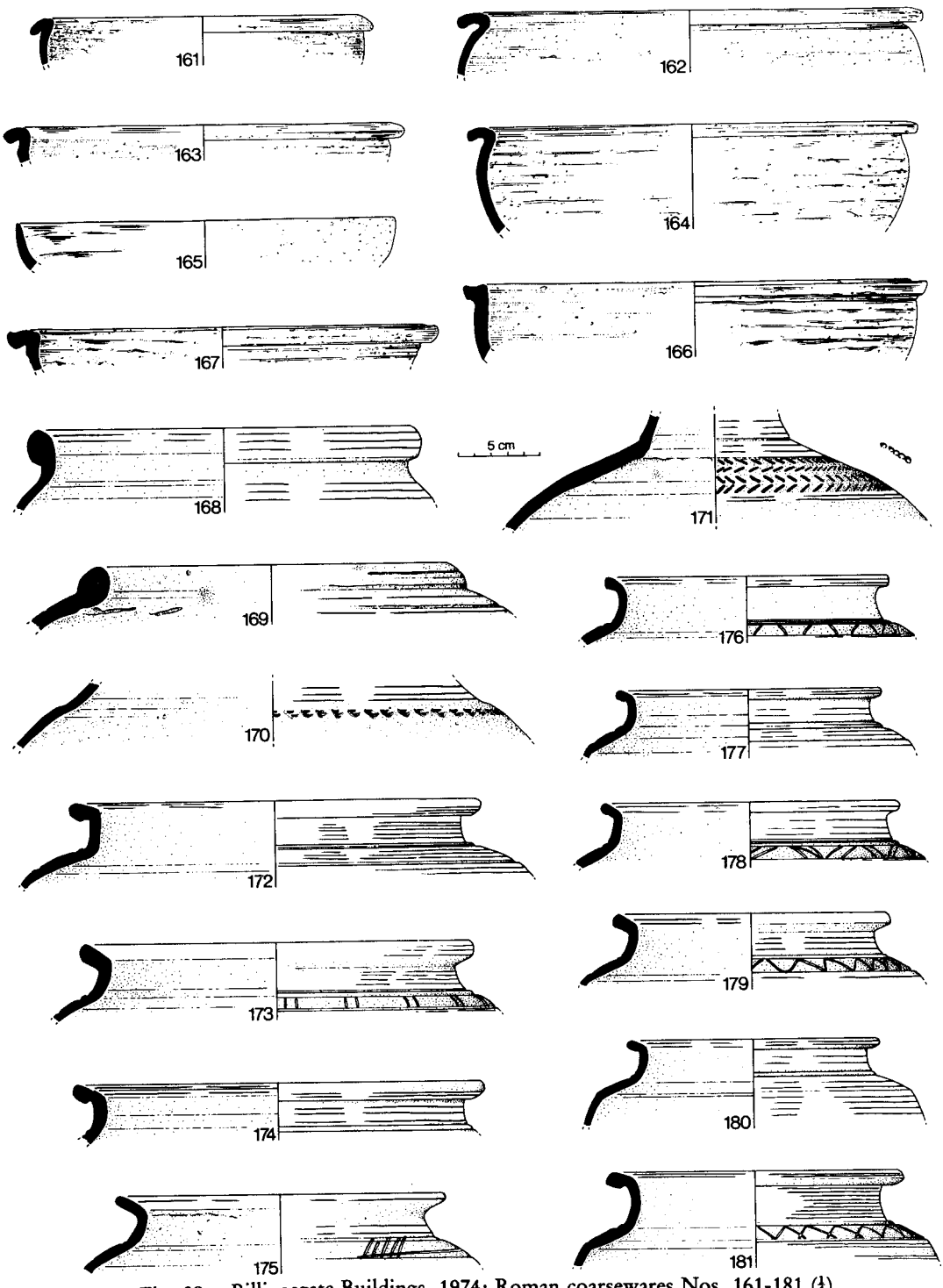


Fig. 29. Billingsgate Buildings, 1974: Roman coarsewares Nos. 161-181 ($\frac{1}{4}$).

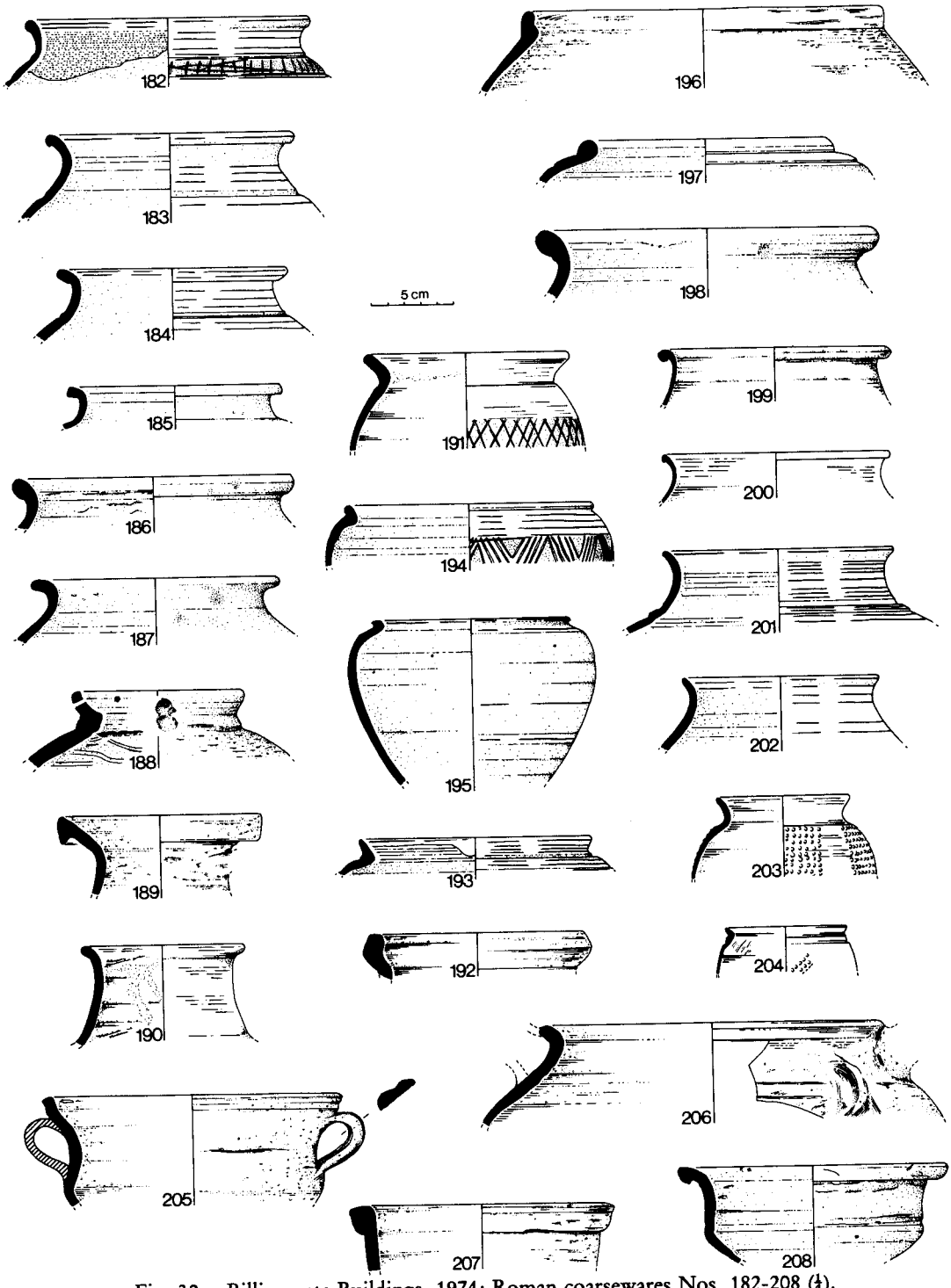


Fig. 30. Billingsgate Buildings, 1974: Roman coarsewares Nos. 182-208 (¼).

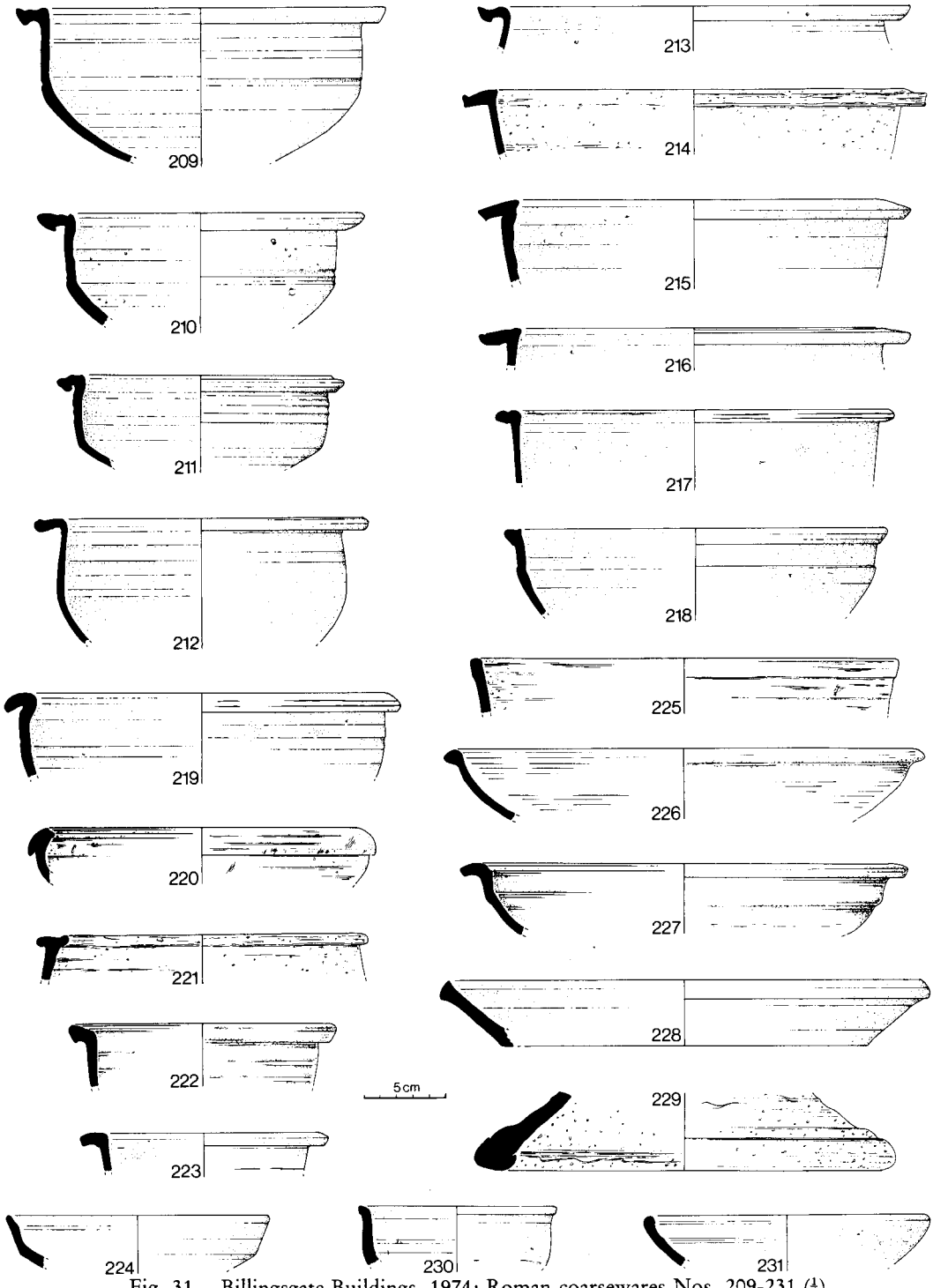


Fig. 31. Billingsgate Buildings, 1974: Roman coarsewares Nos. 209-231 ($\frac{1}{4}$).

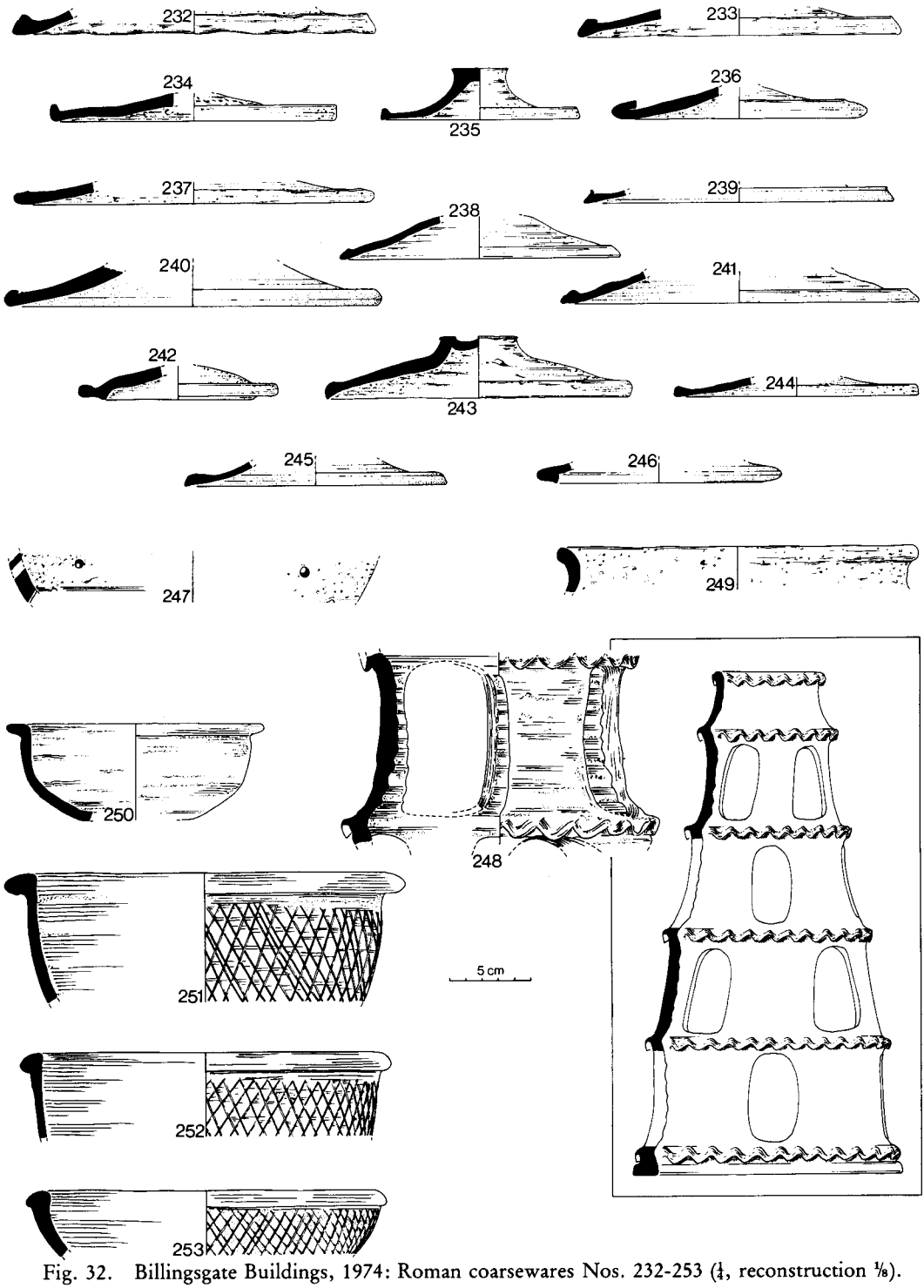


Fig. 32. Billingsgate Buildings, 1974: Roman coarsewares Nos. 232-253 (¼, reconstruction ⅛).

(the colour may have been altered by burning, however), of medium hardness, and very coarse and rough in feel as a result of the abundant inclusions of feldspar and black grog (A/SA, <3mm) and white mica plates of the same size. There are uncertain quantities of quartz (SA, <0.5mm) and much silt-size matter in the matrix. The source must be distant, probably in south-west or west Britain or perhaps the Continent.

0.03% of all pottery: a single sherd from group X (17gms).

250, 251-7 *Black-burnished ware 2* (Figs. 32-33). BB2 (defined by Farrar, 1973) proves to be a style, rather than a single fabric. A recent study (Williams 1977) shows that BB2 was produced at a number of south-eastern kiln sites, with a marked concentration in Kent but also at Colchester, Essex. All the fabrics are tempered with sand and Williams has related many to their sources by using heavy mineral analysis, a technique which could only have dealt with a very small sample of the present assemblage. Nonetheless almost all may belong to a single source, provisionally identified as Colchester, despite the proximity of the Kent sites (see Williams (1977), 195-199). The fabric is dark grey or black, frequently with brown or red-brown margins or core, and of medium hardness. The fairly abundant inclusions of clear, rose-coloured, grey and *ferruginous quartz are generally well rounded*. Other mineral species are sometimes visible, alongside occasional rounded pellets of black ironstone. Inclusion size is 0.2-0.7mm, but normally 0.3-0.5mm, with additional very fine and silt-size quartz in the matrix. *The surfaces are jet black and brought to a high shiny finish*. Bowls are hand-burnished on the base. 250 may not belong to the series, being scarcely burnished and of unusual form. The range of forms is very small, and types 251-3 account for the majority of sherds. No typological trends emerge from such a small sample.

Other examples of the BB2 style are 111 and 191, above.

1.33% of all pottery: absent from groups U and V, 0.3% of W, 2.5% of X, 1.3% of VWX, 1.6% of Y, 1.5% of Z. Weight 2.2kg. Use of BB2 here does not seem to have begun until the 2nd century, though production at Colchester is known to have begun by A.D. 70 (Williams 1977, 207).

258-264 *White-slipped coarseware from the ?Staines-London area* (Fig. 33). One of the most distinctive of the local fabrics. Brownish-orange (e.g. 2.5YR 5/8) usually developing a grey core in places, hard and very rough to touch. *Inclusions are often coarse and much rolled:* fairly abundant quartz (R, 0.2-0.8mm) with sparser brown or black grits, perhaps of rolled flint (R, up to 4mm and more), some red-black ironstone pellets (R, av. 0.3mm), and one or two gross inclusions of calcined flint (<13mm) in some vessels. *A thick slip* is applied to the exterior of flagons and overall on open forms: the colour varies from a fairly pure white, reminiscent of icing sugar, to a *drab light orange-grey*. Presumably the intention was always a white finish. *The slip appears to have contained many inclusions in suspension when applied. The quality of construction and finish is usually poor.* A single flagon (264) is strongly burnished over the slip.

Much the commonest form is the "cupped" ring-neck flagon, but flagon 264, tazze, and a mortarium sherd (258, from a post-Roman deposit) also occurred. No grits remain in the mortarium.

Although a flagon in this fabric was one of the type sherds for Verulamium form 559 (Frere, 1972, p. 304), the fabric is uncommon there, and was probably made either much closer to Londinium, or near Staines, when it appears to be very common (pers. comm. K. Crouch and O. Farrington). None occurred at Billingsgate Buildings before *c.* A.D. 125, and so the fabric may prove a useful type for dating 2nd-century deposits in London; it may occur earlier at Staines, however.

2.35% of all pottery: absent from U, V, W (and Y), but 6.4% of X, 1.0% of VWX and 3.2% of Z. Weight 1.9kgs.

265 *Other flagon types with oxidised fabrics* (Fig. 33). The ?London-Staines flagons described above must be distinguished from other white-slipped oxidised red or orange fabrics. Two types are described, although many others were represented by a very few sherds.

a) *(not illustrated).* A brick red (c.f. 10R 6/10) fabric, sometimes with a paler core or inner margin, hard, with a faintly irregular fracture. Apart from silt-size quartz, *inclusions are virtually absent* or consist of a few fragments of similar grog. Only flagon sherds occurred, slipped white or yellowish-white externally, but the form of the vessels cannot be reconstructed.

0.35kgs of bodysherds were found. Present in all groups except U and Y, with an obvious concentration in V, and hence probably in use mainly in the Flavian period, or before the Billingsgate Buildings deposits began to accumulate.

b) (Fig. 33). A flagon with an unusual everted mouth. Orange-red (5YR 5/8) with moderate-abundant inclusions of quartz and sparse red ironstone (SA <0.5mm) with a little very fine mica. Grey (mudstained?) external slip. Source unknown. A single sherd from group VWX.

265 and other flagons in red fabrics not already described accounted for 0.27% of all pottery, fairly evenly distributed in all groups except U and Y. Weight 0.3kg.

266-7 *Other mortaria* (Fig. 33).

266 Pale yellowish grey (7.5Y 8/2), hard, with abundant quartz (SA <0.2mm, occasionally 0.4mm) and sparser specks of red and black ironstone (SA, R <0.3mm). Any grits have been lost. Mrs. K. Hartley suggests a date from the mid 2nd to the early 3rd centuries for this type, which probably originates in south or south-east England. The present sherd would be early in this date range (group X).

267 Yellowish grey 2.5Y 8/3, hard, cleanly fractured (finely irregular under lens), with *moderate to abundant inclusions of granite (A, 1-4mm)* accounting for the coarseness of the surfaces and rendering additional trituration grits superfluous. Presumably a Continental product. (Single sherd, group W).

(not illustrated). Form and superficial appearance almost exactly as 267, but diameter smaller (260mm). *Ill-wedged fabric,* cream and light pink with dirty buff surfaces, laminar, *moderate to abundant inclusions of similar pink and cream grog* (<4mm) with occasional quartz and ironstone (SA <0.5mm). The matrix is very fine. Source unknown. (Single sherd from group VWX).

The last three items and a few other unidentified mortarium sherds account for 0.14% of all pottery (0.7kg).

268-272 *Locally made white-slipped and wiped fabric* (Fig. 33). Another very distinctive presumably local type, represented by a mortarium (268), an amphora neck (269), and ?jars (? or further amphorae) bearing a heavy applied band at the girth (270-272). (Fragmentary examples of these jars in the Museum of London exhibit a flat base, and, like 271, were often very large). Bluish-grey core with *thick brick-red* (10R 6/10) *or duller red-brown margins, which are often very clearly defined.* Hard or very hard, with irregular fracture resulting from *poor clay preparation* as much as the coarseness of the inclusions, which vary in abundance but consist largely of quartz (often ferruginous, R, also SA, <1mm), with lesser quantities of red-black ironstone (R, <0.5mm), organics and occasional flint and ?quartzite (the last two often as very large rolled inclusions, <10mm). The mortarium was gritted with a similar selection of quartz, soft bright red and shiny black ironstones and rolled flints (all R or SA, 1-4mm). The matrix is silty and contains a little mica. *A thick or very thick white or off-white slip is wiped onto the accessible surfaces. Overall quality of construction very rough;* possibly initially hand-made but finished on the wheel.

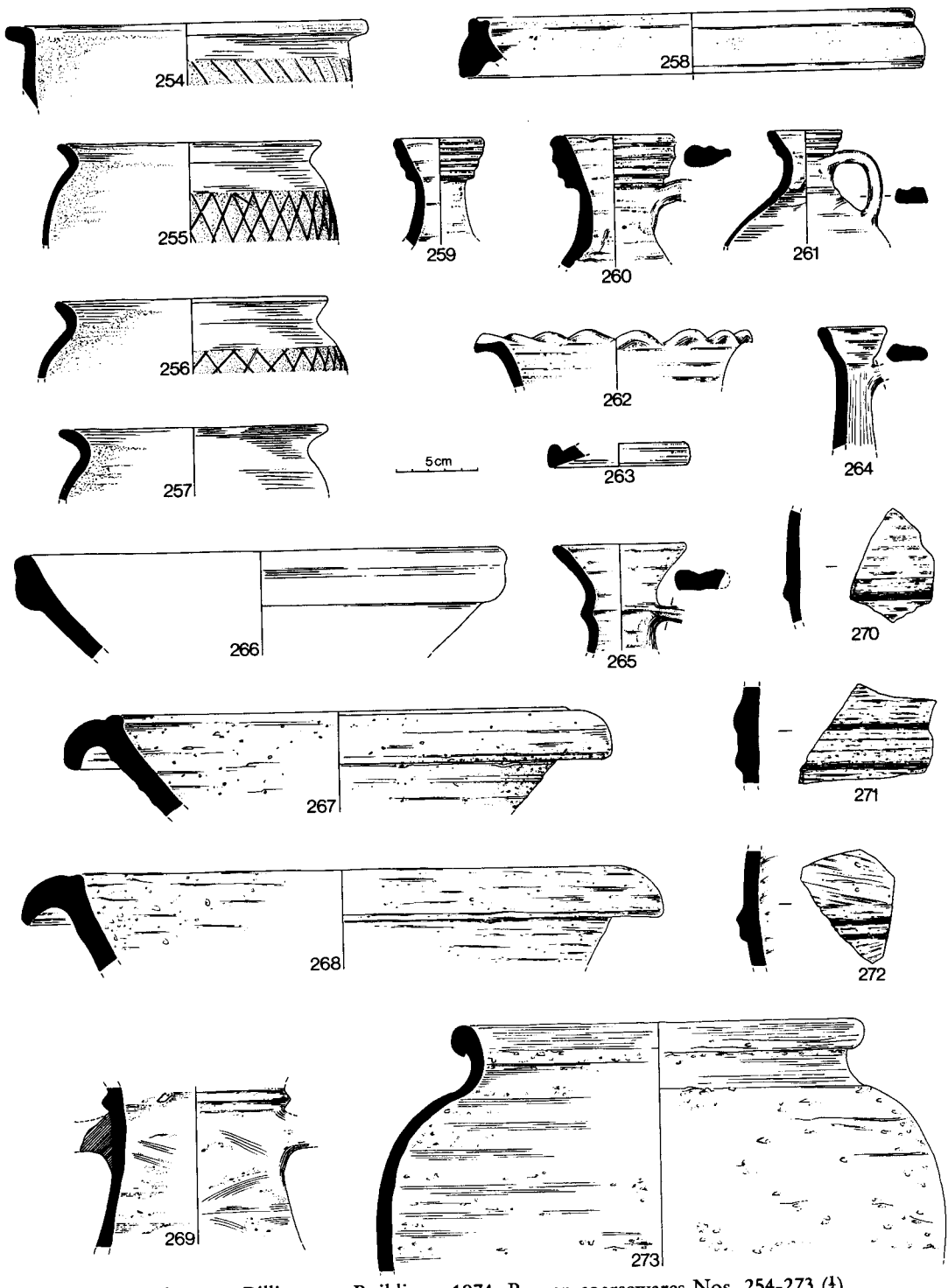


Fig. 33. Billingsgate Buildings, 1974: Roman coarsewares Nos. 254-273 (¼).

Merely 0.07% of all pottery, but apparently unknown elsewhere, and so presumed to be local. Found only in groups X, VWX and Z (one sherd). Weight 0.8kg. From this scant evidence a 2nd-century date is only an interim assumption.

273-5 *Grey grog- and organic-tempered jars* (Figs. 33-34). A loose grouping of apparently similar fabrics, but no identity of source is claimed. Various tones of grey, frequently bluish and with reddish-brown margins. Silt-size quartz and white mica (sparse) are visible in the matrix, but the most obvious inclusions are moderate amounts of grog (similar to matrix, A, <3mm) and moderate or abundant organics represented by voids or charcoal fragments up to 10mm in length. Coarser quartz (SA or R, 0.2-0.5mm) is sparse, if present at all. The vessels are rather highly fired, apparently hand-built but roughly wheel-finished on the body and rim, and frequently knife-trimmed near the base, with consequent plucking of sizeable organic inclusions. 273 may be entirely wheel-made. 272 is a common 1st-century storage jar form in the Rhineland, but rarer in Britain, although examples are known, e.g., from the Brockley Hill-Verulamium kilns in the Flavian period.

0.08% of all pottery, found in groups V, W, X and VWX (but not in U, Y, or Z). Weight 1.5kgs. Sherds were commonest in 2nd-century levels, but too much should not be made of this.

276 *Braughing jar* (Fig. 34). High-shouldered, rilled jars made in various types of fabric around the Roman town of Braughing (N.E. Hertfordshire) and continuing in use there well into the 2nd century (see Stead, 1970). A very close form and fabric parallel for this vessel was found in a cremation cemetery at Skeleton Green, Puckeridge, Hertfordshire (pers. comm. C. Partridge). Dull red-brown with very dark grey surfaces, fairly soft, very irregular "corky" fracture as a result of poor wedging and moderate amounts of very coarse grog (similar to the matrix, A, <2mm) and burnt organics (<1mm). Roughly wheel-made or hand-built and wheel finished. Very lumpy surfaces, knife-trimmed on the exterior with consequent plucking of the inclusions.

0.02% of all pottery: a single vessel whose sherds were found throughout X and VWX (0.2kg).

Miscellaneous wheelmade pottery tempered with sand and grog accounted for an additional 0.13% of the whole (0.2kg).

277-284 *Black-burnished ware 1 (Dorset)* (Fig. 34). By definition, a hand-made type, described by Farrar (1973, 1977; also Williams, 1977). Dark grey or black, fairly hard but rather friable, and filled with abundant often milky inclusions of quartz (SA, 0.2-0.8mm), giving a *characteristic "cod's roe" appearance to the fresh fracture.* Coarse or very coarse fragments of shale occur in some sherds. *Wheel-marks are never present* but vessels are frequently horizontally wiped and *facet-burnished in zones,* as shown in the illustrations. The interior of closed forms and the background of decorated zones are left rough. Rims are trued-up on a turntable. As far as can be seen all but one of the present sherds, including those from group Z (reported separately), are from the major production centre at Poole Harbour in Dorset.

The generally quoted date of *c.* A.D. 120-125 for the widespread trading of BB1 outside Dorset is broadly confirmed here by its sudden appearance in group X. All but very minor variations in form are illustrated, but no typological development is seen between groups X and Y. Only towards the end of the 2nd century and later (see group Z) does BB1 form a major proportion of London assemblages.

1.22% of all pottery: absent from U, V and W. 1.3% of X, 1.7% of VWX, present in Y, 9.8% of Z. Weight 2.1kgs.

285 *BB1 from a non-Dorset source* (Fig. 34). Represented by a single sherd whose form and fabric differs from the Dorset material. Hand-made, grey with brown-grey margins and surfaces. Lacks the "cod's roe" appearance of Dorset fabrics, since the quartz sand is much less well sorted, varying from silt-size grains to *c.* 0.5mm (SA and R). Brown-black and purplish soft ironstones (A, <1mm) are sparse, and there is a little very fine mica.

0.03% of all pottery, from VWX (weight 30gms).

Micaceous burnished pottery from ?South Devonshire (not illustrated). Hand-made, with a superficial resemblance to Dorset BB1. Black (grading to light grey in patches), hard, containing *abundant feldspar, possibly some quartz and rock fragments (mainly A,* <1mm), and abundant plates and blocks of mica (<0.6mm). Burnished in bold facets. The fabric must originate in an area close to igneous or metamorphic rocks, and the south-west peninsular seems a likely source in view of the resemblance to BB1. In fact it is probable that this is the pottery which formed the major component of a later 2nd-century assemblage at Clanacombe on the south coast of Devonshire (approximately 10 miles south of Dartmoor, a suitable rock source) (Greene and Greene, 1970, and pers. comm. Dr. K. T. Greene). Preliminary study of the pottery from New Fresh Wharf (Green, 1979) suggests that this fabric may be present in London in the late 2nd and ?early 3rd centuries.

A single bodysherd from a bowl, group X (probably mid 2nd century), weight 46gms.

286-294 *Hand-made grog-tempered pottery types* (Figs. 34-35). These vessels are divided into two main categories for the purposes of this report: a) fabrics containing a significant amount of quartz sand, and b) "Patchgrove" and similar fabrics which contain very little sand and thus have a "soapy" feel. In both cases there are unusual problems in characterisation, since the hand-made grog-tempered fabrics of south-east England are likely to have been produced at very many sources (sometimes, perhaps, on a domestic scale), with a wide variation in fabric details as a consequence. Even pottery from a single source may show wide variation, since the principal inclusion is artificially prepared and mixed with the clay.

Little attempt has been made to isolate individual types from the Billingsgate Buildings material. The most significant feature is perhaps the very small percentage of the pottery that these types represent.

286-293 a) *Grog-tempered hand-made fabrics with sandy inclusions* (Figs. 34-35). Dark grey, usually with black surfaces, of medium hardness or softer, "corky" in fracture, containing abundant grog (A, <2mm), burnt-out organics, and a good deal of silt-size quartz in both grog and matrix. Larger quartz inclusions (*c.* 0.2-0.8mm) vary in quantity from vessel to vessel. The surfaces are usually burnished to some extent. Many of the sherds illustrated here may be residual, since it is known that pottery of this type (especially "bead-rim" jars like 286-8) was common in London in the pre-Flavian period; nonetheless production may have continued into the 2nd century. Doubtless from fairly local sources, perhaps to the south rather than the north of the Thames.

0.21% of all pottery, evenly distributed through the groups: present in U and W, 0.2% of V, 0.3% of X and VWX (absent from Y and Z). Weight 0.5kg.

294 b) *Patchgrove Ware and other hand-made grog-tempered vessels* (Fig. 35). Patchgrove Ware (not illustrated here): comparison with an undoubted London example shows that Patchgrove Ware (see Ward Perkins 1944, 162 ff; Philp 1973, 60-1) is almost certainly present in groups X and VWX. The fabric is light grey, often bluish, with a "corky" irregular fracture, and contains abundant white, light grey and dark grey grog (A, <3mm) giving *a distinctive "pepper and salt" appearance in the hand.* Very fine burnt organics and rarer

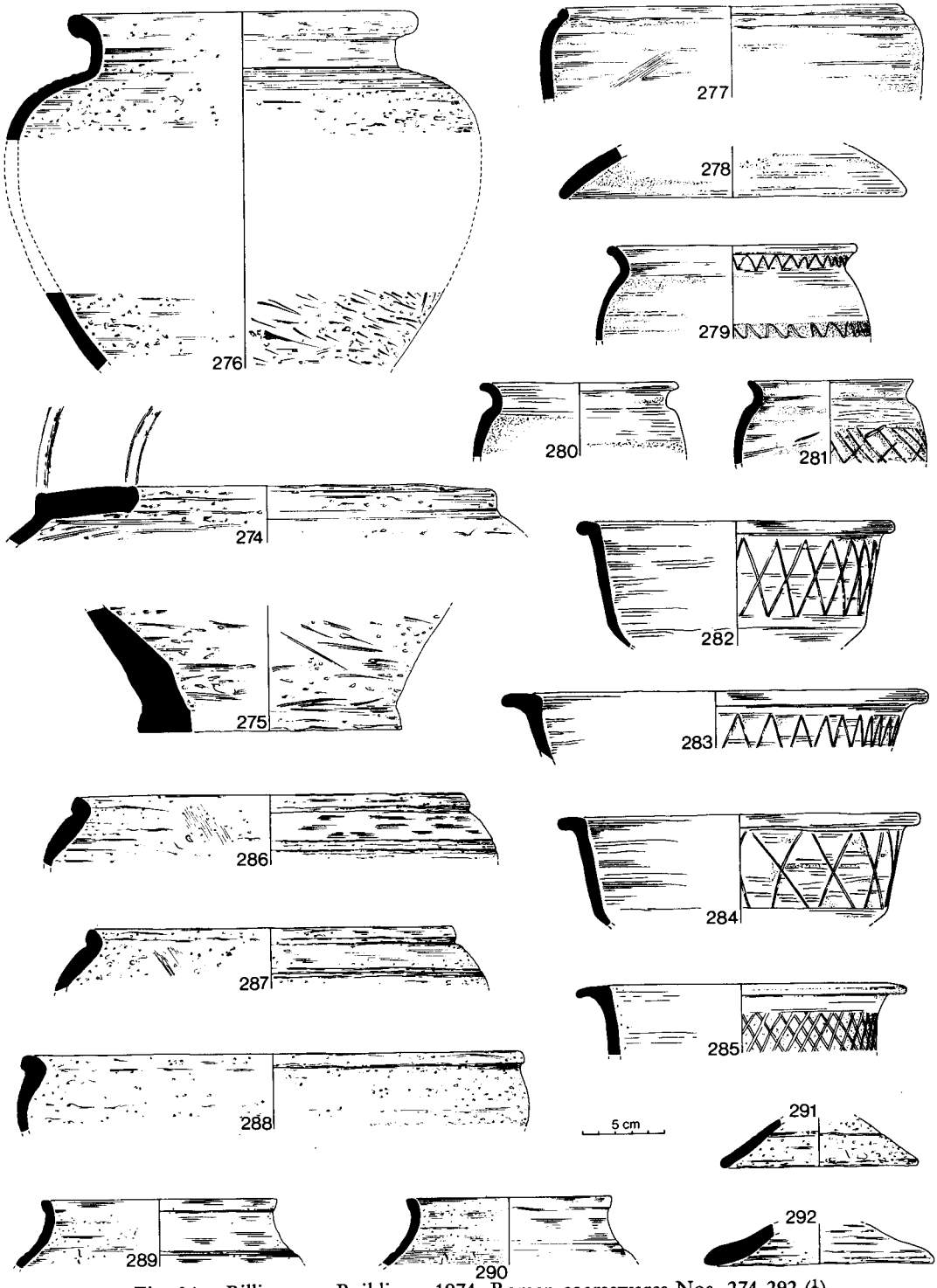


Fig. 34. Billingsgate Buildings, 1974: Roman coarsewares Nos. 274-292 (¼).

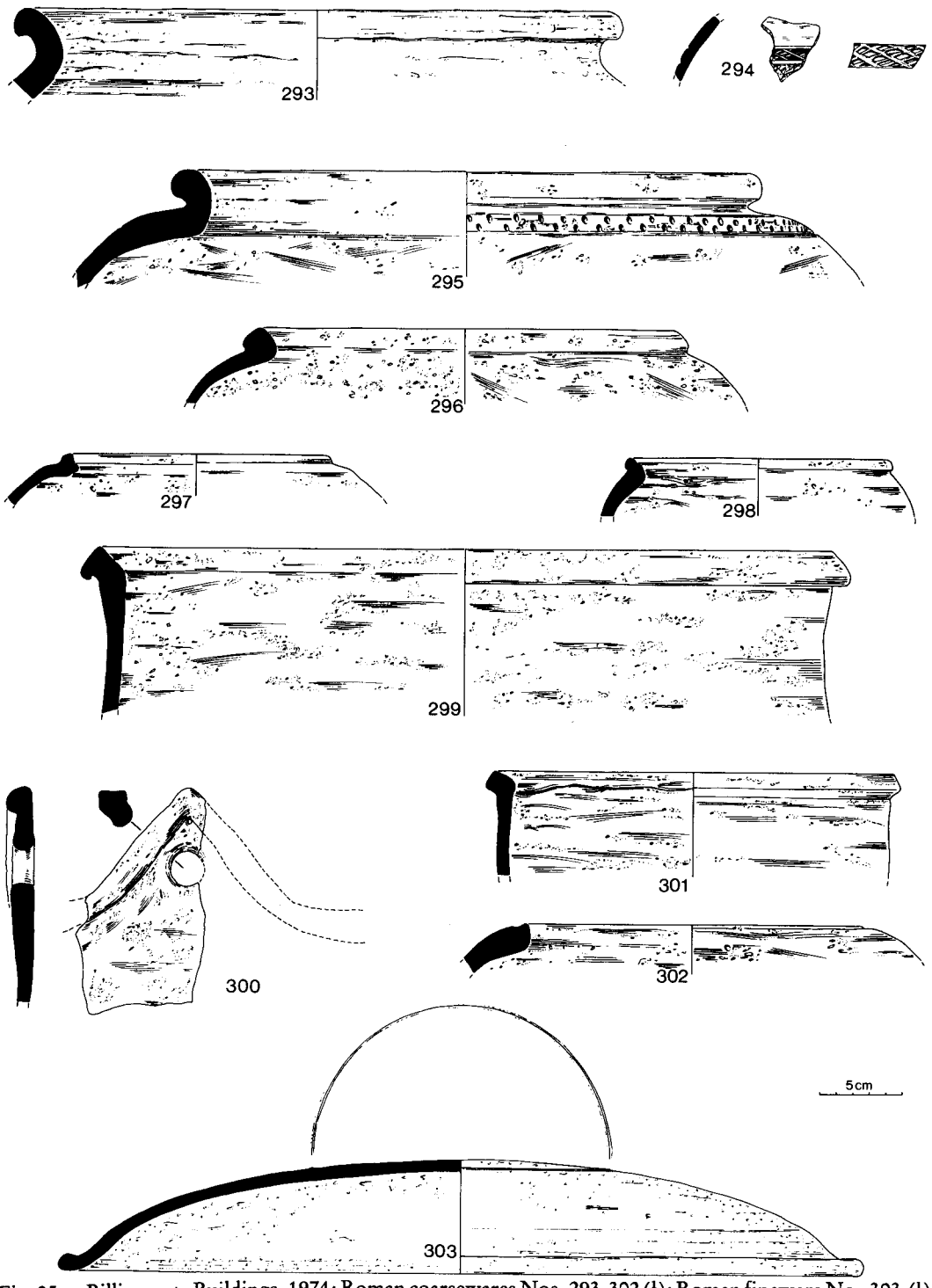


Fig. 35. Billingsgate Buildings, 1974: Roman coarsewares Nos. 293-302 (¼); Roman fineware No. 303 (¼).

mica are present. The surfaces are "porridgy" and practically unburnished, as is normally the case with Patchgrove Ware (except around the wheel-finished rims), but the usual pink-buff surface colour has been stained almost black. The distributional evidence strongly suggests that Patchgrove pottery was produced in West Kent (e.g., Philp, *ibid.*), where it forms a large proportion of 1st and 2nd-century assemblages, though the precise date range is far from clear.

Other types were found in broadly comparable fabrics, but with well burnished surfaces. In view of what little is known of the distribution of grog-tempered pottery in the south-east they are also likely to have a source in west Kent. A roller stamped sherd from group X (294, detail ½ scale) is of particular interest, since this type of decoration is very rare on hand-made pottery.

Patchwork sherds are present in X and VWX (0.2 kg). All other comparable fabrics represent 0.18% of all pottery (a further 1.1 kg, including vessel 384 from group Z).

295-298 *?North Kent hand-made shell-tempered storage jars* (Fig. 35). By far the commonest form in which this fabric occurs is 295, a storage jar with distinctive rim profile, decorated on the shoulder by one or two rows of stab-marks or fingernail impressions between two grooves or above a single groove. A full profile is shown by Detsicas (1972, Fig. 10, 22) from Rochester. Single examples of smaller jars were also found (296-8). Grey or dark grey, often bluish, with darker surfaces (though perhaps mudstained and not typical in their colour), fairly hard but friable and very laminar in fracture as a result of the *many white plates of (?) fossil bivalve shell (1.5-4 mm, occasionally larger)* which the fabric contains. Other inclusions are sparser: some grog (*c.* 0.5 mm, much as the matrix), quartz (*c.* 0.2-0.5 mm, SA), and occasional red ironstone and rolled flints, the last two often very coarse. A vertical fracture shows obvious signs of coil building. *Inclusions can be seen at the surfaces, which are roughly wiped.* The rims may have been roughly trued-up on a turntable.

On distributional grounds, a source near the coast of west Kent seems likely, as many examples occur along the Thames estuary there (although production in Essex, along the north side of the estuary is also possible). Since these jars are quite commonly found in London, but are of poor quality, it seems likely that they arrived as containers for some commodity (pitch adheres to the rim and shoulder of some examples, supporting the view that they were originally sealed for transport). A strong possibility is that the commodity involved was salt, as the jars are often found in association with saltern débris along the Thames and Medway estuaries (e.g., at Higham Marshes, near Gravesend (pers. comm. P. Lewis) and at Upchurch Marshes, near Gillingham (material in Brit. Mus. coll., pers. comm. C. Johns)).

0.49% of all pottery, with a slight concentration in Flavian deposits: 0.7% of V, 0.6% of W, 0.3% of X, 0.6% of VWX (absent from U, Y and Z). Weight 7.1 kgs.

299-301 *?South Essex hand-made shell-tempered pottery* (Fig. 35). A small group of three vessels (all illustrated) which are either deep bowls or very large "buckets". 300 is the suspension lug of one of these most unusual vessels. Much the closest parallels apparently occur at Gun Hill, West Tilbury, Essex (Drury and Rodwell, 1973, p. 80 and Fig. 16, 79-80), where similar vessels may have been made, and at Mucking, Essex, so that a south Essex source is assumed. Dark bluish grey (e.g., 5PB 4/1) with brownish margins and surfaces (e.g., 10YR 5/2), fairly soft to medium hardness, rough to touch. *Abundant inclusions of (?) fossil bivalve shell* (<3 mm), with variable amounts (sparse to abundant) of *well rounded quartz* (0.3-1 mm) and much sparser ironstones and organics in a silty matrix. Surfaces wiped; given the fabric, the pots are quite well finished.

0.15% of all pottery, found in equal quantities in groups X and VWX; weight 1.6 kgs. Date uncertain: the Gun Hill examples are stated to be 1st century.

302 *Other hand-made shell-tempered pottery* (Fig. 35). This accounted for only 0.03% of the whole, and all came from group X. Weight 0.1 kg. The single rim sherd is illustrated (302).

THE FINEWARES

Finewares are included in this section on the basis of conventional description as such, rather than the small particle size of the fabric (Pompeian Red Ware fabric 1 and Romano-British mica-dusted wares, in particular, have rather coarse fabrics). Most of the smaller vessels are illustrated at ½ scale in Figs. 36, 37 and 41 for clarity; others are illustrated at ¼ scale with the coarsewares. Samian and the fineware lamps are reported separately (pp. 80-85 and 84-86); it should be borne in mind that samian was much the commonest fineware at Billingsgate Buildings, and was indeed the commonest single type of pottery.

Joanna Bird, Dr. Kevin Greene, Geoff Marsh and Valerie Rigby have given much help with various finewares, but the author is responsible for the final determination of individual types.

Italian Finewares

303 *Pompeian Red Ware, fabric 1* (Fig. 35). (See Peacock (1977b) for a full description and discussion). Reddish-brown, abundantly filled with various SA or A inclusions (mainly <0.5 mm, occasionally <1 mm), chiefly *black crystals of augite*, white limestone, quartz, feldspars, and ironstones. Surfaces are darker, often sooted, and bowls (but not lids) are internally slipped in the "Pompeian red" colour (cf. 10R 4/6). Two vessels were represented: a very large lid from group X (303), and a fragment of slipped bowl from a post-Roman context. Thus both occurrences are residual, being very much later than the terminal date of *c.* A.D. 80 given by Peacock. The source is almost certainly the Pompeii-Herculaneum area of Italy, and a special purpose (e.g., bread-making) is suggested by Peacock for this type of vessel.

0.06% of all pottery (all from a single context of X). Weight 0.6 kg.

Gallo-Roman finewares

304, 304a *Lyons ware* (Fig. 36). See Greene (1972, 1-2 and Figs. 1-4). Buff-white fabric with a greenish tinge (cf. 5Y 8-9/2), usually soft or medium but sometimes hard, fairly clean-fractured. Inclusions are rare and consist of quartz grits of the type used to roughcast the beakers. *Slipped (greenish) brown* (7.5YR 4/4), *often with a distinctive coppery metallic sheen*, but sometimes thinner and matt. *Most beakers are roughcast inside and out with coarse quartz sand* (A, SA, R, 0.5-2 mm) as shown in detail at actual size (304a). Sherds from 5 or 6 beakers of Greene's form 20 (reconstruction from a London example, Lombard Street) were found, with a single plain beaker sherd and a lid (304). Probably made near Lyons, generally pre-Flavian, though the beakers may have been longer-lived.

0.05% of all pottery: sherds present in U, W and X, 0.2% of V, absent from VWX, Y and Z. Weight 41 gms. Most or all of the material may be residual.

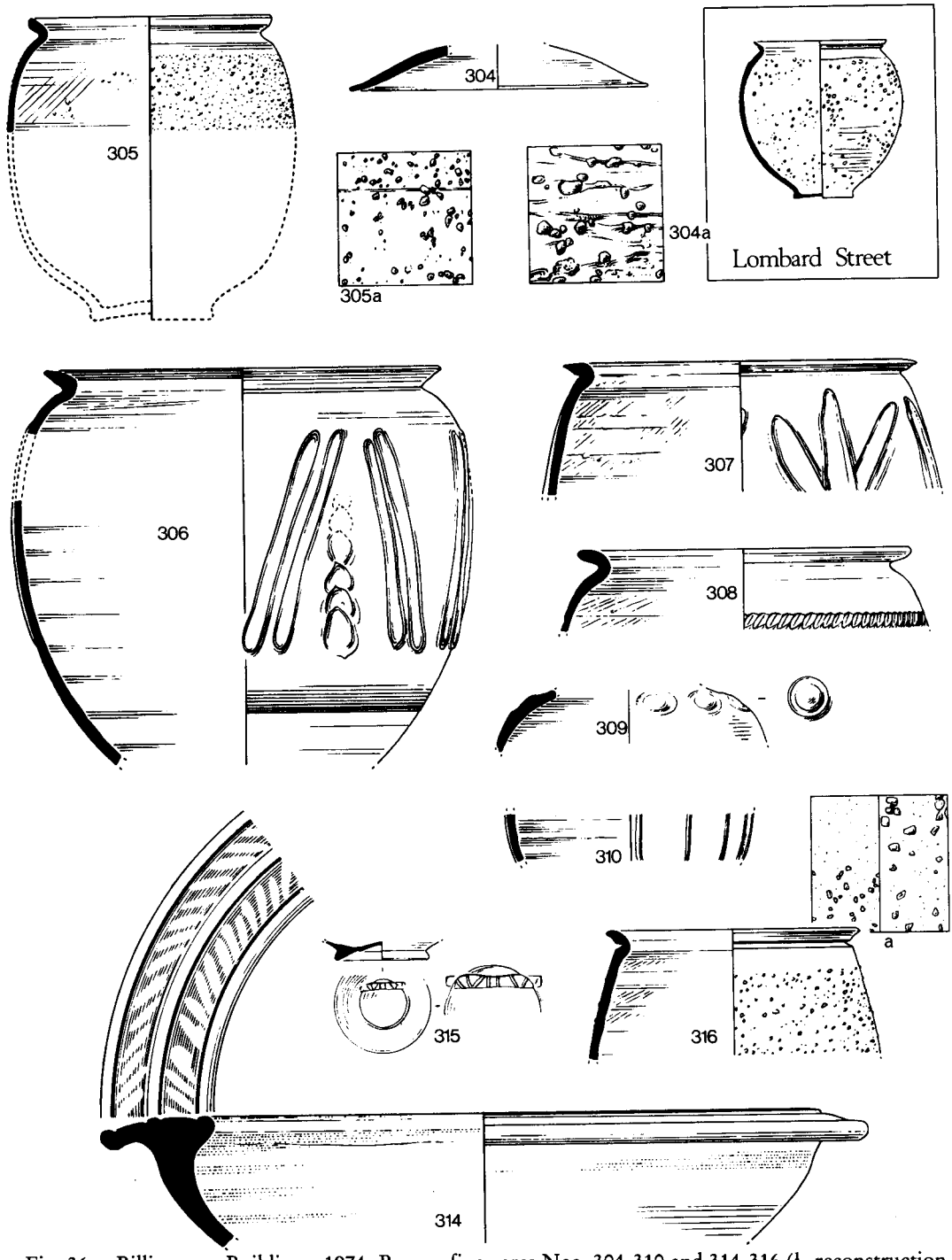


Fig. 36. Billingsgate Buildings, 1974: Roman finewares Nos. 304-310 and 314-316 (½, reconstruction ¼, details 1/1).

305-308 *Central Gaulish colour-coated ware (white fabric)* (Fig. 36). See Greene (1972, 4-5 and Fig. 7). *Extremely fine creamish or almost pure white,* hard, clean-fractured, with usually rare inclusions of quartz and red particles (both <0.1 mm). Variety lies largely in the surface treatment. The roughcast beaker (305) is thinly slipped blood-red inside and out (c.f. 10R 4/10) *over crushed white clay pellets* (<1 mm) which cover the exterior and base (305a detail shown at actual size). 306 and 307 are decorated with "hairpins" and "teardrops" smeared on with the fingers *en barbotine* and slipped almost black or a dark greenish-brown (10YR 5/4-3/2), though the lower body and interior is blood-red as a result of the method of kiln stacking. 308 has the same dark slip but is rouletted.

The roughcast vessels should be amongst the latest of their series, according to Greene *(ibid.),* and the Flavian date here agrees with this. The *barbotine* decorated vessels are usually a little later (Flavian and Trajanic); most of the Billingsgate Buildings sherds come from groups VWX and X. 308 is from a later Flavian deposit (group V).

Source: Lezoux area of Central Gaul.

0.19% of all pottery: <0.1% of V, 0.4% of X, 0.2% of VWX (absent from U, W, Y and Z), but of the total weight of 56 gms, half comes from V.

309, 310 *Central Gaulish Glazed Ware* (Fig. 36). See Greene (1972, 12-13 and Figs. 10-12). Formerly termed "St. Rémy Ware". Both sherds here are in Greene's fabric 'A', which is *identical to that of 305-8 above, but patchily or evenly lead-glazed.* Both the sherds found here are from flagons. 310 is wheel-made (not moulded) and decorated *en barbotine* with vertical ribs beneath a glaze of typical light-green colour (5Y 7/8). 309 is moulded, and covered inside and out with an untypical, thick, black highly lustrous glaze. The colour of this vessel is a result of overfiring, and there is a flaw in the sherd which would have rendered the vessel useless as a container. London is the only part of the province where this fineware has been found in the form of "seconds" (pers. comm. K. T. Greene).

Source as for 305-8, probably pre-Flavian, and residual here. Both sherds are from V (weight 6 gms).

Central Gaulish colour-coated ware (coloured fabrics) (not illustrated).

a) A small number of sherds from various beakers. Pale buff (cf. 10YR 8/4) or pink (cf. 5YR 8/4-7/8), hard, fairly clean-fractured, slightly rough. The major inclusions are thin angular plates and splinters of a reddish pearly mineral (?of the mica group) (<0.3 mm) and quartz (<0.2 mm), with much rarer white mica. Normally slipped black and often lustrous, but one sherd has a deep red slip (10R 4/8) on the base, much as 305-7 above. Where roughcasting is present, crushed clay (<1 mm) has been employed. "Judder" rouletting is present on one sherd, others may be from plain forms. Easily confused with some later Colchester products, but probably Central Gaulish.

0.04% of all pottery: 0.2% of V, sherds present in X and VWX (but absent from U, W, Y and Z). Weight 37 gms.

b) These sherds are apparently in a black-slipped version of a Central Gaulish samian fabric: pink (2.5YR 7/8), clean-fractured and inclusionless to the naked eye, but containing abundant reddish pearly plate-like inclusions (?mica family) and diffuse white particles (both mainly <0.1 mm). Black, more or less shiny slip. The very fragmentary material is probably all from beakers, one of which (group VWX) shows a small area of moulded vertical "rope" decoration.

Sherds present in groups X, VWX and Z, with a more doubtful example in W. Weight 31 gms.

311-313 *Pompeian Red Ware, fabric 3* (Fig. 38). See Peacock (1977b). Quite distinct from fabric 1: beige (10YR 7/3) sometimes sooted, smooth, laminar as a result of *abundant inclusions of white and brown micas* (<0.5 mm); sparse SA quartz and some white limestone (both <0.3 mm) are also present. The red slip (10R 4-5/8), is usually lost, being very soft. Peacock suggests a source near Lezoux and production during most of the 1st century. Observation of a number of London sites suggests that 2nd-century use is also very possible, however, and that the type is by no means uncommon here. Only lids and bowls of the types illustrated were produced, though the sizes vary greatly as can be seen from 311-3.

0.13% of all pottery: 0.1% of V, 0.4% of W, 0.1% of X, 0.2% of VWX (1.2% of Z) (absent from U and Y). Weight 0.3 kg.

314 *Painted bowl* (Fig. 36). Beige (10YR 7/4) with grey core, hard; abundant inclusions of quartz (SA, 0.2-0.4 mm) with a little white mica visible at the surfaces, and a few specks of iron oxides. The surface is now mudstained, and it is not clear whether this has caused the mottled effect on the body. The rim is divided by three beads into two zones bearing a painted herringbone design (?originally white).

Difficult to parallel. A Central Gaulish ("Lezoux") source has been suggested, though without much certainty.

0.13% of all pottery: a single sherd from X (0.2 kg).

315 *Black Eggshell Ware* (Fig. 36). The base of an extremely thin vessel, stamped? VIIVI? (shown actual size; the ends of the stamp are uncertain). Dark grey with brownish margins and smooth black surfaces, burnished externally. Fairly abundant quartz inclusions (SA <0.2 mm) and a little white mica. (This fabric seems to have been used for most, if not all, of the stamped eggshell wares known from London).

Valerie Rigby comments that the base is probably from a very small version of a carinated or necked jar, similar to Holwerda's types 26-7 or 74 (Holwerda, 1941, Pls. VII and XIII). No other stamps from the die are known, but an identical base from Southwark is either stamped DVRIVS or may be another illiterate stamp using the same letters, I and V. There are also stamps with the same letters, in different arrangements, from Cologne, but the vessels are of the larger type, Holwerda 26a (Gollub 1962-3, abb. 6, 9 and 11). Production of this type of pottery may have started before *c.* A.D. 40, but no pre-Claudian examples are known from Britain, and a tentative date here would be *c.* A.D. 45-75. Source: probably the Rhineland or Trier, where there is a marked concentration of finds.

Single sherd from group X (3 gms), residual here.

316, 316a *"Cologne" roughcast beakers* (Fig. 36). A familiar type, usually termed "Cologne" though the source may lie elsewhere. White or faintly creamish, hard, fairly clean-fractured, without any inclusions >0.1 mm, these consisting of some quartz, occasional flakes of mica and specks of red ironstone. Roughcast on the base of the body beneath a plain zone under the rim, using crushed clay pellets (as the body fabric, <2 mm depending on the size of the vessel; 316a shows details at actual size). All surfaces are covered with a very dark brown slip (2.5YR 3/2) which contains many minute flakes of red and black ?iron oxides.

316 illustrates the only form recovered, though the size varies considerably (316 is of average dimensions).

0.24% of all pottery, only found in groups X and VWX: 0.3% of X, 0.5% of VWX. Weight 67 gms. A Hadrianic introduction seems possible.

317 *Trier rouletted beaker* (Fig. 37). Orange-brown to red (e.g. 2.5YR 5/8) with dark grey external margin and surfaces, *very hard and subconchoidally fractured as a result of firing to a state of partial vitrification.* With the exception of silt-size quartz, there are very few inclusions, mainly of ferruginous ?sandstone (0.2-3 mm). The surfaces are slipped (firing white internally, but not noticeable externally), burnished and fired

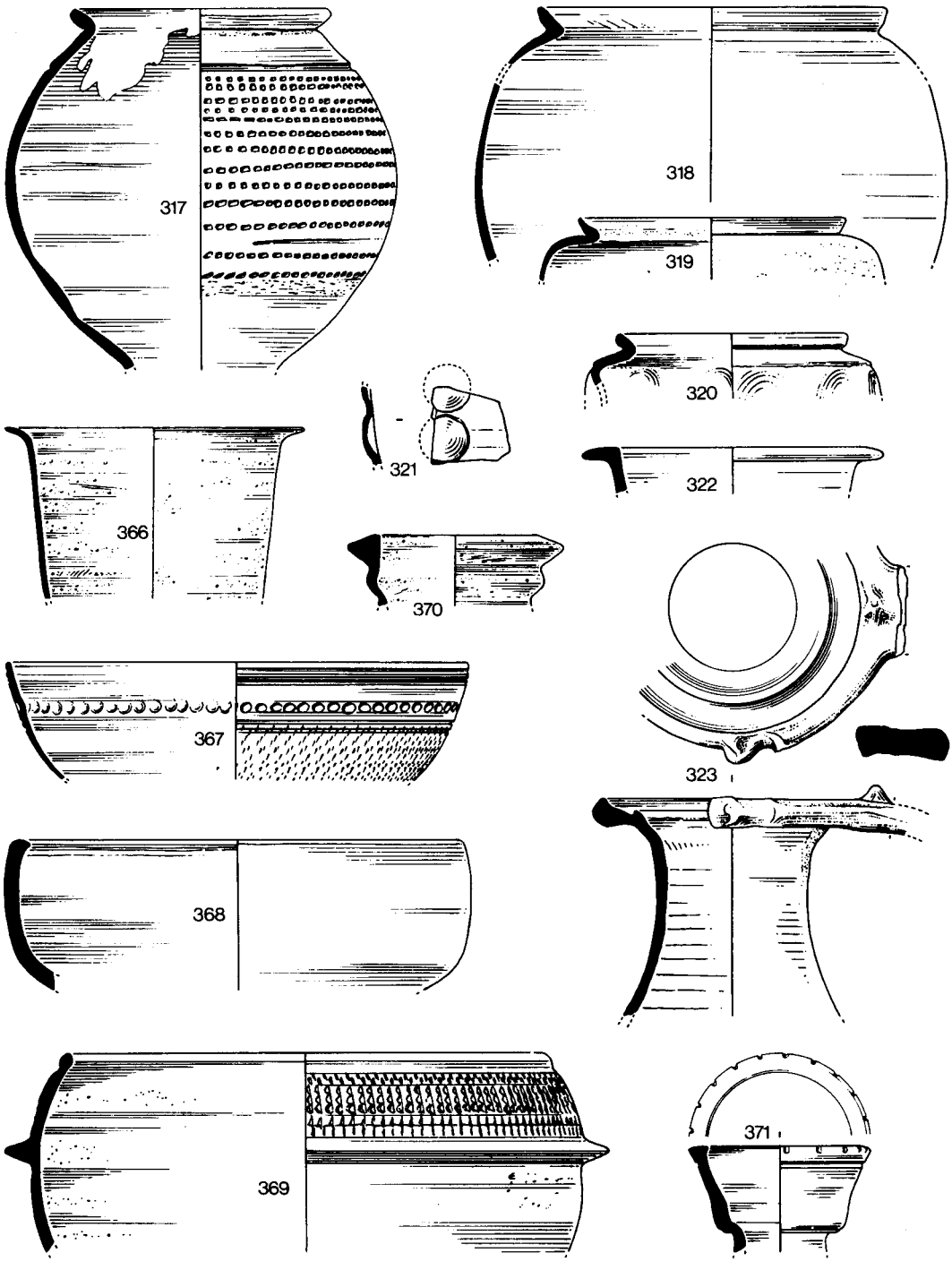


Fig. 37. Billingsgate Buildings, 1974: Roman finewares Nos. 317-323 and 366-371 (½).

to give a *high lustrous finish*. Rouletted with a square-toothed wheel. A Trier product.

0.17% of all pottery, found only in V and X (97 gms).

318-323 *Fine mica-dusted wares* (Fig. 37). These and the Romano-British mica-dusted wares (below, 325-353) are more or less thickly slipped with a suspension of dark micas to give a convincing "bronze" surface finish. (The fabric itself may or may not contain mica). The slip was presumably obtained by washing a highly micaceous clay.

318-323 are fine, thin-walled vessels. Dull beige-brown developing a grey core; smooth to touch, since there are very few inclusions >0.1 mm, though much silt size quartz, a little ironstone and some mica can be seen. Externally slipped. The commonest forms are plain, high-shouldered beakers (318-9), but folded beakers with a large number of folds (*c.* 12?) were found (320), and one beaker sherd was decorated with bosses pressed out into a circular "mould" (321). Other forms were a small bowl and a fine copy of a metal flagon (322, 323), but imitations of Pompeian Red Ware bowls are conspicuously absent.

Thought to be an imported type, probably from the Rhineland.

0.87% of all pottery: 1% of V, 1.2% of X, 0.7% of VWX, sherds present in Z but absent from U, W and Y. Weight 175 gms.

Romano-British finewares

324 *Imitations of early Gallo-Belgic finewares* (Fig. 38). Valerie Rigby's comments on these sherds are incorporated here. As can be seen the quantities are extremely small.

a) (not illustrated). Grey (N6), with black margins and surfaces; hard, slightly irregular in fracture with few inclusions: quartz and sparse mica (<0.2 mm). Slipped and highly finished surfaces. Only a moulded footring is preserved, imitating the imported platter *Camulodunum 16* (Hawkes and Hull, 1947). The quality is better than that of some imports but a British source is more likely on the whole. Dated, like *Camulodunum 16*, to *c.* A.D. 60-85 or 90. (From group V, Flavian. Weight 27 gms).

b) Poorly finished, vaguer copies, though there is no great difference between the fabric of these platters and that of a) above, and both might even belong to the same industry. Similar platters from Southwark are occasionally stamped. 324, a loose copy of *Camulodunum 13*, is from a post-Roman context. More likely of Flavian, or Flavian-Trajanic, than pre-Flavian date. (Residual sherds from group Y and a post-Roman context).

c) (not illustrated). Single bodysherd from a local copy of a butt-beaker, probably *Camulodunum 112* or *113*. Orange-pink (2.5YR 7/10) with buff inner margin and surfaces (7.5YR 7/6), very hard. Silt-size quartz and mica are visible, but the main inclusion is rather abundant grog (<1 mm), which is only distinguishable from the matrix with difficulty, and sparser black ?ironstones (<0.2 mm). Decorated with faint close vertical combing and regularly spaced horizontal scoring. Flavian at the latest.

From group V (Flavian): weight 8 gms.

325-353 *Coarse locally made mica-dusted wares* (Figs. 38-9). Relatively coarse mica-dusted vessels are common in late Flavian and early 2nd-century deposits in London, and production in or near the Roman town is possible. Recent excavations at Staines have produced so much of this material, however, that it is now assumed to have been the major local production centre (pers. comm. K. Crouch and O. Farrington). Similar mica-dusted wares were also made at Colchester (Hull, 1963, pp. 101, 107 and Figs. 56 and 59) and elsewhere, so that work on this type of pottery is still at a somewhat provisional stage. See, however, Marsh and Tyers (1976) and Marsh (1978), whose basic classification between 'more' and 'less' coarse fabrics and fine imports (318-323 above) is adopted here.

325-344 a) (Figs. 38-9). These are the coarsest types, mainly consisting of undoubtedly local material: generally brown (7.5YR 5/4 or redder, e.g., 5YR 5/8) with a grey or dark grey core, hard and irregularly fractured, with fairly abundant quartz inclusions (SA, 0.3-0.6 mm), sparse black and bright red ironstones and burnt organics in a very silty matrix. The fabric contains no visible mica but there is a "bronze" mica slip inside and out. Much the commonest forms are extremely faithful copies of Pompeian Red Ware dishes (325-6), and they may have had a similar use, as their bases are often sooted. Other forms (328-9, 334-6, 339-40 and 342) almost all occurred as single examples, although deeply flanged bowls (330-3) are also common. A small quantity of the coarser types may be attributable to Colchester kilns, however, since some sherds resemble BB2 in fabric (251-7, above) and are brick-red in colour (2.5YR 5/10), occasionally with a grey core. Forms are similar to those of the (?)more local fabric: types 338 and 341 are notable amongst Pompeian Red forms and flagon fragments. It is not always possible to make a hard and fast distinction between ?Staines and ?Colchester fabrics.

Largely 2nd century in occurrence. 1.39% of all pottery: 0.8% of V, 0.4% of W, 1.8% of X and VWX (absent from U, Y and Z), but the weight of sherds (total 2.7 kgs) was more heavily concentrated in the later groups: 150 gms from V, 67 gms from W, but 1.4 kgs from X and 1.1 kgs from VWX.

345-351 b) (Fig. 39). A finer fabric, bluish-grey (10 PB 6/2) with usually well demarcated orange margins, hard or very hard, apparently more highly fired than a). Inclusions consist of sparse to moderate quartz grains (SA, <0.3 mm) in a silty matrix, and the slip is often lighter ("golden") in colour. In addition to Pompeian Red Ware copies, forms 345-51 were represented by single examples. 347 is a copy of the common 1st-century samian form, Drag. 27, from group V (Flavian). None of the more exotic local mica-dusted forms such as *paterae* and wine-strainers were found at Billingsgate Buildings.

0.41% of all pottery, again tending to be 2nd century in date: 0.1% of V, 1.1% of W, 0.2% of X, 0.7% of VWX (absent from U, Y, and Z). Weight 0.6 kg.

352-3 c) Other mica-dusted wares. Two notable sherds are illlustrated (Fig. 39). 352 is a Pompeian Red Ware copy in a wholly black fabric with a very thin (perhaps largely lost) mica slip; inclusions consist merely of quartz grains (SA, occasionally R, 0.1 – 0.4 mm), and the surfaces are sooted.

(From group VWX). 353, probably also a bowl but conceivably a jar shoulder. Dark grey/black with abundant quartz (A <0.3 mm), a good deal of very fine white mica and pellets of ?black ironstone (SA, <0.2 mm). Thinly mica-slipped, decorated by groups of wavy lines made with a closely-toothed comb. (From group VWX).

Other mica-dusted wares account for 0.03% of all pottery. Weight 0.4 kg.

354-365 *"London" and "Upchurch" finewares* (Fig. 39). These types are difficult to distinguish with the methods used here. Both types have mid-grey fabrics with black margins and surfaces, and contain little but silt-size quartz and fairly sparse white mica (often not readily noticeable in the hand). The accessible surfaces are very smoothly finished/burnished. Although the types are not distinguished for statistical purposes, the following points were observed:

a) "London Ware". One of the commonest finewares in London. A range of forms is described by Marsh and Tyers (1976) and in Marsh (1978), and a largely Trajanic date is suggested. The most usual forms are compass-scribed and/or rouletted copies of the samian form Drag. 37 (354-7 here). Compass-scribed samian copies are often referred to

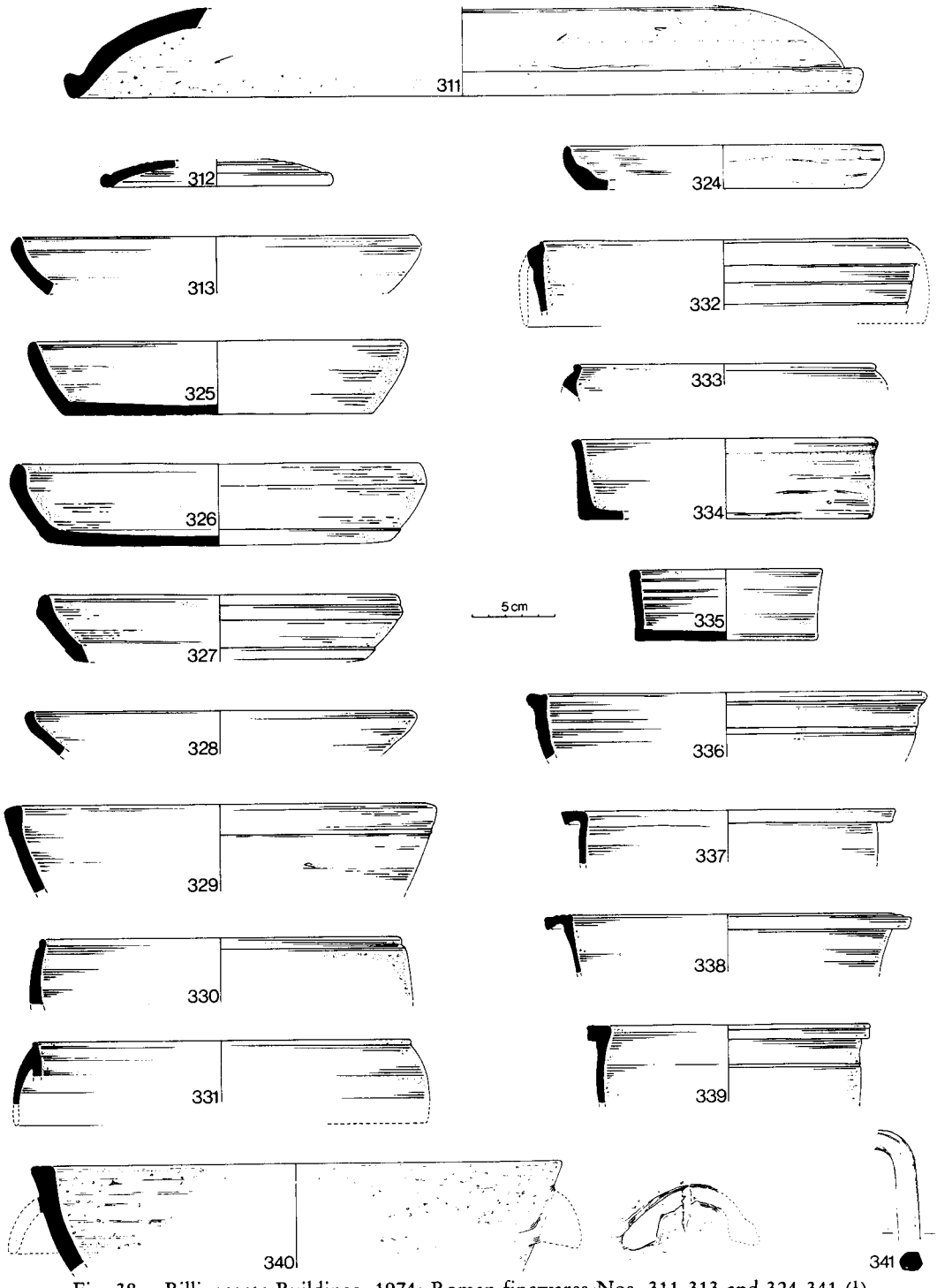


Fig. 38. Billingsgate Buildings, 1974: Roman finewares Nos. 311-313 and 324-341 (¼).

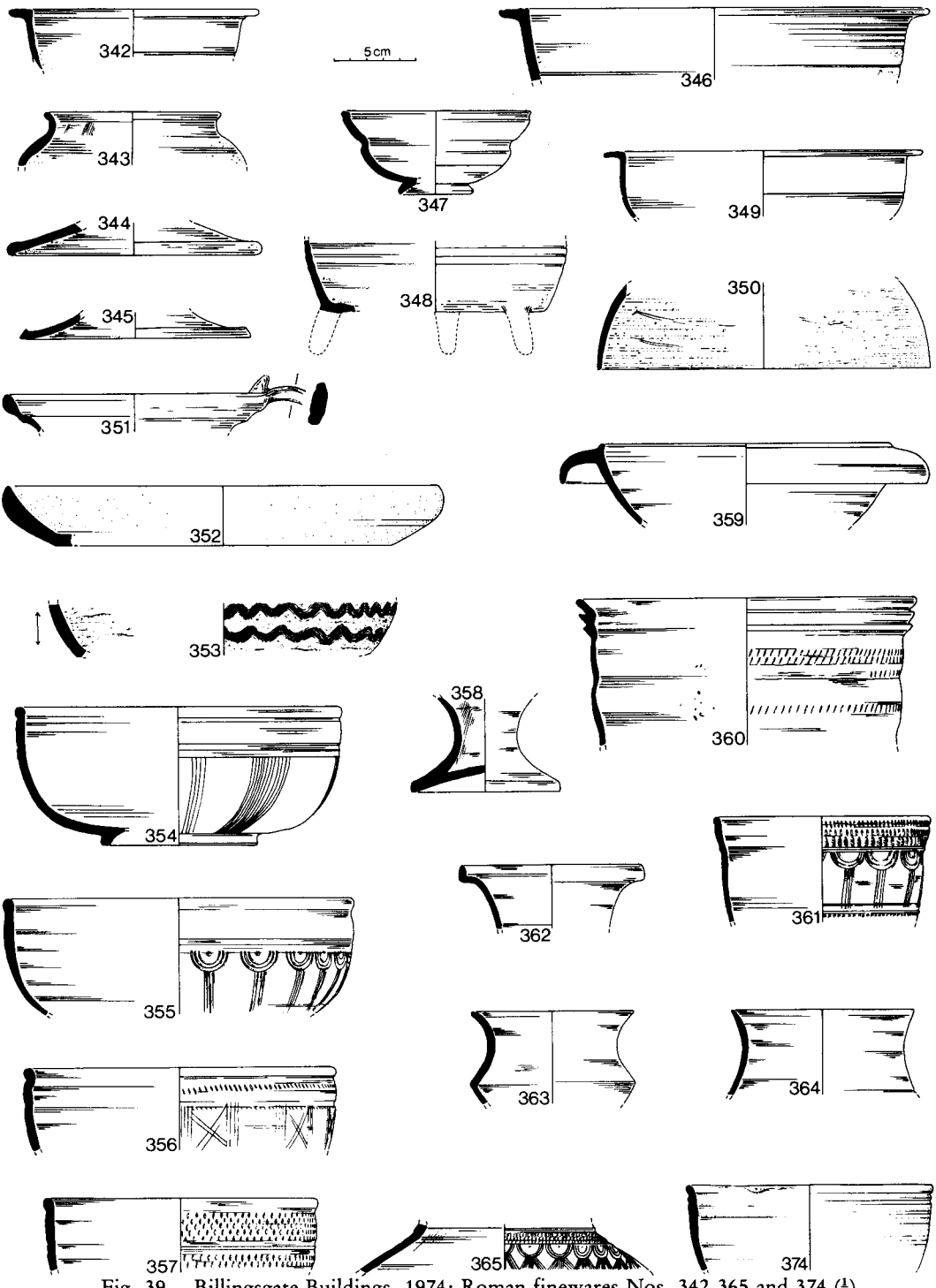


Fig. 39. Billingsgate Buildings, 1974: Roman finewares Nos. 342-365 and 374 (¼).

generically as "London Ware" even when quite obviously made at one of the several kilns outside the London area known to have made such bowls, and it is suggested that the term be restricted to the smoothly finished black-surfaced London fabric.

b) "Upchurch Ware" is strongly concentrated in the Medway area of Kent (Noël Hume, 1954), but is not rare in London. Inspection of unpublished material in the Museum of London, British Museum and Rochester Museum provisionally suggests that "Upchurch Ware" may be distinguished by its higher degree of firing, cleaner fracture, higher jet-like finish, frequently more prominent mica and the strong internal wheelmarks on many examples. These features were not always helpful with worn material, however, and so the following are suggested to be "Upchurch" vessels on largely typological grounds: ?358, 359-60, ?361, 362-4. ("Upchurch Ware" has a range of highly individual forms, often with very angular profiles). 360 and 361 (imitations of Drag 30) are slightly distorted or spalled 'seconds'.

365 has a hard light grey fabric and surfaces. Its attribution is uncertain.

"London" and "Upchurch" wares together account for 0.67% of all pottery, the former probably being rather commoner: 1% of V, 0.7% of X, 0.6% of VWX (absent from U, W, Y and Z). Weight 1 kg, only *c.* 20% of which is from V.

366-369, ?370, 371 *?Locally made eggshell ware* (Fig. 37). See Marsh (1978). Vessels in this fabric are strongly concentrated in and around London, and so are presumed to have been fairly locally made. They include works of consummate skill like 367, which is thrown to a thickness of as little as 2 mm and regularly decorated with a small circular stamp while still wet. The fabric is pure white, very pale cream (5Y 9/1) or orange-pink (5YR 7/8), often "streaky" and with slightly duller surfaces; clean-fractured. Inclusions (of quartz (A, SA <0.3 mm) and a little ironstone) may be practically absent, sparse, or moderately common, and the thinnest vessels occur in both the finest and the coarsest fabrics. 369 is a copy of the Claudio-Neronian samian bowl Drag. 24/25, but the eggshell wares are thought to be Trajanic in date (pers. comm. G. Marsh). 370 is probably, but not certainly, in this fabric. See also "Marbled ware" (following).

Unfortunately, all the sherds with the exception of 366 (group Y) and 370 (group W) are from group VWX, and so of rather uncertain date, though a Trajanic *floruit* is quite possible. 0.25% of all pottery. Weight 64 gms.

?Locally made marbled ware (not illustrated). The fabric is indistinguishable from that of the eggshell wares (366-71), though rarely with more than sparse inclusions and ?always more or less white, and the remarks on the distribution and dating of eggshell ware also apply. *A distinctively "marbled" slip has been applied, perhaps with a sponge, and is either ?oxidised orange red* (2.5YR 6/12) *or ?reduced greyish brown* (10YR 4/4).

Only three body and base sherds were found, again all from VWX (weight 17 gms).

Brockley Hill-Verulamium area "ring and dot" beakers (not illustrated; reconstruction Fig. 41). See Green (1978). Usually a pale cream/yellow, but the range of colours for Brockley Hill-Verulamium "white" fabrics is known, and thin section examination shows that *the fabric of these beakers is probably that of a Brockley Hill-Verulamium paste with much sparser visible inclusions* – perhaps a refined clay. Decorated *en barbotine* with rings and panels of dots. The distribution – concentrated in London, with examples at Verulamium – supports the origin suggested by the fabric, although no examples seem to be known from relevant kiln sites. The illustrated vessel is a London example from Gracechurch Street (Museum of London Acc. No. 10680).

0.15% of all pottery, with a concentration in groups V and W which suggests a Flavian and perhaps Trajanic date. Weight 58 gms.

372 *Red-painted fineware* (Fig. 41). A single sherd from a bowl with a deep flange. Buff-grey (7.5YR 7/3), irregular-laminar in fracture. There are no inclusions larger than the silt-size quartz and sparse mica of the matrix. Decorated with closely spaced, dull red painted lines (10R 4/7).

Presumably Romano-British. Similar types are known from Yorkshire (Keen, 1970) and Wiltshire (pers. comm. K. Greene), but it is not known whether their fabrics are comparable.

From group X (12 gms).

Colchester roughcast beakers (not illustrated). Reddish-brown (2.5YR 5/6), often with a grey core, irregularly fractured and *noticeably rough to touch*, as a result of abundant very fine quartz in the matrix. Larger inclusions of quartz (A, *c.* 0.25 mm) are sparser, and a little very fine ironstone and mica is seen. The roughcast grits consist of similar crushed clay and occasional rounded quartz grains (1-2 mm), and the surfaces are covered in a drab, very dark grey slip.

Absent from groups U, V, W and Y; sherds present in X, VWX and Z, i.e., Hadrianic and later here? Weight 65 gms.

373-4 *Miscellaneous grey finewares* (Figs. 39 and 41). A residuum of sherds from small "grey-ware" vessels with very fine fabrics, usually with no other inclusions than very fine quartz and sparse ironstones and micas. There is a continuum with the finer grey "coarsewares". The two most complete profiles are illustrated: 373, decorated with a cluster of barbotine dots, from group V, and 374 from group VWX.

0.48% of all pottery. Weight 0.4 kg.

II POTTERY FIRST OCCURRING IN GROUP Z

The bulk of the pottery from this single layer (222, ER 4008) is thought to be of early or mid 3rd-century date for the following reasons:

i) it must post-date the late Antonine samian found in underlying deposits.

ii) obviously 4th-century types are absent.

iii) the close resemblance of the group to that from the initial fill of the so-called 'Mithraeum' at Colchester (Hull, 1958, 107 ff), which is now thought to belong to the first half of the 3rd century (Harden and Green, 1978).

iv) bowls of types 377-9 have been thought to be one of the few distinctive 3rd-century types in Southwark deposits. However, two Saxon sherds (Nos. 713-4) were also found in this layer, and unless they intruded during the construction of the superincumbent Victorian cellars it would seem that the group has been redeposited more or less wholesale in the Saxon period. The coherence and preservation of the assemblage and the absence of 4th-century types argues against its being a straightforwardly "residual"

group. There is no doubt, though, that this layer has been partially disturbed (perhaps outside the confines of the trench), as further sherds from the same vessels were distributed amongst several post-Roman layers; these sherds are disregarded here, but vessels 389 and 392 (from modern deposits) would be very much at home in group Z and may once have belonged to it.

The quantities of various types which were also found in groups U-Y are given in the appropriate sections above, since all are likely to be residual in group Z. Quantities cited here refer to the proportion of group Z, but the group is too small to be of much statistical significance.

IMPORTED AMPHORAE

375 *Chalk type* 6 (Fig. 40). See Peacock (1977a, p. 298). Orange (2.5YR 6/8) with darker brown margins and cream-brown/light grey inner core and surfaces (10YR 7/4 to N7), very hard, with fairly abundant, often coarse, inclusions: white or grey limestone (A-SA, 0.2-0.7mm), quartz and *fragments of granite* (both A, 0.5-2mm) and a few other rock fragments. The surfaces are spalled by the inclusions. Source unknown, and the date is somewhat uncertain as *Chalk 6* is so rare, but both this and the Chalk example are of probable 3rd-century date.

4.3% of Z. Weight 0.2kg.

376 *Micaceous amphora/jar* (Fig. 40). Bodysherd of a weakly ridged vessel probably related in both form and fabric to the one-handled jars and late 'B iv' amphorae described by Peacock *(ibid.)*. Buff-grey (2.5Y 5/2) with a *thin brown-black external slip* (5YR 4.5/1), hard, fairly clean-fractured (not laminar). The inclusions consist of *fairly abundant white and brown micas* (<0.4mm), which are obvious at the surfaces, and a little very fine limestone. The precise source is unknown, but probably lies in the Aegean or Asia Minor, the source areas suggested by Peacock for the commoner micaceous vessels, which have a 3rd to post 4th-century usage. Examples of the present type are known from Carthage, but this is the first British record (pers. comm. D. P. S. Peacock).

Single sherd (20gms).

ROMANO-BRITISH COARSEWARES

377-9 *Bowls of Colchester type 306* (Fig. 40). *Distinctive often coarsely thrown bowls with small wire-cut bases and rounded or "D-shaped" rims* formed by folding over the upper body. They correspond to Colchester type 306 (Hull, 1958, 228 and Fig. 121) where they were regarded by Hull as occurring after *c.* A.D. 175, and were found in the 'Mithraeum' there *(ibid.*, type 87 p. 140). A few examples are known from Southwark (pers. comm. J. Bird) and other London sites. Two fabrics seem to be present in roughly equal quantities:

a) Light grey with darker margins and surfaces, hard, containing fairly abundant quartz inclusions and a few ironstone fragments (both SA or A, <0.3mm) and some very fine mica in a silty matrix.

b) Superficially similar, but sometimes darker, with brown margins and generally larger (e.g. <0.6mm) *often rounded inclusions* of the same type.

The Colchester 'Mithraeum' sherds could not be found for comparison, but two bowls found at North Hill, Colchester (Colchester and Essex Museum Acc. No. 207.65) are indistinguishable from the form and fabrics described here, and Colchester or a nearby kiln seems the likeliest source for both fabrics.

Sherds from at least 18 vessels are present, accounting for 22.6% of Z. Weight 1.4kgs.

380-1 *Bowls of Colchester type 40a* (Fig. 40). The fabric is apparently identical to that last described, but the surfaces are dark grey or black and smoothly burnished. They are Hull's Colchester type 40a, which he describes as 'very common' *(ibid.*, pp. 280-1) and occurred at the 'Mithraeum' (types 98-9, *ibid.*, p. 140), though some of the 'Mithraeum' examples are a little coarser than the present vessels. A Colchester or Essex source is very probable.

Sherds from two bowls, 3.5% of Z. Weight 40gms.

382 *Black-burnished ware type 2* (Fig. 40). See types 250-257 above; the single sherd from group Z is grey, not black, but almost certainly a Colchester example.

1.5% of Z. Weight 0.1kg.

383 *Narrow-necked vase* (Fig. 40). Dark grey core and surfaces with lighter margins, hard, with moderate quantities of ferruginous quartz (R, 0.3-0.5mm) and a little very fine mica in a silty matrix. Burnished in zones on the exterior and decorated as shown. Such vessels usually have a narrow, or even "pedestal" base and tend to be late 2nd and 3rd century in date. They are common in Essex (e.g., 'Mithraeum' types 105-114 *(ibid.*, p. 141; also Jones and Rodwell, 1973), but are also known to have been made elsewhere, e.g., at Cambridge (Hartley, 1960). The precise source of the single example is unknown.

15.2% of Z. Weight 0.1kg.

Alice Holt/Farnham greyware (not illustrated). Sherds from perhaps four bowls in the fabric described by Orton (1977a, p. 32), and closely comparable with known Alice Holt examples. One has a 'D' shaped rim but is too fragmentary for illustration. Their occurrence is a little surprising at this early date (if they are to be considered as earlier 3rd-century vessels), but too little is known of 3rd-century pottery distribution to preclude the presence of Alice Holt vessels here.

1.7% of Z. Weight 0.2kg.

384 *Handmade grog-tempered jar* (Fig. 40). Light grey with darker burnished surfaces, medium hardness, corky fracture. Abundant inclusions of grog – both crushed "greyware" pottery and white clay (A, <1.5mm) with a little very fine white mica. Source and date unknown; perhaps from West Kent.

Single sherd, 2% of Z. Weight 45gms.

385-7 *Black-burnished ware type 1* (Fig. 40). See above, types 277-284; the vessels from group Z are also apparently from Dorset. The forms are, however, quite different to those from groups X and Y and resemble 4th-century BB1 types much more closely (as do the Colchester 'Mithraeum' examples: Hull, 1958 types 101-2, p. 140). It is clear that BB1 already formed a much more important component of London's supply than it had done in the 2nd century.

9.8% of Z. Weight 0.8% kg.

FINEWARES

Beakers from a Nene Valley or German source (not illustrated). Sherds from ?*c.* 6 vessels. Pure white, fairly clean-fractured with some silt-size quartz and generally sparse larger grains (SA-R, <0.5mm), with occasional minute specks of iron oxide. Slipped black overall (greenish-brown where thin). The barbotine decoration is too fragmentary for certain interpretation but seems to consist of broadly applied ?leaves or tendrils and probably a hunt scene on one sherd. One vessel, at least, was judder-rouletted above the base.

These sherds are suspected to have a "Rhenish" source but such vessels are notoriously hard to distinguish from Nene Valley examples. Weight 90gms.

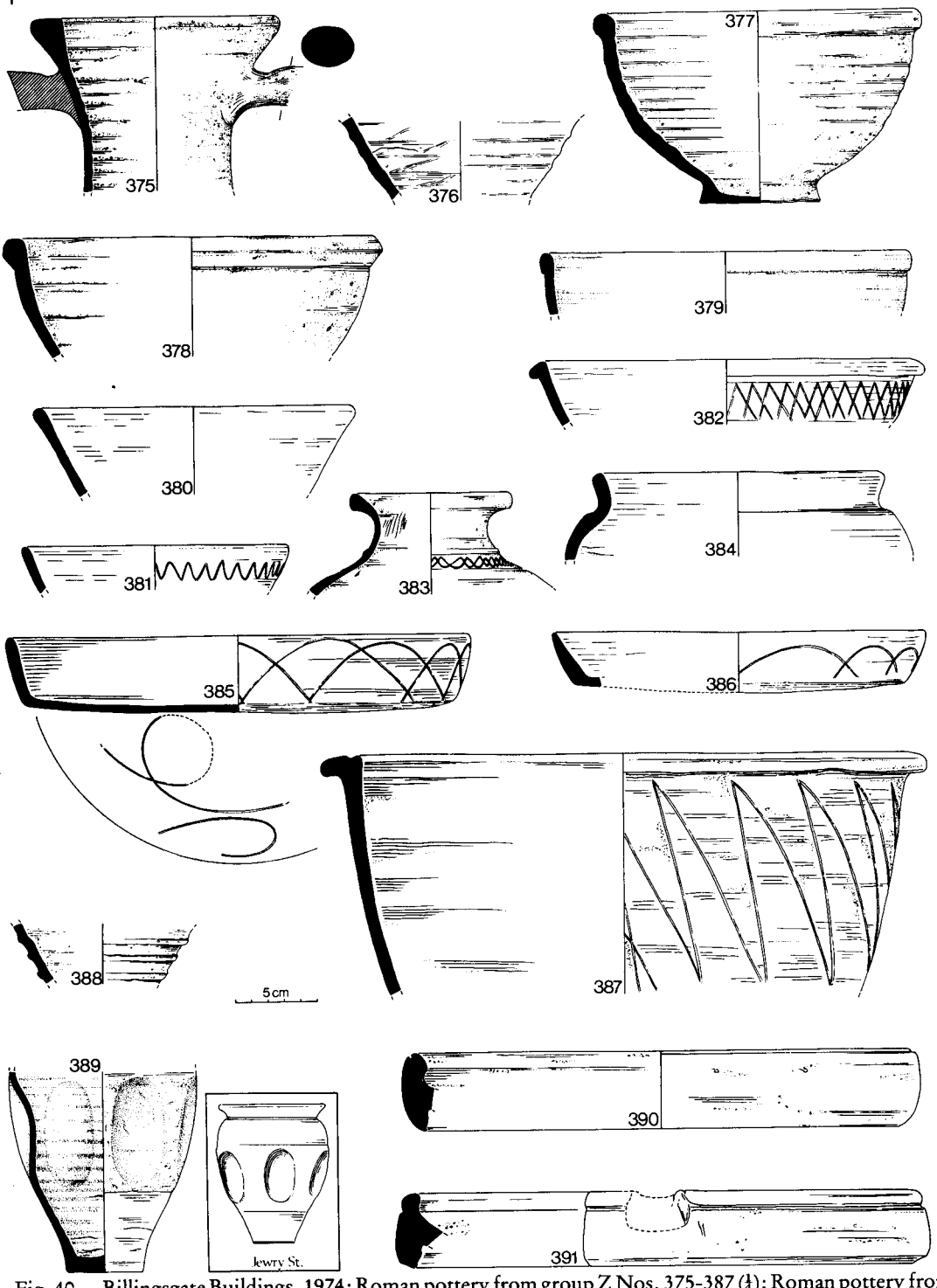


Fig. 40. Billingsgate Buildings, 1974: Roman pottery from group Z Nos. 375-387 (¼); Roman pottery from post-Roman levels Nos. 388-391 (¼).

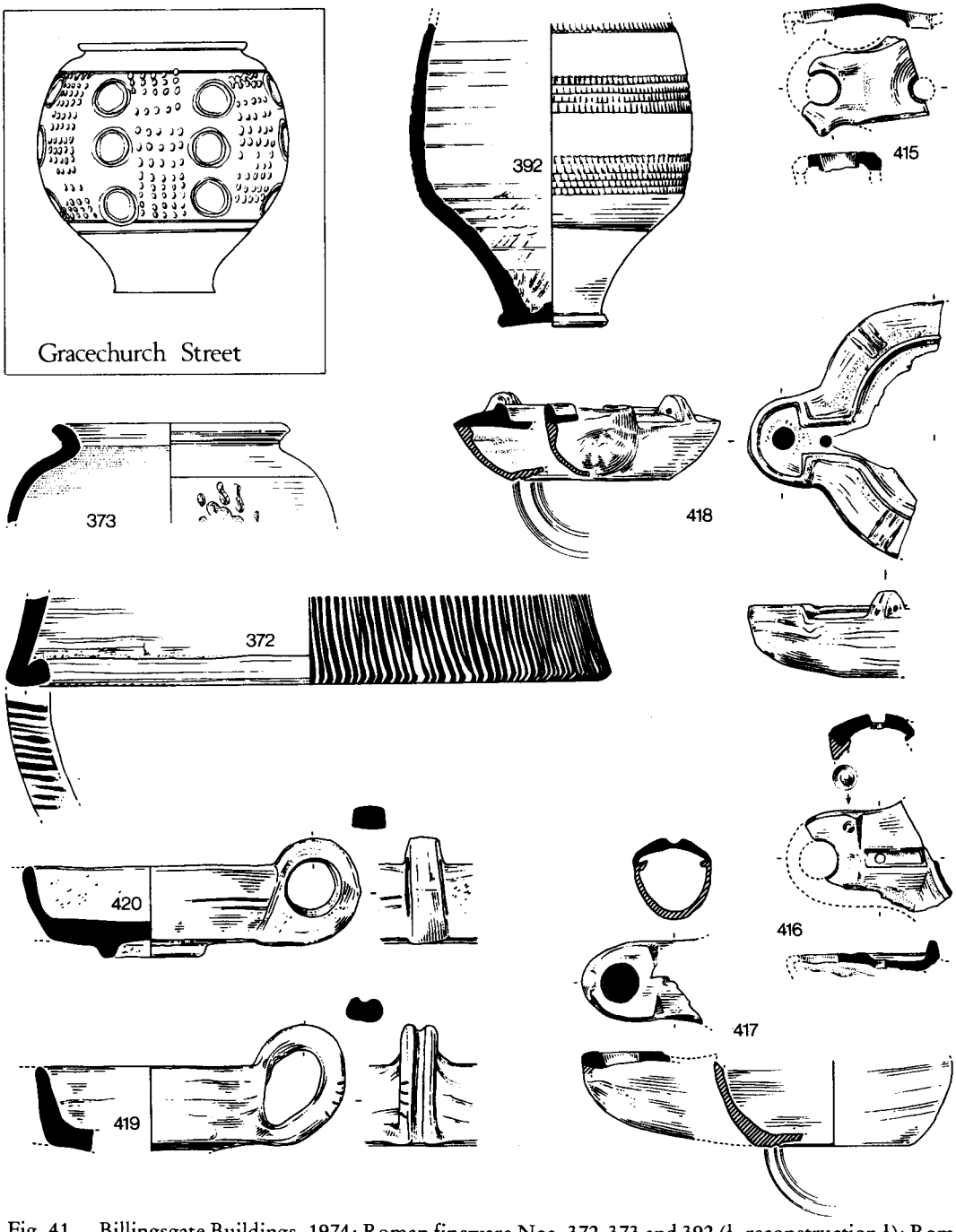


Fig. 41. Billingsgate Buildings, 1974: Roman fineware Nos. 372-373 and 392 (½, reconstruction ¼); Roman fineware lamps Nos. 415-420 (½, detail of No. 416 1/1).

Hadham Ware (not illustrated). See Orton (1977a, p. 37); also Harden and Green (1978). Three redware sherds from closed forms; the single fragmentary rim sherd may be from a vessel like Angel Court type 243 (*ibid.* Fig. 9). Hadham Ware was found in some quantity at the Colchester "Mithraeum" (Hull, 1958, types 36-45, pp. 134-5).

2.1% of Z. Weight 19 gms.

Unfortunately the samian from group Z is all clearly residual, none being post-Antonine in date.

III TYPES FOUND ONLY IN POST-ROMAN CONTEXTS

AMPHORAE

Central Tunisian amphora (not illustrated). A distinctive hard dull brick-red fabric (10R 5/8) with grey margins and surfaces, which have a speckled appearance as a result of the abundant inclusions of well-sorted greyish-white limestone (SA-R, 0.3-0.4 mm) and quartz (SA-R, 0.2-0.3 mm). The single sherd is from a cylindrical form, and was possibly made at Sulentum, south of Tusa, central Tunisia (pers. comm. D. P. S. Peacock). Not uncommon in later Roman (?post-Antonine) deposits in London.

388 (Fig. 40). A heavily ridged sherd from the lower body of a late Roman type, presumably from the eastern Mediterranean. Drab grey-brown (10YR 5/2) inner margin, grading to dull red-brown (5YR 6/8) externally, hard, very "compact" in appearance. Limestone (<0.1 mm), quartz and other minerals (A, SA, R 0.1-0.3 mm) are abundant, alongside much sparser brown grog (<1 mm), shell (<0.5 mm) and very fine mica.

OTHER COARSEWARES

389 *Folded jar* (Fig. 40). This type has an everted rim, as shown by an example from Jewry Street, London (inset), and seems likely to be from an Essex source (?Colchester), since it was found in quantity in the Colchester 'Mithraeum' in a similar fabric. Grey with slightly darker surfaces and a reddish-brown core, hard, rough to touch. Abundant quartz inclusions (A, SA, R <0.5, rarely 1 mm). Probably 3rd (?-4th century).

390-1 *Soller mortaria* (Fig. 40). Identified by Mrs. K. Hartley as the products of the mortarium workshops at Soller Kreis Düren (near Bonn). 390 should date to the period *c.* A.D. 150-240. Bright pale orange or pale pink, hard, faintly laminar in fracture, with fairly abundant *well sorted quartz grains* (SA-R, 0.5-0.7 mm) and sparser grog in a very fine matrix. The grits are of similar, but larger, well-sorted quartz (2-3 mm).

FINEWARE

392 *Colchester beaker* (Fig. 41). The fabric is a better finished and less highly fired version of the roughcast beaker fabric already described from 2nd-century groups (above), and a bright pale yellow in colour. The slip is externally brown-black, but orange internally and above the base as a result of the method of kiln-stacking.

DISCUSSION AND CONCLUSION

Despite certain limitations imposed by occasionally indistinct stratigraphy and the probable degree of residuality of much of the material, the pottery from the Billingsgate Buildings trench has provided valuable information which compensates for the considerable labour expended upon it.

One practical result is that a study of this nature may be of chronological use at a local level. The Billingsgate Buildings deposits have provided examples of a broad range of types for a period (later Flavian to mid 2nd century) in which *Londinium* was well populated and which is consequently often the subject of excavation. Groups of the size of V and X should provide fairly reliable statistical information, and may be assumed to at least approximate to that potentially available from other sites in the capital. This should aid the dating of assemblages which lack coin evidence or diagnostic samian, since certain locally common types have been shown here to have a restricted date range. (Thus Black-burnished ware 1, ?Black-burnished ware 2, Staines-London white-slipped flagons, and perhaps "Cologne" finewares should indicate a Hadrianic or later date, if present in any quantity). Identity of fabric will be of crucial importance in making such comparisons between sites, but if the fabric grouping adopted in this report has been reliable, then the occurrence, or relative abundance or scarcity of a given fabric may prove a less uncertain guide to the date of a deposit than purely typological considerations. The emphasis will be on the *reliability* of dating, however, and not its refinement, for the present study has merely served to reinforce the view that at present coarse pottery assemblages cannot usually be dated within a margin of ±15 or even 20 years for this period, and that even so a sequence of deposits is required for certainty. Well-sealed, externally dated deposits such as pit- or well-groups are obviously desirable for any further intensive work in this field.

Pottery distribution and trade is the second area in which the Billingsgate Buildings material is of value. Studies of local trade, such as those prepared by Hodder (1974) for certain Roman towns on the basis of pottery distributions, may never be available for London since the modern conurbation has swallowed the area in which one would have expected most local pottery trade with *Londinium* to have taken place. Nonetheless it is obvious from the evidence obtained here that the Brockley Hill-Verulamium and "North London" industries (e.g., the Highgate kilns) must have sent a very sizeable proportion of their production to London; it may be possible to see precisely how much as quantitative investigations of the pottery found at *Verulamium*, Staines and other relevant sites take place.

It is less difficult at present to examine the sources of the Billingsgate Buildings pottery in the broader contexts of the province and the empire. Indeed, pottery which has become part of a large accumulated dump

of "rubbish", as in this instance, may be particularly suitable for the purpose since it is *prima facie* more likely to give a reasonable cross-section of London's pottery supply than some other types of deposit. (Pit groups, for example, may simply reflect a single activity such as drinking, and additionally may reflect the material life of the rich rather than the poor, or *vice versa*). Fig. 42 gives a fairly reliable, if not wholly accurate impression of the sources of all late 1st to mid 2nd-century imports (i.e., all groups except U, Y and Z). The most striking features are the unusually large quantities of samian and amphora-borne commodities which were imported in this period, and raises the question of the extent to which London served as a centre for their redistribution as well as their consumption. Figs. 43 and 44 show the approximate sources of much of the Romano-British pottery from groups V (Flavian) and X (Hadrianic-Antonine), respectively (in each case a large proportion of the "unknowns" are likely to be local in origin). In both groups, but particularly V, the quantity travelling more than 20 miles (32 kms) is surprisingly small. The beginnings of a wider provincial trade can, however, be seen in group X with the establishment of the Black-burnished ware supplies from Dorset and Colchester. How far 1st-2nd century London was typical of other Roman towns in these respects is at present uncertain, but the briefest comparison with London's 4th-century pottery supply shows that there is no inevitability in the choice of local suppliers. Fig. 45, which presents the sources for the pottery from layer 9 at Angel Court, Walbrook (Orton, 1977a), shows that at that period most of London's pottery travelled considerably more than 20 miles from its source, the main local production centres of the earlier period having long since ceased operation.

Finally, Group Z is a welcome discovery, since 3rd-century pottery is seldom recognized with any degree of certainty, and changes in the character of the London settlement in the later Roman and Saxon periods may well have worked against the preservation of such groups, whether *in situ* or redeposited. Its interpretation is correspondingly difficult. The similarities between this assemblage and that from the Colchester 'Mithraeum' are beyond doubt, but in the absence of further comparable groups we can only guess whether London was heavily reliant on Essex sources for its pottery during part of the 3rd century; might not the group simply contain a chance arrival of pottery from Colchester (for example as part of the personal baggage of someone who had travelled in that direction)? (It may be relevant that the Colchester region is one of the few from which there is much evidence of pottery production in the 3rd century; on the other hand its products do not appear to be very heavily represented in the older London collections). Whatever the answer, it seems reasonable to infer that the trade pattern represented in Figs. 43 and 44 had already been broken, and that London's pottery supply was drawn from relatively widespread sources well before the 4th century.

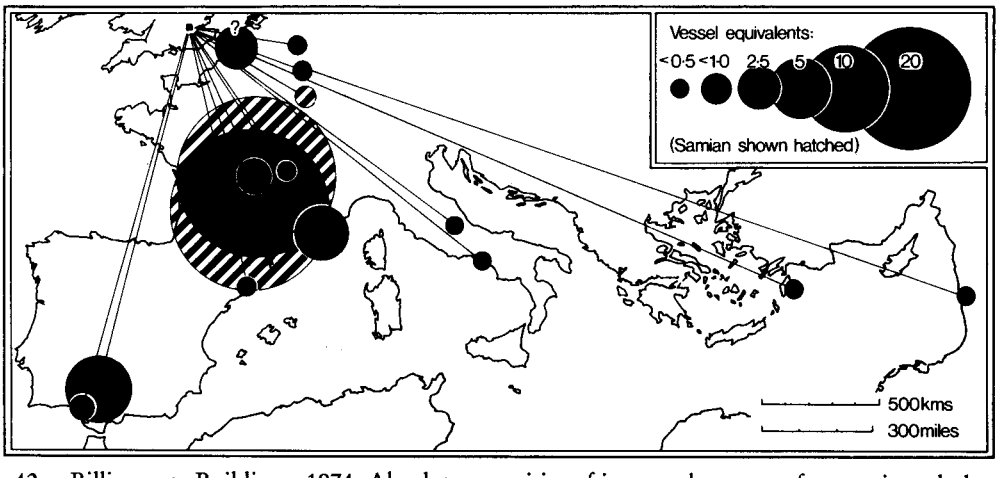


Fig. 42. Billingsgate Buildings, 1974: Absolute quantities of imported pottery of approximately known source found in groups V-X (including residuals). For convenience the South and Central samian sources have been arbitrarily given equal weight.

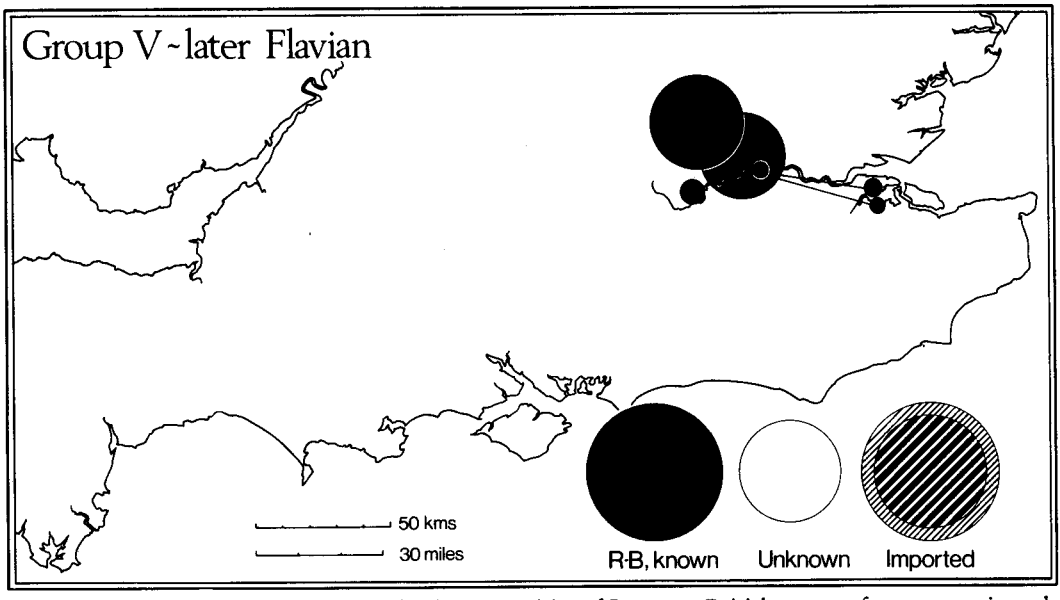


Fig. 43. Billingsgate Buildings, 1974: Absolute quantities of Romano-British pottery from approximately known sources found in group V, with quantities from unknown sources and imports shown for comparison. Residuals are included and the proportion of imported samian is emphasised. Symbol size as in Fig 42.

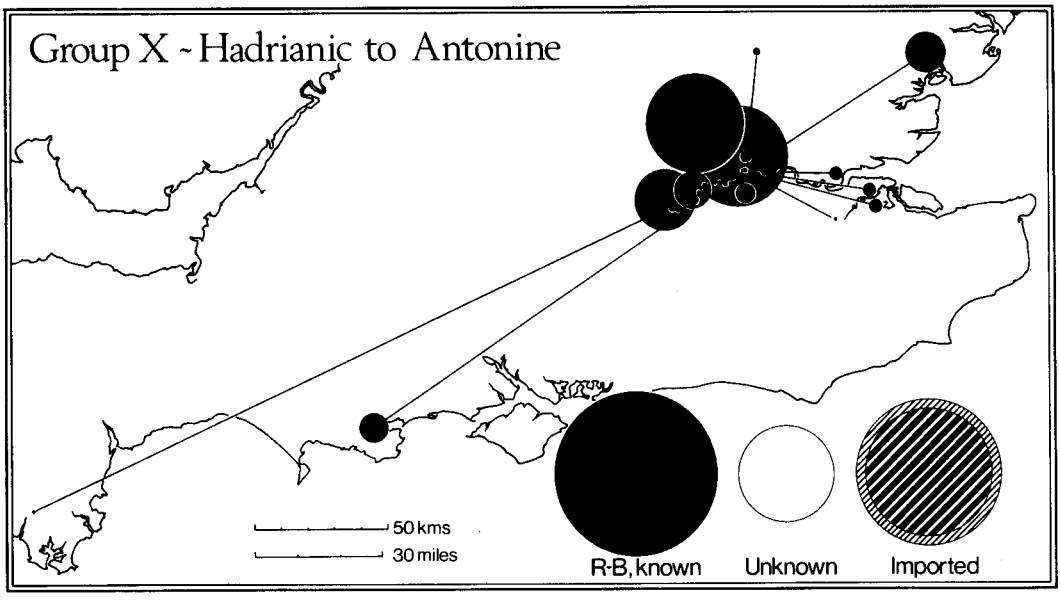


Fig. 44. Billingsgate Buildings, 1974: Sources for the pottery (including residuals) in group X, shown in uniform with Fig. 43.

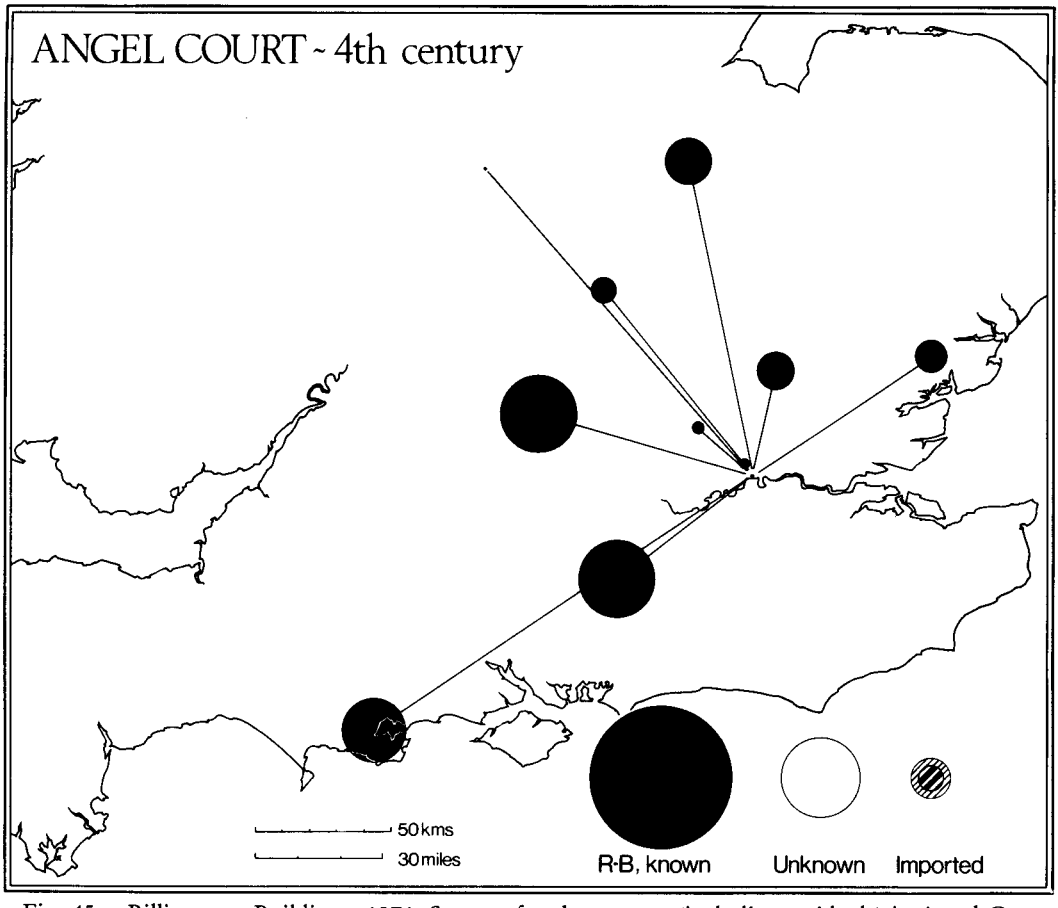


Fig. 45. Billingsgate Buildings, 1974: Sources for the pottery (including residuals) in Angel Court, Walbrook Layer 9, shown in uniform with Figs. 43 and 44.

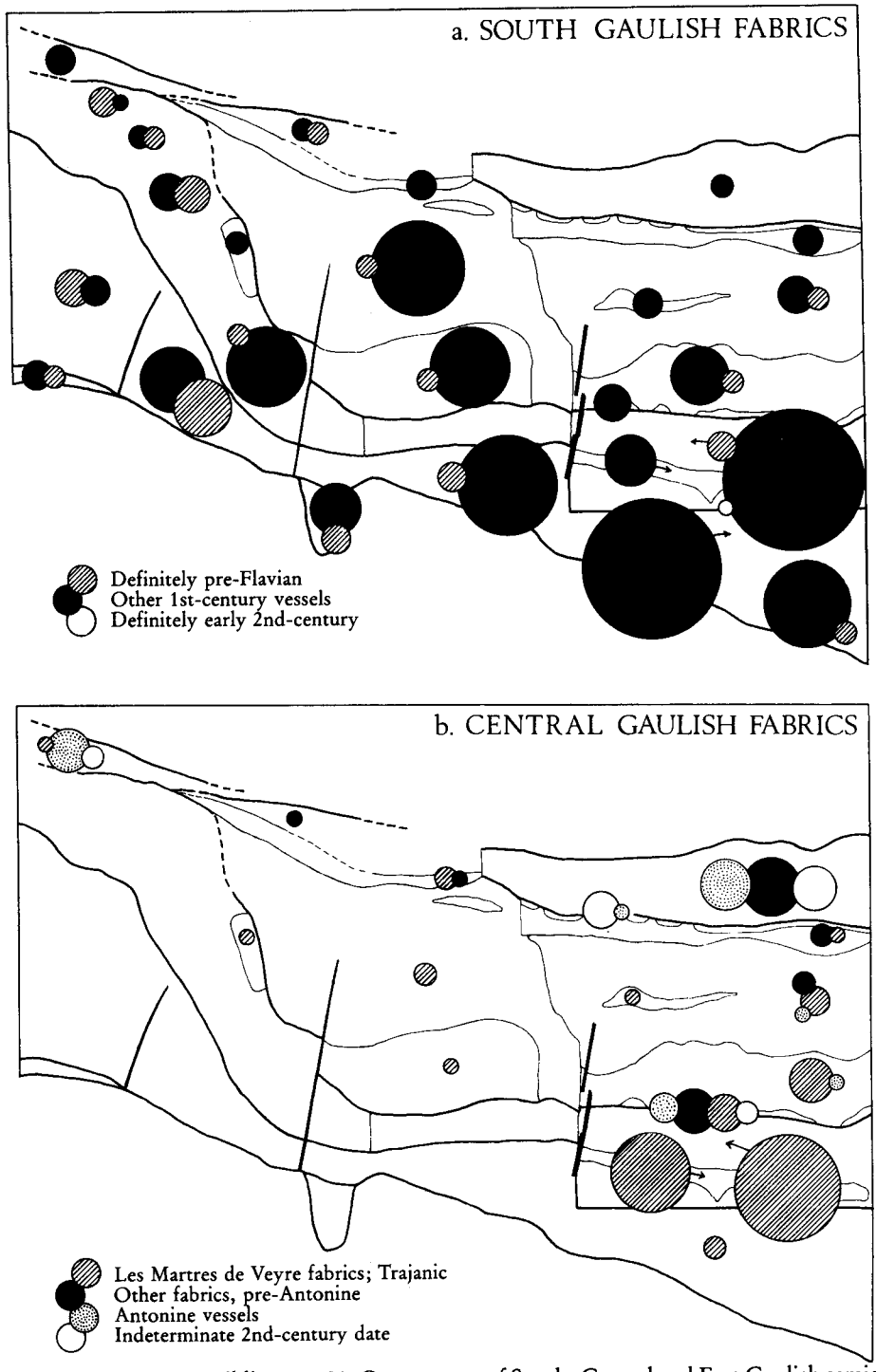


Fig. 46 a-c. Billingsgate Buildings, 1974: Occurrences of South, Central and East Gaulish samian fabrics, plotted on to a section through the site's stratigraphy (drawn with an exaggerated vertical scale for clarity; stratigraphic units and the limits of pottery groups U-Z are shown in 46c). The measure used is the minimum number of vessels represented, and includes residuals.

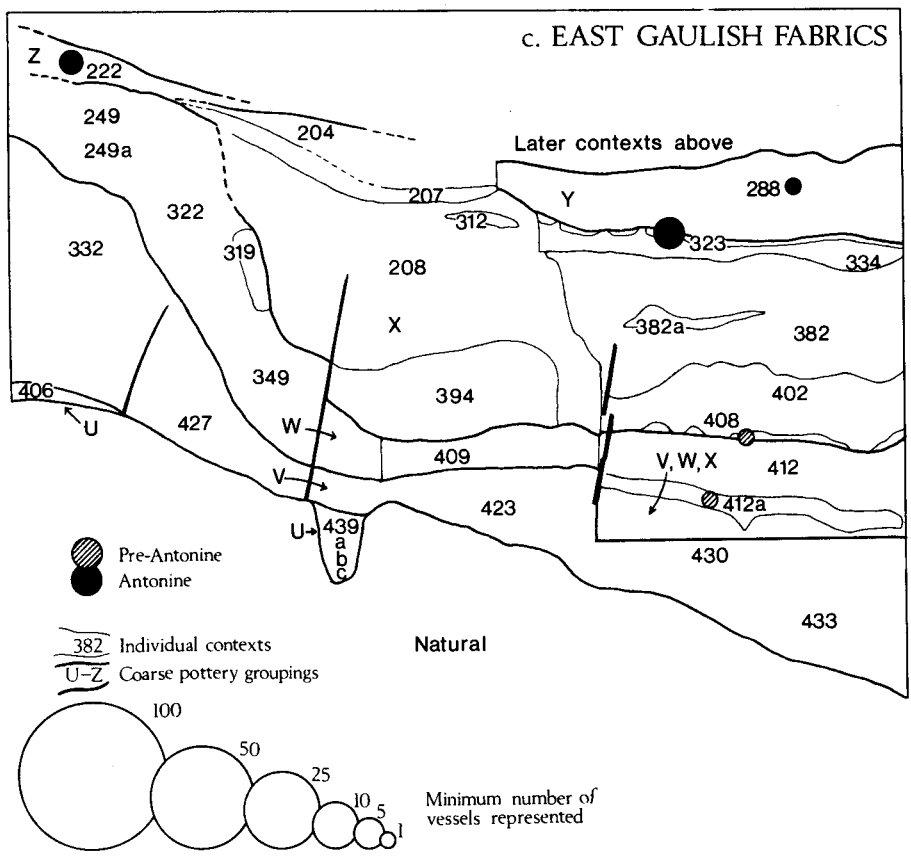


Fig. 46c. Billingsgate Buildings, 1974: East Gaulish Fabrics

(b) SAMIAN

by Chris Green, G. B. Dannell and Dr. Grace Simpson

Introduction

by Chris Green

Samian fabrics form the largest single type of pottery from the Billingsgate Buildings site, and the catalogue of individual sherds is a lengthy document, copies of which may be obtained by application to the Museum of London Department of Urban Archaeology. A list of the numbers of vessels of each form and source and date-range is also available. These catalogues have been prepared from notes on the forms and fabrics by G. B. Dannell and notes on the decoration by G. B. Dannell and Dr. Grace Simpson and on the stamps, by Brenda Dickinson.

The information contained in these catalogues is abstracted in Figs. 46a-c, which show the occurrence of South, Central and East Gaulish types, plotted onto a vertically-exaggerated section through the stratigraphy. In addition a small proportion of the decorated forms are described below as they are of intrinsic interest (none of the plain forms are especially noteworthy).

The samian dating evidence has been the primary criterion for the way in which the stratigraphic units have been grouped in the summary diagrams (Figs. 46a, b and c), but two points require further comment. Firstly, the ubiquity of residual South Gaulish samian in 2nd-century deposits is obvious in Fig. 46a; such a degree of

residuality may have a strong bearing on the interpretation of the occurrence of other pottery types and their periods of use, though unfortunately it is not possible to refine this information by using the 'vessel equivalent' means of measurement. Secondly, it will be seen from Fig. 46b, that Central Gaulish fabrics of Trajanic date are virtually absent from group W (which is thought to be Trajanic) and only begin to appear in significant quantities in group X, whose coarse pottery indicates a Hadrianic and Antonine date (as does the samian). A number of explanations are possible for this apparent anomaly, other than the small size of group W. Perhaps the most economical is that group W comes from a very rapidly dumped series of deposits which formed early in the 2nd century before much Central Gaulish samian had had time to circulate.

Samian fabrics represented 27.2% of all pottery, evenly distributed throughout the major groups: 27.2% of V, 27.2% of W, 28.4% of X, 21.1% of VWX (88.0% of Y, 15.4% of Z, present in U). Since these figures include the known residual South Gaulish element in groups VWX and X, it is possible to conclude in this instance that South Gaulish samian was relatively more abundant in the later 1st century than Central Gaulish samian was in the 2nd century. The total weight of sherds recovered in groups V-Z was 24kgs.

DECORATED SAMIAN

by G. B. Dannell and Dr. Grace Simpson (for Montans wares)

Figs. 47-48, Nos. 393-414

The abbreviations CG, EG, SG and M de V stand for Central Gaul, East Gaul, South Gaul and Les Martres de Veyre (Central Gaul). O is short for Oswald (1936).

Context 423 c. A.D. 70-100

393. (4080/732) Drag 37, SG, the same dog appears on a form 37 from Holt, *cf.* Grimes (1930, Fig. 37, 41). *c.* A.D. 85-100? (illustrated).

Context 427 c. A.D. 70-100

394. (4081/654) Drag 29, SG, lower zone: panel decoration with an inset triple-bordered medallion with a Mercury, 0.548. The seat is drawn in two forms, either as a block, *cf.* Knorr (1919, Taf, 83, 3) by VITALIS, or as a high-backed chair, *cf.* Knorr (1919, 96C) which is a very similar scene to this one, as is that from Pompeii, *cf.* Atkinson (1914, Pl. 16, 78). *c.* A.D. 75-90 (illustrated).

Context 430 c. A.D. 70-100

395. (4082/647) Drag 37, SG, FRONTINVS style, his ovolo, *cf.* Hermet (1934, Pl. 85, 2) and upper zone from a form 29 from Günzburg, *cf.* Knorr (1952, Taf 25A). *c.* A.D. 70-90 (illustrated).

396. (4082/649) Drag 37, SG, M CRESTIO style; his ovolo, leaf and tendril binding, *cf.* Knorr (1919, Textbild 36). The right hand goose, 0.2286 is on the same vessel, and the other, 0.2284 on a form 37 from Margidunum, *cf.* Oswald (1948, Pl. 22,6). For the basal wreath, *cf.* Knorr (1952, Taf 19H). The conical leaf is on a stamped form 29 from London (Museum of London, Guildhall Collection). *c.* A.D. 75-90 (illustrated).

Context 412 c. A.D. 80-125

397. (4078/636) Drag 29, SG, upper zone very similar to that by MEDDILVS, *cf.* Knorr (1952, Taf. 39c) and Oswald (1948, Pl. 7, 25). The large leaf was used by PASSENVS, SEVERVS and VITALIS, with whom MEDDILVS appears to have shared moulds, *cf.* Knorr (1952, Taf. 83). *c.* A.D. 70-85 (illustrated).

398. (4078/713) Drag 37, SG, panel decoration, with opposed stipuled buds over a boar, 0.1682. To the right, an elaborate festoon of a three-leaf motif with trailed leaves, the larger similar to, but different from, those in No. 402, the smaller having serrated edges. SEVERVS style, *cf.* Hartley (1972) for the large leaf, buds and lanceolate corner tendrills. *c.* A.D. 75-90 (illustrated).

399. (4078/725) Drag 37, SG, panel decoration with the following figures, from left to right; lion 0.1438, birds 0.2249, 2262 and 2294, bestiarius 0.1043 paired with gladiator 0.1044 and stag 0.1748. The modelling is good throughout, although the mould is worn. The ovolo is slightly assymetrical, with the borders running close together at the bottom right, distinguishing it from similar ones attributed to SEVERVS, *cf.* Oswald (1948, Pl. 11, 21) and M CRESTIO *(ibid.,* Pl. 21, 19) *c.* A.D. 75-100 (illustrated).

400. (4078/642) Drag 37, SG, see No. 414. The additional decoration is in the style of SEVERVS, *cf.* Knorr (1952, Taf 83A for the central leaf motif and B for the large leaves). *c.* A.D. 80-95 (illustrated).

401. (4078/637) Drag 37, SG, narrow, double-bordered ovolo, with tongue to the right ending in a rosette, *cf.* Oswald (1948, Pl. 11, 24) ascribed to SEVERVS. The birds are 0.2249 and 0.2294, the dog is 0.1921. *c.* A.D. 80-100 (illustrated).

402. (4078/634) Drag 37, SG, for all the elements *cf.* Knorr (1912, Taf. 21). The leaf was used by a number of Flavian potters including BIRAGILLVS, FL. GERMANVS, PATRICIVS and SEVERVS. A number of the vessels shown by Knorr have a scroll with the opposed geese 0.2244 and 2286, together with the same tendril binding. However, the ovolos are comparatively regular, whereas the present one varies considerably in width, *cf.* Knorr (1919, Taf. 16.16) for BIRAGILLVS. *c.* A.D. 90-110 (illustrated).

403. (4078/615) Drag 37, SG (Montans), double-bordered ovolo with tongue to left ending in a small swelling. It is known from a form 37 in the Musée St. Raymond, Toulouse (Acc. Nos. 11228 and 27, 707), with a mould-maker's stamp in the decoration of PRIVATVS. *c.* A.D. 100-120 (illustrated).

404. (4078/659) Drag 37, M de V, Rogers' ovolo B56, which he ascribes to his potter X-11. *c.* A.D. 100-120 (illustrated).

405. (4078/731) Drag 37, SG (Montans), single-bordered ovolo without tongue. The decoration is in panels with a bitch 0.1936 type *(cf.* Simpson 1976, p. 272). The decoration is in the style of the "leaf-stamp potter" *(ibid.,* Fig. 7, 28 and 30-32, and p. 263). Similar ovolos occur on two form 37's from Saintes; the Lescar villa (Bats, 1971, Fig. 5, 66); and finally on an unprovenanced piece in the Musée d'Aquitaine, Bordeaux, close to the ATTILLVS style. *c.* A.D. 100-145 (illustrated).

406. (4078/638) Drag 37, M de V, Rogers' ovolo B15 used by the mould-maker DRVSVS II. The animals are a stag 0.1697, lion 0.1450, and bear 0.1588. *Cf.* Stanfield and Simpson (1958, Pl. 89, 12) for a similar stag panel with trailed leaf. The fabric of the present vessel is from Les Martres, wherever the mould was made. *c.* A.D. 125-140 (illustrated).

Context 412A c. A.D. 80-125

407. (4079/727) Drag 37, M de V, IGOCATVS style: with repeated panels of Perseus, 0.234 and Medea 0.844. *Cf.*

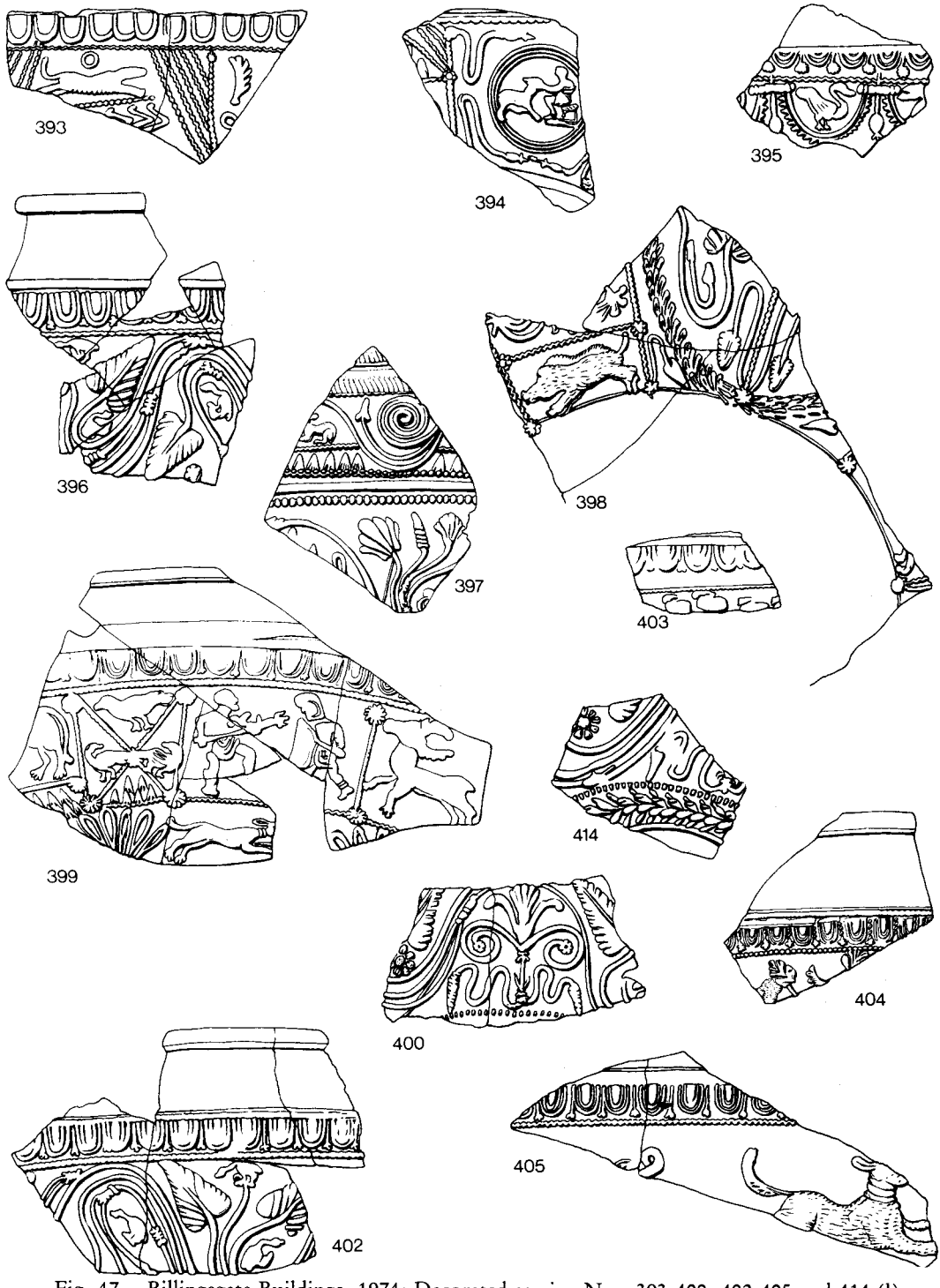


Fig. 47. Billingsgate Buildings, 1974: Decorated samian Nos. 393-400, 402-405 and 414 (½).

Stanfield and Simpson (1958, Pls. 17-19). *c.* A.D. 100-120 (illustrated).

Context 208 c. A.D. 125-160

408. (4007/729) Drag 29, SG, lower zone of bowl in panel decoration, with gryphon, 0.1370 and dog, 0.1971 (reduced). The former is used by MACER, who shared work with MELAINVS, who himself worked with ALBVS, *cf.* Hermet (1934, Pl. 106, 15 and 13). If this is theirs, then like the form 29 from Cologne (Knorr 1919, Taf. 48), it is later work. *c.* A.D. 60-75 (illustrated).

409. (4007/730) Drag 30, SG, single-bordered ovolo with plain tongue to right. Winding scroll of large vine leaves, with opposed putti holding acorns on tendrils around a central leaf ornament. The right-hand of the putti looks like 0.435, which he attributes to LICINVS and MOMMO, of the period appropriate to this vessel. The attribution is not easy; the ovolo is given to INGENVVS, *cf.* Knorr (1919, Taf. 41.57), while the long leaf is similar to detail 28. The vine leaf can be seen on a form 30 from Xanten, *(ibid.*, Taf. 97B). *c.* A.D. 50-65 (illustrated).

410. (4007/712) Drag 37, SG, a bowl from the workshops of BIRAGILLVS and his associates. For detail *cf.* Knorr (1919, Taf. 16). The slip is very bright. *c.* A.D. 85-110 (illustrated).

Context 408 c. A.D. 125-160

411. (4076/651) Drag 37, CG, ovolo of Potter X-6, *cf.* Stanfield and Simpson (1958, Fig. 18.3). The large lion is 0.1497K type, but note the treatment of the tail, matching the smaller one, 0.1500. By one of the Hadrianic potters at Lezoux. c. A.D. 125-140 (illustrated).

412. (4076/648) Drag 37, EG (Blickweiler), probably by AVSTRVS, his ovolo, *cf.* Stanfield and Simpson (1958, Fig. 25.1). The stag is 0.1784. Note the assymetrical leaf motif *(ibid.*, Fig. 25.7). The slip is smooth and orange-red. *c.* A.D. 125-140 (illustrated).

Context 334 c. A.D. 125-160

413. (4055/710) Drag 64, CG (Lezoux), a winged figure, 0.398, and a cock, 0.2344A on a smooth, orange-slipped vessel in the BVTRIO style. *c.* A.D. 115-135 or 120-140 (illustrated).

Unstratified

414. (4000/656) Drag 37, SG, the nearest parallel to this piece is from Colchester, *cf.* May (1930, Pl. 21, 118) which has both the rosette and basal wreath, and the curious border, neither a wavy line, nor a bead row. *c.* A.D. 80-95 (illustrated).

(c) CERAMIC LAMPS

by D. M. Bailey

Probably all the fragments in this small collection are from lamps which were imported into Britain; only No. 419 may be a British product. They range in date from the middle years of the 1st century A.D. until some time in the first half of the 2nd century. No. 415, the earliest fragment, was made in Gaul, its white, pipeclay fabric perhaps pointing to the Allier valley or to the Rhineland. It can be placed in Type IB of Loeschcke's classification (Loeschcke, 1919). Three fragments come from *Firmalampen*, but no signatures survive. Their fabrics indicate that two of them, Nos. 416 and 418, were made in North Italy; these fall respectively into Loeschcke Type IX and the *Kurzform* Type XK. The pierced lugs of the latter point to an early date within the type. The other *Firmalampe*, No. 417, of Loeschcke Type IX, was probably made in Gaul.

It is not certain whether the three remaining items, Nos. 419-421, of Loeschcke Type XI, are lamps, or lamp holders, designed to catch the inevitable drips and seepage of expensive imported oil. The former usage is, however, perhaps more likely, although the user would have to accept the fact of a smoky flame, as the wick could not be tamped down sufficiently in the open wick-rest to prevent smoke. Possibly different individuals used these objects in different ways, as a lamp-holder or as a lamp. No. 419 is wheel-made with an applied handle; it may have been made in Britain. The other two, almost certainly of Rhineland manufacture, were made by pressing sheets of clay into one-piece plaster moulds, and adding the top of the handle, which was then shaped and pierced.

(Fig. 41, Nos. 415-421)

415. (4078/544) Nozzle and discus fragment from a volute-lamp of Loeschcke Type IB (with angled nozzle-tip). White clay; dark brown slip. Made in Gaul. Middle years of 1st century A.D. From Context 412 (illustrated).

416. (4057/552) Nozzle fragment from a *Firmalampe* of Loeschcke Type IX: air-hole in nozzle channel; impressed circle in angle of wick-hole area. Orange-brown clay, unslipped. Made in North Italy. *c.* A.D. 70-100. From Context 349 (illustrated).

417. (4080/360) Two non-joining fragments of a *Firmalampe* of Loeschcke Type IX: nozzle and part of underbody with multiple base-ring. White-buff clay; brown slip. Made in Gaul. *c.* A.D. 70-100. From Context 423 (illustrated).

418. (4068/278) Front part of a *Firmalampe* of Loeschcke Type XK. Pierced lugs on shoulder. Multiple base-ring. Orange-brown clay, unslipped. From a plaster mould. Made in North Italy. *c.* A.D. 90-100. From Context 394 (illustrated).

419. (4079/551) Fragment of a wheel-made open lamp or lamp-holder, of Loeschcke Type XI. Flat floor, with almost vertical side-walls; applied, ribbed handle at rear. White-grey clay with some mica; dark grey slip. Made in Britain or Gaul. From Context 412A and therefore not later than *c.* A.D. 125 (illustrated).

420. (4000/548) Fragment of a mould-made open lamp or lamp-holder, of Loeschcke Type XI. Flat floor with almost vertical side-walls; base-ring; pierced handle at rear (the lower part of which was formed in the mould and the upper part modelled and added). White-grey clay, with a grey core; olive-green-brown slip. From a plaster one-piece mould. Made in Gaul, probably in the Rhineland. *c.* A.D. 75 to well into the 2nd century A.D. Compare an example from Grave 87 at Pont (on the Rhine, near the German border with Holland) dated early in the second quarter of the 2nd century (Geschwendt, 1960, Pl. 26,4). Examples in Frankfurt Museum from Hedderheim are also close in appearance. Unstratified (illustrated).

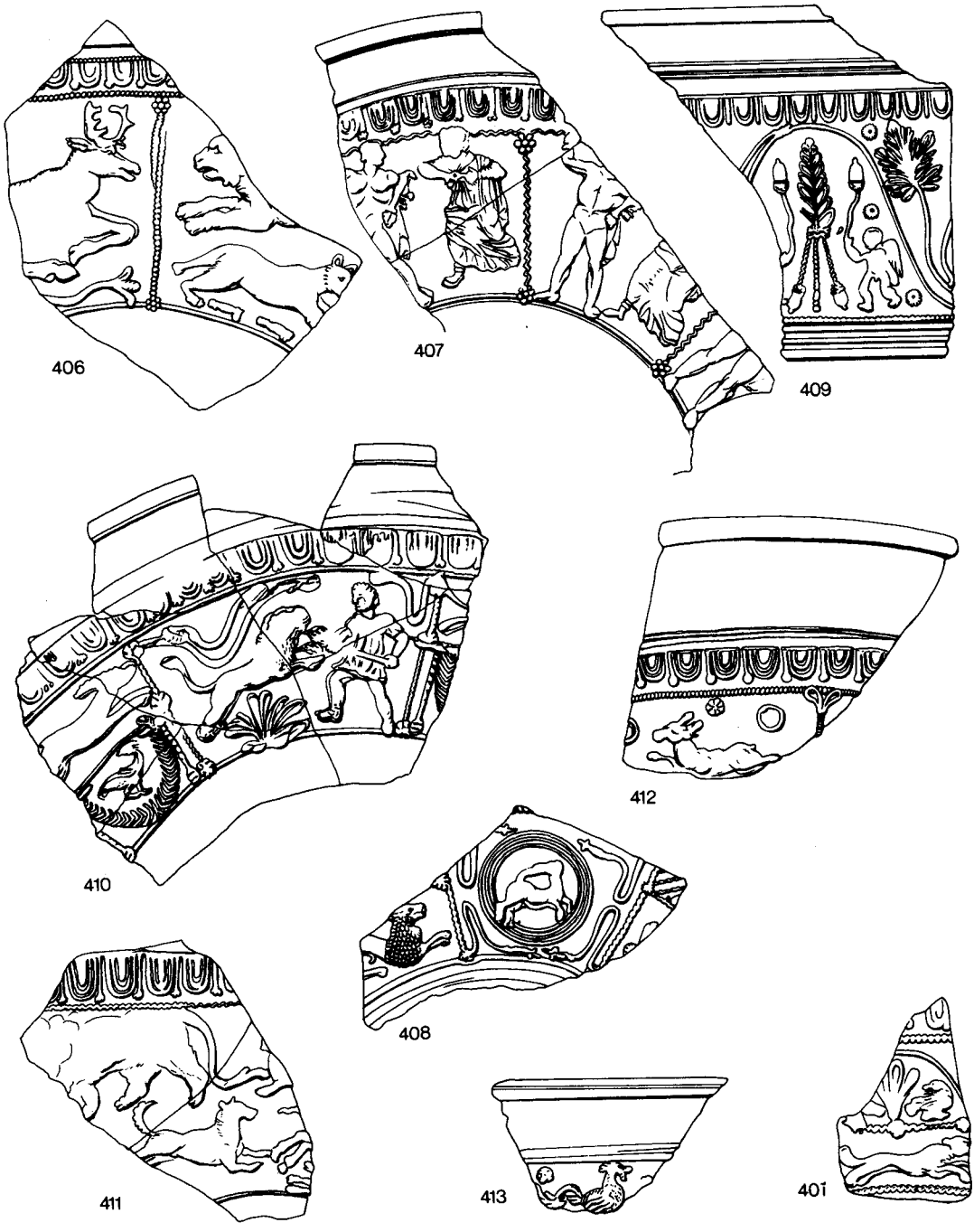


Fig. 48. Billingsgate Buildings, 1974: Decorated samian Nos. 401 and 406-413 (½).

421. (4078/553) Fragment of a mould-made open lamp or lamp-holder, similar to the last in form and fabric. Slightly convex floor; base-ring. Brown clay with a grey core; drab brown slip. From a plaster, one-piece mould. Made in Gaul, probably in the Rhineland. On type, this could be from *c.* A.D. 75 to well into the 2nd century, although as it comes from Context 412 it cannot be later than *c.* A.D. 125.

(d) OBJECTS MADE FROM POTSHERDS

by Chris Green

Broken and discarded pottery must have strewn many areas of Roman London, but on this site the evidence for its re-use is slight considering the total quantity of pottery recovered. Rural sites often produce many more worked sherds from considerably smaller assemblages.

(Fig. 49, Nos. 422-424)

422. (4065/563) Sherd of an amphora rod-handle (Dressel 2-4 (Italo-Koan) see p. 42) used as a rubber or grinder at one end – perhaps a small pestle. From Context 382 and therefore discarded prior to *c.* A.D. 160 (illustrated).
423. (4035/403) "Counter", roughly chipped from a sherd of a Brockley Hill mortarium (see p. 49). From Context 288 and therefore finally discarded prior to *c.* A.D. 200 (illustrated).
424. (4000/547) Amphora sherd in hard, fine fabric, rubbed to a smooth surface on the edges and perhaps also the exterior. Mud-stained and burnt. Unstratified (illustrated).

(e) GLASS

from notes by Dr. D. B. Harden

Although about 150 fragments of Roman glass were recovered, they are mostly small and only those pieces large enough to be drawn and identified have been included in this report.

(Fig. 49, Nos. 425-445)

425. (4080/400) Fragment of a tall, pillar-moulded bowl in blue-green glass. A late 1st to early 2nd-century type. From Context 423 and therefore not later than *c.* A.D. 100 (illustrated).
426. (4082/415) Fragment of cast, green window-glass with original rounded edge of sheet. Typologically late 1st to early 2nd century. From Context 430 and therefore not later than *c.* A.D. 100 (illustrated).
427. (4051/68) Rim of a blue-green jar, folded outwards, downwards and upwards. A late 1st to early 2nd-century type. From Context 322 and therefore not later than *c.* A.D. 125 (illustrated).
428. (4057/247) Similar to No. 427. From Context 349.
429. (4057/248) Base of a rectangular, blue-green bottle of late 1st to early 2nd-century type. From Context 349 and therefore not later than *c.* A.D. 125.
430. (4058/240) Rim of jar, in blue-green glass. From Context 349A and therefore not later than *c.* A.D. 125 (illustrated).
431. (4078/207) Fragment of rectangular bottle in blue-green glass. From Context 412 and therefore not later than *c.* A.D. 125.
432 (4078/254) As for No. 431.
433. (4078/191) Small fragment of rim of bottle, bent outwards and folded inwards, in blue-green glass. Date and provenance as for No. 431 (illustrated).
434. (4078/397) Fragment of window glass similar to No. 426. Date and provenance as for No. 431.
435. (4007/255) Fragment of carinated bowl in colourless glass with two, raised, horizontal ribs, one just above and two others just below the carination. Cast, then ground and polished on both sides. A 1st-century type. From Context 208 (illustrated).
436. (4007/215) Rim fragment from the tall concave neck of a jar in blue-green glass. Lip slightly thickened and rounded in flame. From Context 208 and therefore not later than *c.* A.D. 140 (illustrated).
437. (4068/493) Window glass. Fragment from a cast sheet approximately 5mm thick, showing a small portion of grozed edge. From Context 394 and therefore not later than *c.* A.D. 140.
438. (4068/167) Fragment of jug handle, showing central rib. Late 1st or early 2nd century. From Context 394 (illustrated).
439. (4065/182) Bottle rim, bent outwards, upwards and inwards, and pressed solid. Thick, blue-green glass. Typologically late 1st or early 2nd century (illustrated).
440. (4008/39) Spherical bead, broken from a strip of similar beads, of colourless glass; iridescent owing to weathering. Residual in Context 222 (illustrated).
441. (4008/2 and 4004/7) These adjoining pieces were submitted to Miss J. Price who writes: "Two fragments of the lower body and part of the base of a blown bowl in greenish-colourless glass, with very few bubbles or other impurities. The outside surface is pitted and iridescent and there are strain cracks. The wide lower body curves inwards to the base and has, on the outside, a horizontal band of unmarvered trails, pinched together to form a net-work pattern.

In view of the small part which survives, it is not possible to be certain of the form of this vessel. It seems, however, most likely to be a more or less hemispherical bowl; a form, with or without a base-ring, which occurs quite commonly in 3rd and 4th-century contexts in the north-western provinces of the Roman Empire (see Isings, 1957, Form 96, 113-115 and 131-133; Form 107, 133-4; and Form 108, 134-135). Perhaps the best known group of these bowls is that decorated with facet- and line-cutting. Examples from Romano-British sites include three from King William Street, London (see Wheeler, 1930, 121-122, Fig. 42, 1-3), as well as others from Verulamium (Charlesworth, 1972, Nos. 48-53, 208 and 210, and Fig. 78) and York (see Harden, 1962, 137 and Fig. 88: H.G. 162; 205.1; 210, which is rather cylindrical; and 211). Nonetheless, other decorative variants are known, including rows of trailed or moulded raised rings (e.g. from Verulamium, see Charlesworth, 1972, No. 57, 210 and Fig. 79), or applied, unmarvered blobs and zig-zag trails (e.g. from Hastenrath, Kreis Düren, now in the Landesmuseum, Bonn; see Fremersdorf, 1962, 31 and Pl. 35). The nearest parallels for the decoration on this London fragment seem to occur on a tall bowl with an applied base-ring, which was found in Luxemburger Strasse, Köln, in a context dated to the latter part of the 3rd century A.D. (published on several occasions, e.g. Fremersdorf, 1959, 74 and Pl. 115), and on a hemispherical, footless bowl, also from Luxemburger Strasse, Köln, dating from around A.D. 300 *(ibid., 72* and Pl. 110)."

Fragments 4008/2 and 4004/7 come from Contexts 222 and 203 respectively, both of which are of indeterminate date after the 2nd century (illustrated).

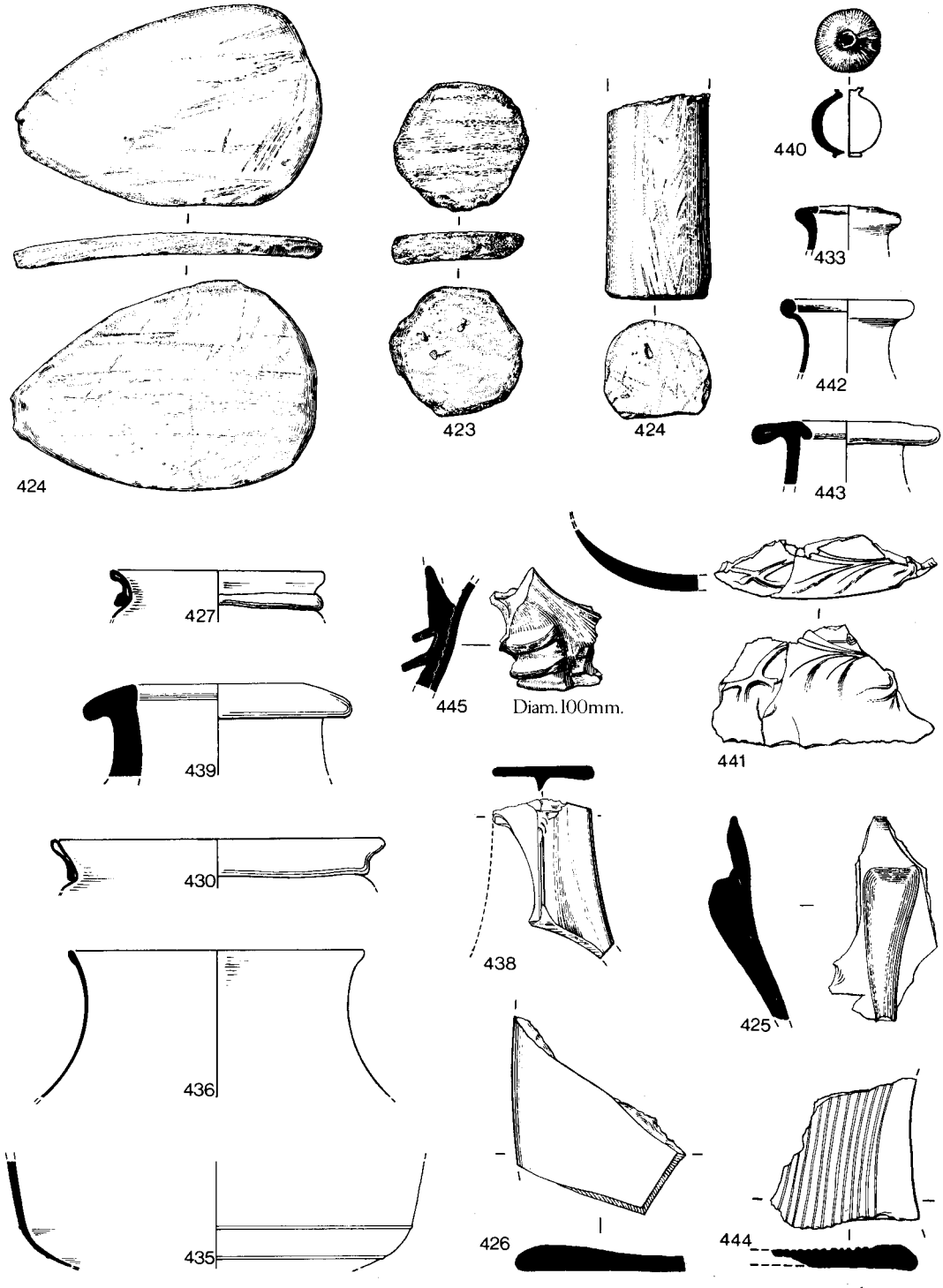


Fig. 49. Billingsgate Buildings, 1974: Objects made from potsherds Nos. 422-424 (½); Roman glass Nos. 425-445 (½, except for No. 440 2/1). (*Erratum* No. 424 (right) is No. 422).

442. (4011/119) Small fragment of the rim of a flask or flagon in blue-green glass, folded inwards and down. Residual in Context 231 (illustrated).
443. (4001/28) Rim of bottle in green glass, rim folded outwards, upwards and inwards and flattened on top. Cylindrical neck, late 1st or 2nd century. Residual in Context 200 (illustrated).
444. (4002/10) Fragment of colourless, multi-ribbed handle of bottle. Probably 3rd but possibly late 2nd century. Residual in Context 201 (illustrated).
445. (4000/252) Part of bottom attachment of handle in olive-green glass with a nicked tail, from a jug with spiral trailing. Late 1st to early 2nd century. Unstratified (illustrated).

(f) COINS

by Ralph Merrifield

446. (4078/232) A *sestertius* of Nerva (R.I.C. 86). A.D. 97. From Context 412.
447. (4011/33) A *sestertius* of Hadrian. Small in size (29mm) with an irregular die axis, ↑↖. Unofficial copy of issue of A.D. 134-138, *O.* HADRIANVS [AVGVSTVS P.P.] *R.* Illegible. Seated figure l. From Context 231.

(g) COPPER-ALLOY

by Hugh Chapman

(Fig. 50, Nos. 448-455)

448-455. (4082/354, 4079/246, 4079/258, 4007/43, 4007/51, 4072/181, 4034/139, 4000/388 respectively) Needles in various states of preservation. The complete examples (Nos. 448, 452 and 454) have an oblong eye and a tapering, wedge-shaped head; typical examples. No. 448 comes from Context 430 and is therefore not later than *c.* A.D. 100. Nos. 449 and 450 come from Context 412A and are therefore not later than *c.* A.D. 125. Nos. 452 and 453 come from Contexts 208 and 402 respectively and are therefore not later than *c.* A.D. 140. No. 454 comes from Context 287A and No. 455 is unstratified (all illustrated).

(Figs. 51-53, Nos. 456-469)

456-458 (4078/256, 4078/261, 4079/190 respectively) *Ligulae* with flat spatulate disc ends; shanks roughly hexagonal in section; all originally straight. Nos. 456 and 457 come from Context 412 and No. 458 comes from Context 412A, therefore none is later than *c.* A.D. 125 (all illustrated).
459. (4083/355) Decorative mount; cast, the wider blunt end is flat and rough on underside; the bifurcated ends opposite have been snapped off. The two blunt transverse arms are perhaps deliberately fashioned in phallic form. Use uncertain, but *cf.* a similar example from Richborough (Cunliffe, 1968, 96, No. 136 and Pl. 38, No. 136). From Context 433 and therefore not later than *c.* A.D. 100 (illustrated).
460. (4080/356) Fragment of flat strip bracelet, with three punched circles as decoration; three transverse grooves near the broken end suggest several attempts to snap the length off. Date and provenance as for No. 459 (illustrated).
461. (4082/347). Disc, with central hole and concentric groove around edge of one side. From Context 430 and therefore not later than *c.* A.D. 100 (illustrated).
462. (4078/169) Finger ring; plain, with hammer marks visible on inner side. From Context 412 and therefore not later than *c.* A.D. 125 (illustrated).
463. (4078/251) Fragment of thin rectangular sheet; one edge has been folded over and doubled back; pierced by two rivets, one of which survives *in situ*. Date and provenance as for No. 462 (illustrated).
464. (4079/205). Thin delicate shaft, roughly circular in section, one end flattened and pierced with a circular hole, the other snapped off. Perhaps the end fragment of arm of a balance with hole for suspension of pan. The object is too thin and insubstantial to be part of a toilet set, and very different from the usual Roman needle *(v.* Nos. 448-455, above). Very fine, delicate balances, presumably for weighing coins, precious metals and materials, are known in the Roman period (e.g. Museum of London Acc. Nos. A18320; 1040 from London) and the identification of this object as the end of the balance arm would appear to be most likely *(cf.* for example Brailsford, 1962, 17, No. 166 and Pl. 11). From Context 412A and therefore not later than *c.* AD. 125 (illustrated).
465. (4079/245) Stud, with concentric groove round edge of head, pin square in section; much crushed and distorted. Date and provenance as for No. 464 (illustrated).
466. (4007/267) Tool or "knife" with triangular blade and hollow tubular socketed handle (now bent) above short haft and shoulders. By comparison with other examples (see below) it is clear that the broken corner of the blade was originally finished in a round semi-circular fashion and not in an acute angle like the opposite corner. The blade is stamped with a symbol and an inscription which reads GERMA[NVS (reading by Mark Hassall).

Two other examples of the same type of implement are known from London. The first of these (Museum of London Acc. No. 19285) comes from the stream bed of the River Walbrook, Bucklersbury House site, while the second (Museum of London Acc. No. 177) is from Tokenhouse Yard in 1865, *v.* Cuming (1875, 207-8). Both are of copper-alloy and while the Bucklersbury House example has a similar tubular handle, inside of which the remains of a secondary (?) smaller copper-alloy tube survive, the other example has a thin handle, nearly circular in section and may have acted as a tang inside a bone or wooden handle. The tubular handles of the other two presumably held a wooden or bone shaft acting as a handle.

The three examples from London have the same distinctive blade shape, though the Bucklersbury House site has an additional feature, a small but prominent hook at the top of the curved section of the blade, a feature that is known on a fourth example from Vindonissa, Switzerland (photograph in Museum of London files) and may of course have been present on the example from Lower Thames Street.

The purpose and function of this class of knives is not clear. Their distinctive but uniform shape must indicate that they have a specific use. Their manufacture, including the blade and cutting edge, in copper-alloy rather than iron, the more normal metal for knives and cutting implements, might indicate a surgical or medical use, but examination of known Roman medical implements *(e.g.* Milne, 1907) has not revealed any parallels, and indeed medical cutting implements, *i.e.* scalpels, commonly have an iron blade set in a bronze handle.

A second proposed identification has been that of a currier's or leatherworker's knives, though the apparent weakness of the handles must preclude their use in the early stages of treatment of skins, and they can only have been used for more delicate work. The large quantity of leatherwork from the site perhaps adds weight to this suggestion. A third possibility must be that they are domestic razors, and though they differ radically from the best identified group of Roman razors, *v.* Garbsch (1975, 73-81 and Figs. 3-6), which have flat wide curved blades of iron surmounted by animal or bird-headed bronze handles, their curved blade might well indicate a similar purpose. The example from this site comes from Context 208 and is therefore not later than *c.* A.D. 140 (illustrated).
467. (4007/272) Thin sheet strip, hole at either end with surviving nail from one. Now distorted but originally bent at one end just behind nail hole. Edge binding (?) from wooden box or similar. Date and provenance as for No. 466 (illustrated).
468. (4068/244) Instrument with long oval bowl and blunt probe at other end; main shaft faceted and decorated with a group of transverse mouldings; bent in two places.

A common object, often thought to be surgical, but there are so many from London and elsewhere that their primary purpose must have been domestic, *e.g.* the extraction of cosmetics from unguent bottles and their preparation. From Context 394 and therefore not later than *c.* A.D. 140 (illustrated).
469. (4008/42) Pin, shaft bent, rubbed head. From Context 222 (illustrated).

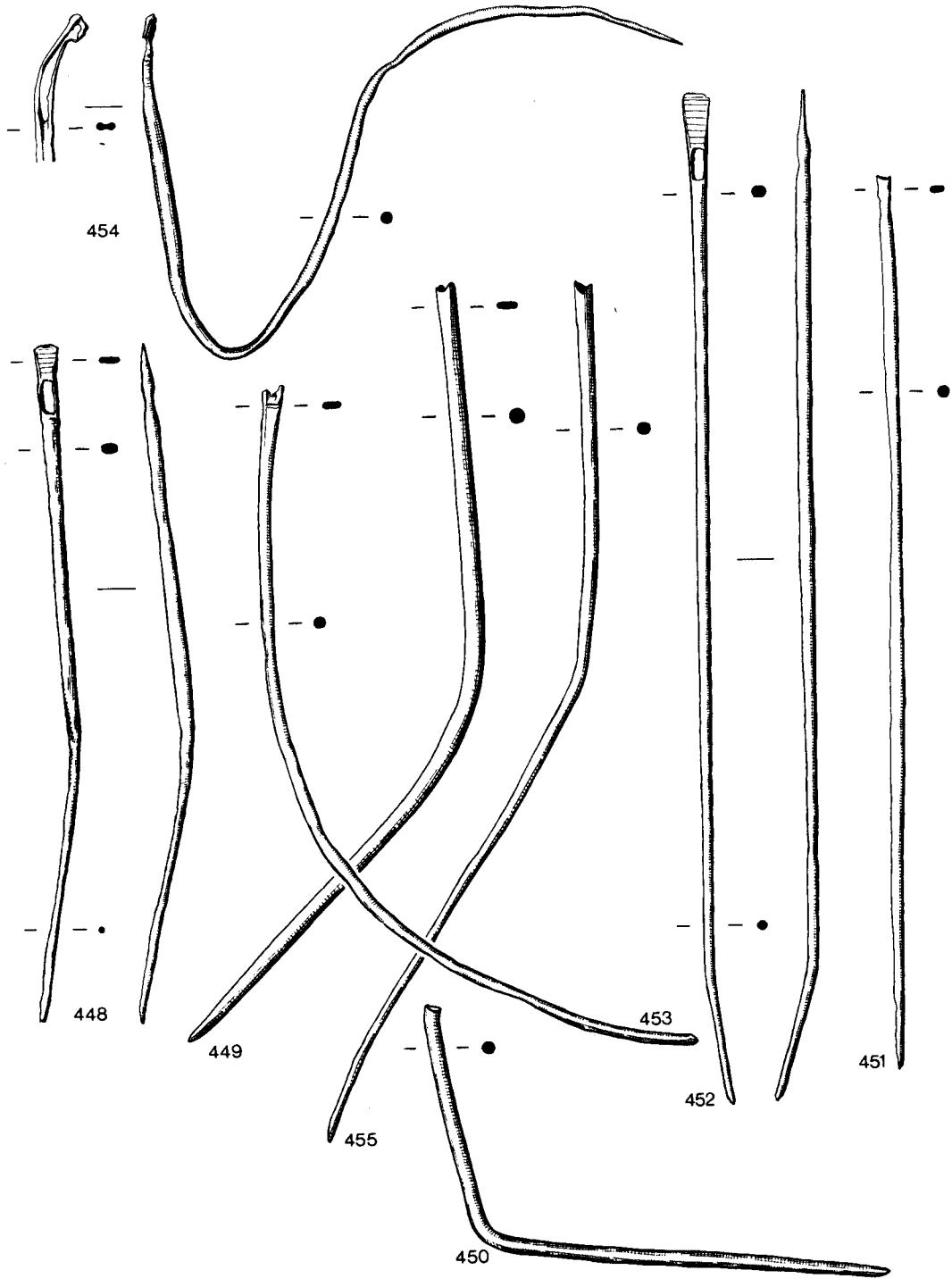


Fig. 50. Billingsgate Buildings, 1974: Roman needles of copper-alloy Nos. 448-455 (1/1).

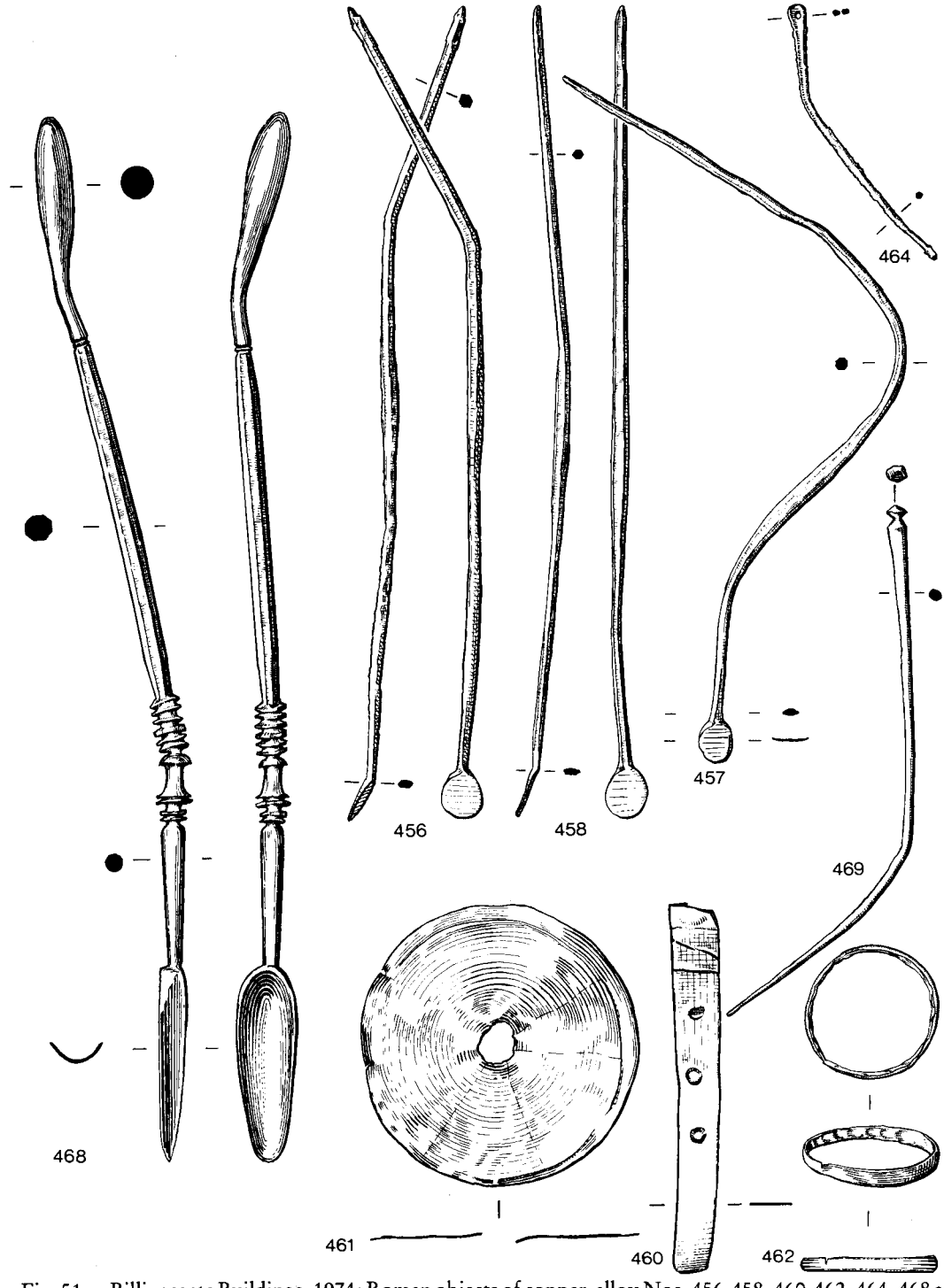
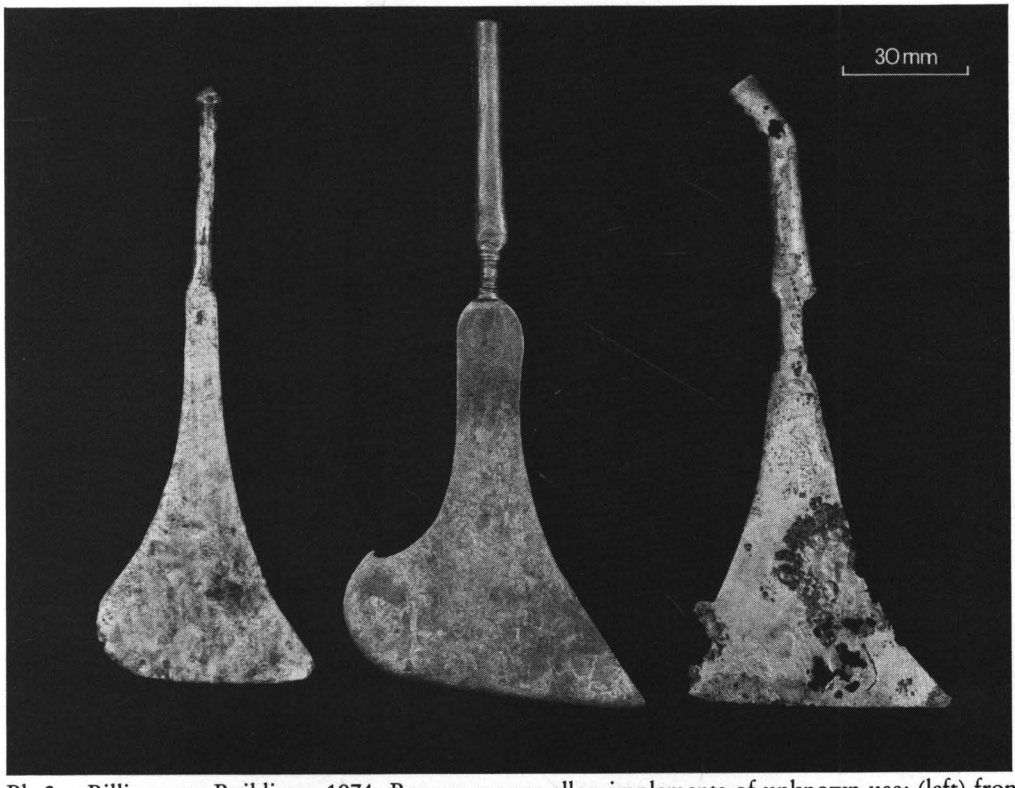
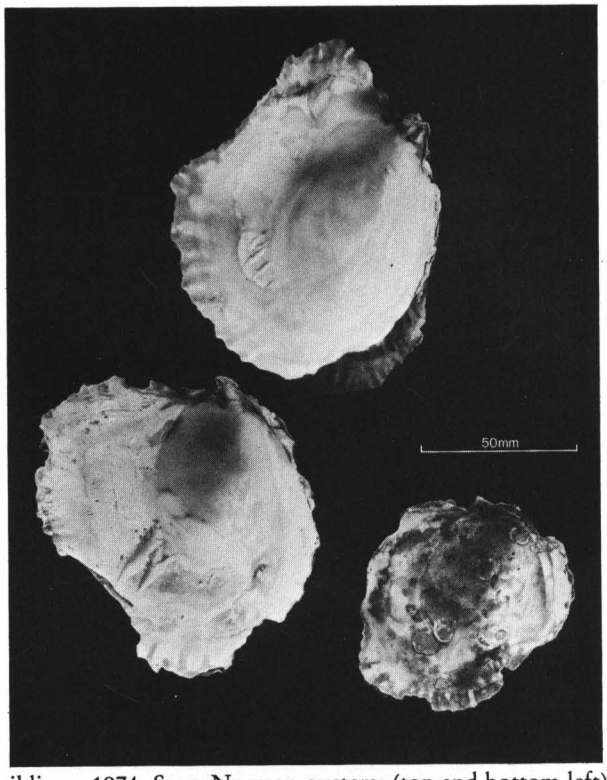


Fig. 51. Billingsgate Buildings, 1974: Roman objects of copper-alloy Nos. 456-458, 460-462, 464, 468 and 469 (1/1).

Pl. 1. Billingsgate Buildings, 1974: Roman *amphora* neck with painted inscription No. 37 (p. 45). With marginal photographic enhancement by infra-red techniques *(T. J. Hurst)*.



Pl. 2. Billingsgate Buildings, 1974: Roman copper-alloy implements of unknown use: (left) from Tokenhouse Yard, London, M.O.L. Acc. No. 177; (centre) from Bucklersbury House, London, M.O.L. Acc. No. 19285; (right) from Billingsgate Buildings No. 466. See p. 88 *(J. Orsmond)*.



Pl. 3. Billingsgate Buildings, 1974: Saxo-Norman oysters: (top and bottom left) knife-marks and other damage caused on opening the shells; (bottom right) discoloured specimen with spat on the inside showing that it was dead when collected. See p. 147 *(J. Orsmond)*.

Pl. 4. Billingsgate Buildings, 1974: Roman domestic ox: Four, articulated thorax vertebrae with the transverse process chopped through and the rib removed. Context 394. See p. 152 *(P. R. Crabb)*.

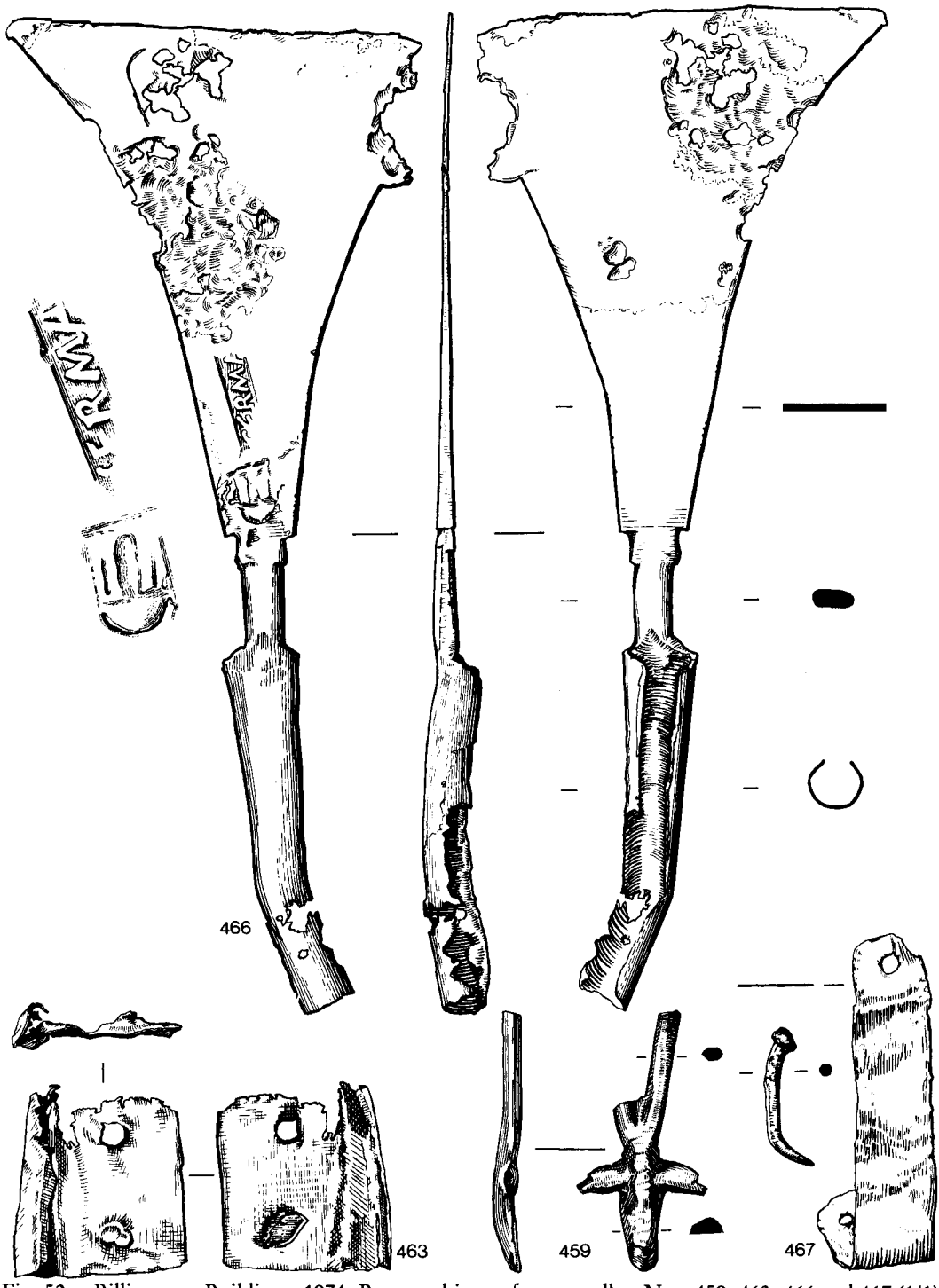


Fig. 52. Billingsgate Buildings, 1974: Roman objects of copper alloy Nos. 459, 463, 466 and 467 (1/1).

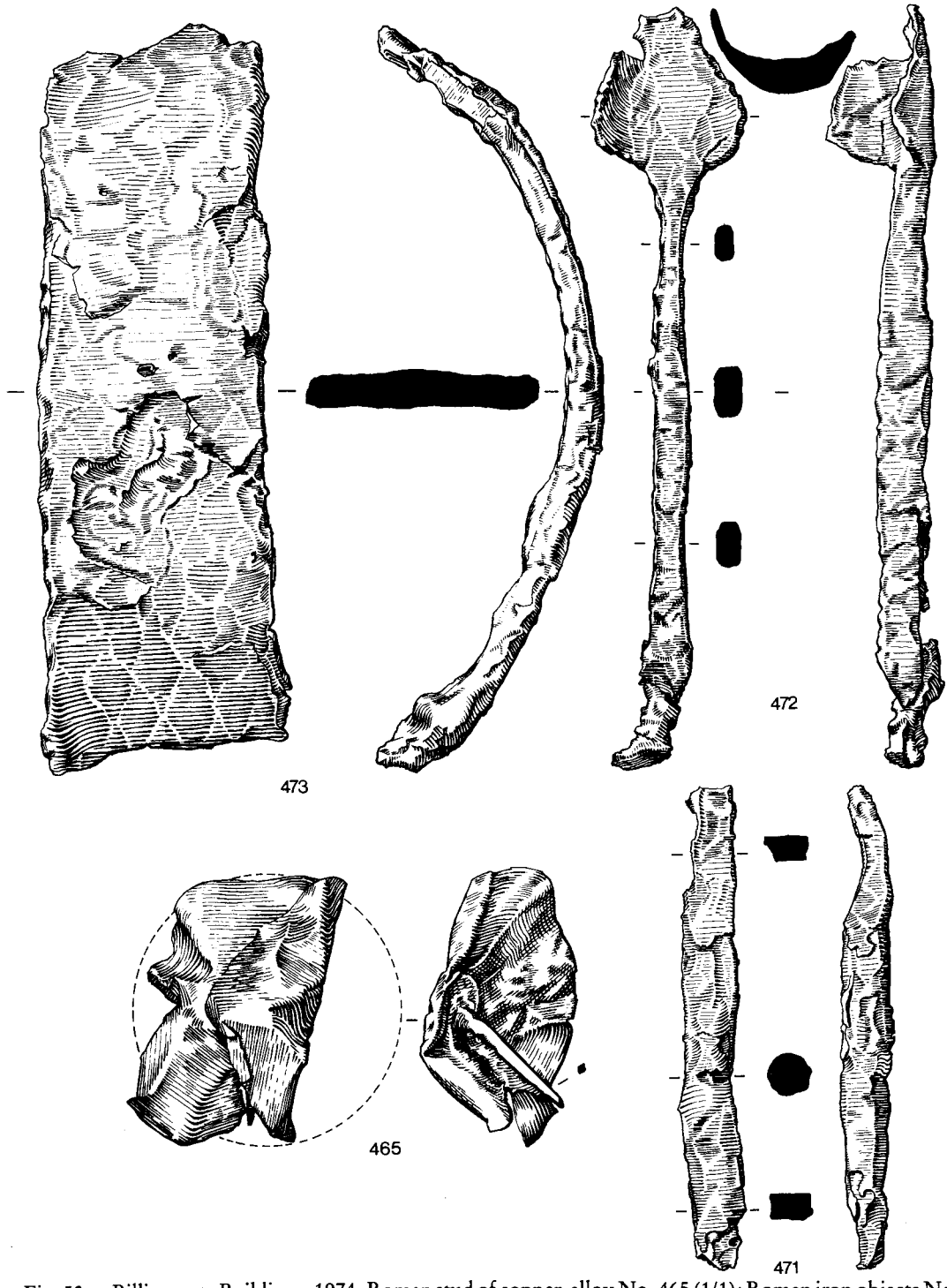


Fig. 53. Billingsgate Buildings, 1974: Roman stud of copper-alloy No. 465 (1/1); Roman iron objects Nos. 471-473 (1/1).

(h) LEAD

by Hugh Chapman

470. (4000/516) Rivet; used to repair a samian bowl (Drag. 37) broken in antiquity; a rim-sherd with traces of one of the fixing holes survives with the rivet. Unstratified.

(i) IRON NAILS

by Michael Rhodes.

Eleven nails, all in poor condition, were recovered from seven different deposits of Periods I to III. A few nails in later deposits are probably of Roman origin but these have been ignored.

Seven of the nails are of Type 1 (see Rhodes, 1977b) and one is of Type 2. Two nails from Context 322 (E.R. 4051) and one from Context 412 (E.R. 4078) were too deteriorated to classify. The approximate dimensions of the Type 1 nails, where l. is the overall length and w. is the maximum width of the head, are as follows (measurements in mm.):

	l.	w.
Context 423: E.R. 4080	56	14
Context 349: E.R. 4057	61	8
Context 208: E.R. 4007	57	13
	57	15
	102	17
Context 408: E.R. 4076	54	13
Context 288: E.R. 4035	51	12

The Type 2 nail is from Context 208 (E.R. 4007) and is 43mm long.

(j) IRON

by Hugh Chapman

(Fig. 53, Nos. 471-473)

471. (4035/118) Bar, roughly rectangular in section; badly corroded; use not certain. From Context 288 and therefore not later than *c.* A.D. 200 (illustrated).

472. (4008/57) Plasterer's (?) tool; much corroded and broken but originally had a handle rectangular in section with an open-ended flat bottomed U-shaped shovel or scoop at the end. The other is broken off.

A Roman tool of similar size and form with a shovel at one end and a spatulate end at the other at right-angles to the handle is known from London (King's Arms Yard, Museum of London Acc. No. 22091). This has been interpreted as a plasterer's tool for corner work. From Context 222 (illustrated).

473. (4008/500) Fragment of a hub-rim or nave band from wheel; indications of a raised "rim" on one edge; original diameter would have been *c.* 127mm; *v.* Manning (1972, 172 and Fig. 64 No. 32) for parallel and further references. From Context 222 (illustrated).

(k) BONE

by Hugh Chapman

(Fig. 54, Nos. 474-493).

(All the bone objects were submitted to Dr. J. Clutton-Brock and Dr. P. Armitage for bone identification, and their findings are included below).

474. (4008/26) Pin; hand cut, rough ovoid head. From Context 222 (illustrated).

475. (4025/41) Pin; hand cut, rough ovoid head; shaft broken. From Contexts 276A and 276B amalgamated (illustrated).

476. (4018/27) Pin; hand cut, rough ovoid head with point; shaft broken. From Context 251 (illustrated).

477. (4018/29) Pin; hand cut, conical head; point missing. From Context 251 (illustrated).

478-479 (4078/404 and 4011/140 respectively) Fragments of pin shafts. No. 478 is from Context 412 and is therefore not later than *c.* A.D. 125, and No. 479 is from Context 231 (both illustrated).

480-484 (4078/361, 4078/566, 4079/200, 4035/45, 4035/56 respectively) Fragments of needles of varying sizes with (where remaining) single oblong eyes. Nos. 480 and 481 come from Context 412 and No. 483 from Context 412A; they are therefore not later than *c.* A.D. 125. Nos. 484 and 485 come from Context 288 and are therefore not later than *c.* A.D. 200 (all are illustrated).

485. (4079/166) Bodkin or large needle with flat head and single eye; point broken. From Context 412A and therefore not later than *c.* A.D. 125 (illustrated).

486. (4079/389) Wool spinning spindle (?); both points broken. Date and provenance as for No. 485 (illustrated).

487. (4078/405) Plain gaming counter with bevelled edges and central hole on one side marking position of lathe chuck. From Context 412 and therefore not later than *c.* A.D. 125 (illustrated).

488. (4068/260) Plain gaming counter with bevelled edges and central hole on side marking position of lathe chuck. The other side has a *graffito* reading L11, *i.e.* '52' or possibly 'L,2', since there is a superscript bar over the last two characters but not the first (information from Mark Hassall). From Context 394 and therefore not later than *c.* A.D. 140 (illustrated).

489. (4078/192) Die, cuboid; numbers marked by ring and dot, and arranged on opposite sides as modern dice, *i.e.* 1.6; 2.5; 3.4. From Context 412 and therefore not later than *c.* A.D. 125 *(illustrated)*.

490. (4082/387) Triangular tool fashioned from a scapula, probably ox; the side edges and apex corner are smoothed and rounded; the working side is worn to a blunt edge. A single hole presumably for suspension is pierced through the body near the apex corner. The upper side appears to be the more concave of the two and has a depression into which the thumb naturally fits when the tool is held in the right hand.

The tool is paralleled exactly by another bone example from the Roman fort of Newstead, *v.* Curle (1911, 314 and Pl. 83.2), and to a lesser extent by the known series of thin flat iron triangular blades with integral rectangular knobbed handles. There are several examples of this iron type from London (Museum of London Acc. Nos. 13653, 19039, 21006, 21728) and they are also represented on the 1st-century A.D. sculptured reliefs of a cutler's workshop and stall from Villa Massimo, Rome.

A worked ox scapula (BM(NH) R5129, see p. 152) from the site might represent another unfinished example of the same type of tool, perhaps discarded because it was not sufficiently flat and rectangular in shape.

The underside of the completed tool has an incised *graffito* and Mark Hassall writes: "The reading is CIIRIIS·IIQITIS *(Ceres Eq(u)itis)*. Inscribed bone scrapers, though of a different form, have been found at Ilkley and Trier. The Ilkley example reads I.H.IS CONICILLI I.KI.; see Woodward (1926, 289 and Fig. 49) and the one from Trier reads L. RESTITVTI SPAT(H)A; see Bersu (1930, 13 and Pl. 16.5). (For the critical conventions used here see Collingwood and Wright (1965, xxxiv)). On the analogy of these it is likely that *Eq(u)itis* represents a personal name in the genitive, although the cognomen *Eques* is rare. Kajanto (1965, 313, C.I.L. Vol. 2, No. 5964) cites only one example; a second occurs as a *graffito* on a samian cup of form 27, found in London; see Wright (1954, 109) although the name has, unnecessarily, been expanded to *Eques(ter)*. Returning to the Billingsgate Buildings *graffito*, one would expect that the word preceding *Eq(u)itis* to refer to the implement itself (as *spatha*, on the implement from Trier) and *Ceres*, as the name of a goddess

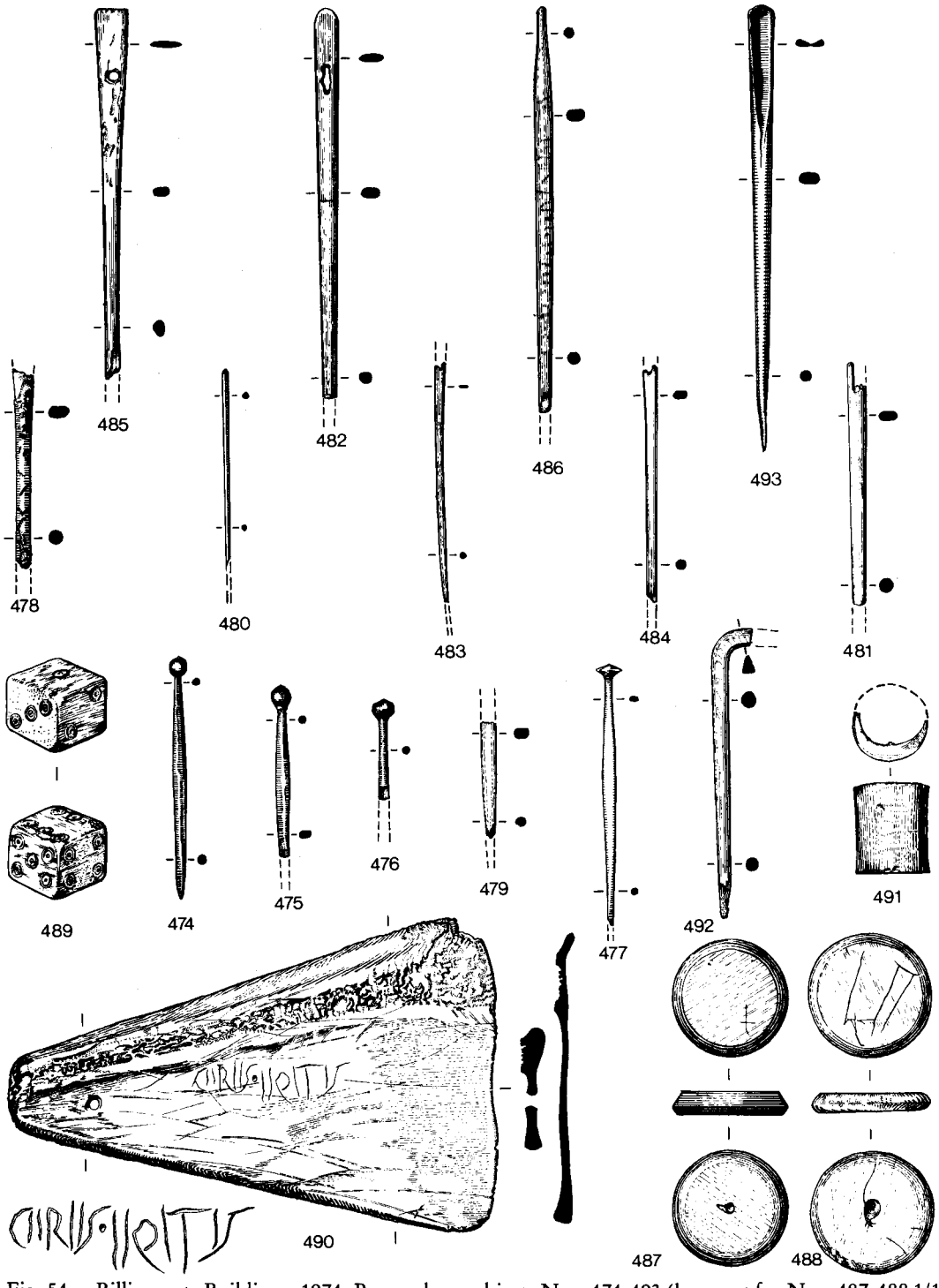


Fig. 54. Billingsgate Buildings, 1974: Roman bone objects Nos. 474-493 ($\frac{1}{2}$, except for Nos. 487-488 1/1, and No. 489 $\frac{3}{4}$).

seems out of place. It is just conceivable that a word derived from the Latin *cera*, wax, is intended".

From Context 430 and therefore not later than *c.* A.D. 100 (illustrated).

491. (4078/357) Bone cylinder from sectional hinge; half survives, *v.* Frere (1972, 149, Nos. 186-92 and refs. cited). From Context 412 and therefore not later than *c.* A.D. 125 (illustrated).

492. (4078/434) Shaft, hand cut, pointed at one end, curved and changing to triangular section at other, now broken. Purpose not clear, but perhaps a key or latch lifter, *v.* Kenyon (1948, 269, No. 8 and Fig. 92) for a bone example from Leicestershire. Date and provenance as for No. 491 (illustrated).

493. (4068/271) Stylus; polished shaft tapering to sharp point at one end and flat spatulate head, with a wide V-shaped scoop cut in at the other. From Context 394 and therefore not later than *c.* A.D. 140 (illustrated).

(l) LEATHER

by Louise M. B. Miller and Michael Rhodes

The assemblage of leather from the dumped layers associated with the Roman revetments can be divided into manufactured articles and waste pieces. Shoes (described elsewhere, pp. 99-128) dominate the former comprising 147 out of 164 articles (*c.* 90%). The waste pieces may be subdivided into "discards", "cut-outs" and "trimmings", and also according to the type of leather used (cattle, goat or calf). "Discards" are the unusable pieces of a hide or skin such as the wrinkled and blemished shoulders or the belly (Waterer 1968, 24-5), "cut-outs" are the small, shaped pieces left when a piece of leather is cut to the required pattern, and "trimmings" are the thin strips removed from the edges when carefully reducing a shaped piece of leather to the exact dimensions required. The number of waste pieces of each sort, excluding miscellaneous scraps too deteriorated to classify properly, are given in Fig. 55.

	discards	cut-outs	trimmings	total
cattle	20	88	31	139 (67%)
goat	32	14	4	60 (29%)
calf	4	4	–	8 (4%)
total	56 (27%)	106 (51%)	45 (22%)	207

Fig. 55 Billingsgate Buildings, 1974: Details of Roman leather waste.

Most of the waste material is of cattle-hide, possibly because this was used for shoe-sole units which are by far the most numerous type of finished leather article from this site, and the cut-outs and trimmings are almost certainly waste from shoe-making. Thus, well over half of the total leather assemblage probably originates from the manufacture of shoes.

Of the 17 pieces of leather articles described below, 13 have been deliberately torn or cut-up, and 14 show the stitch-holes of hems and seams. It is therefore suggested that they represent the unwanted parts of leather objects cut-up for re-use, and with the material already described and some of the shoes which have been cut-up for re-use (see p. 126), probably represent waste from a leather-worker's shop.

The pieces of leather artefact which have survived represent a very small part of the original objects and for this reason it is not possible to determine what they were or to cite many parallels. In any case, most of the Roman leatherwork, other than shoes, which has been found to date is of military origin (*e.g.* Groenman-van Waateringe, 1967; Gansser-Burckhardt, 1947; McIntyre and Richmond, 1934; and Curle, 1911) and might not be of much help in interpreting these objects if they were of household origin. Nonetheless, the seams and hems found here also occur on most of these other sites and have been classified according to the systems devised by Groenman-van Waateringe (1967, 24-31) and McIntyre and Richmond (1934, 77-78).

The stitch-holes are all in the form of slits made prior to stitching. Their direction is occasionally of some use in determining whether border stitching is of a hem or seam; stitch-holes at right-angles to the border appear to be associated with hems, and holes running parallel to the border, with seams.

(Figs. 56-68, Nos. 494-510)

494. (4080/365) Small piece of goat(?)-leather article cut for re-use. The only original edge is a short length of decorative, serrated border with a line of stitch-holes *c.* 1 mm long, 1 mm apart running parallel, indicating that this formed part of a seam; perhaps a Groenman-van Waateringe Type 1 reversed so that the decorative edge could be seen. There are also faint traces of an embossed decoration in the form of parallel wavy lines. Perhaps from a garment or piece of upholstery. From Context 423, and therefore not later than *c.* A.D. 100 (illustrated).

495. (4082/327.1) Piece of a worn, goat-leather article with a seam edge of Groenman-van Waateringe Type 1; the other edges were produced when the object was cut up for re-use. A series of irregularly spaced, 3-6 mm long slits run close to the top and left of the surviving portion. Their purpose is not clear. From Context 430, and therefore not later than *c.* A.D. 100 (illustrated).

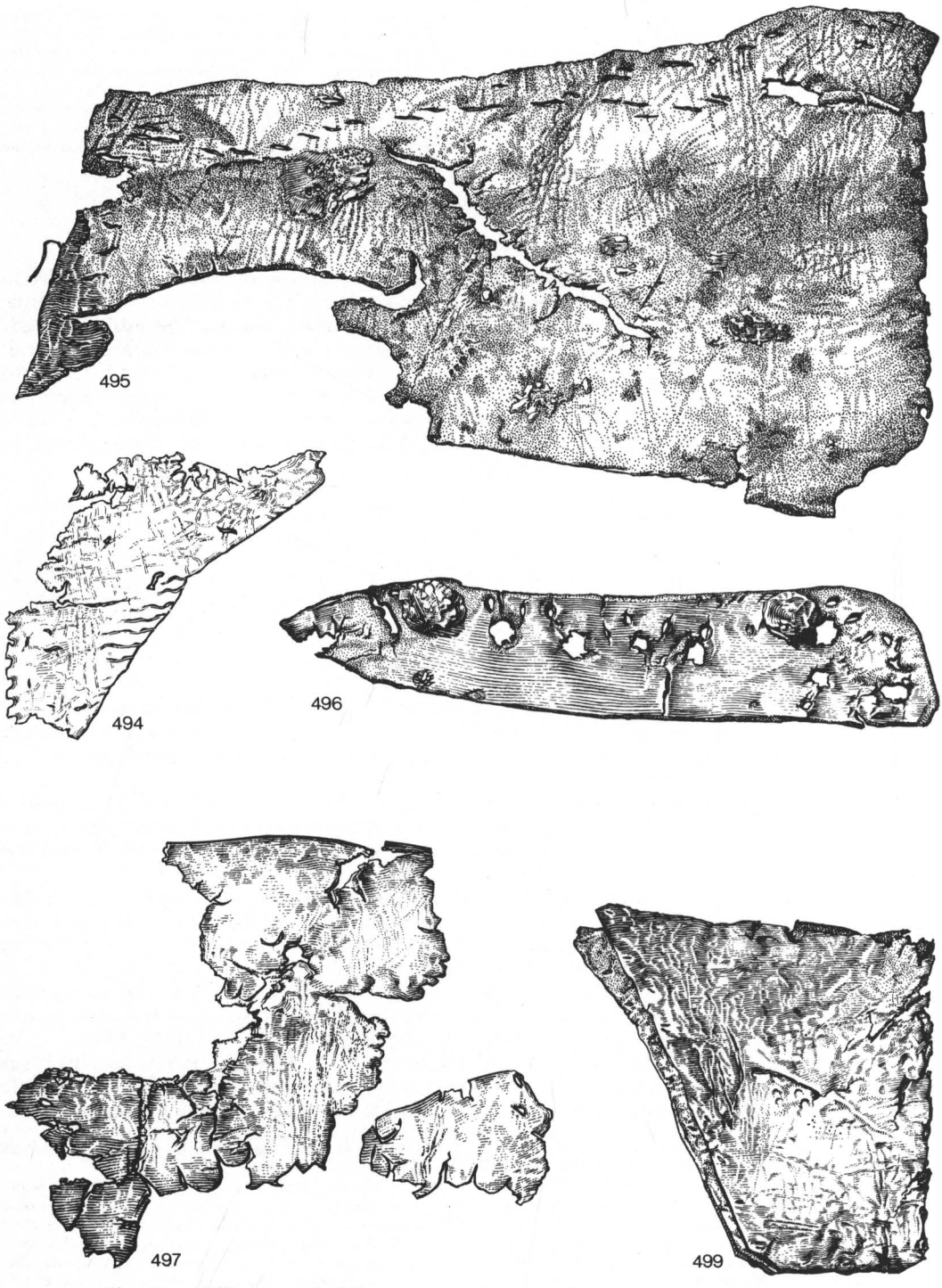


Fig. 56. Billingsgate Buildings, 1974: Roman leather Nos. 494-497 and 499 ($\frac{1}{2}$).

496. (4078/178) Small portion of a cattle-hide article, *c.* 2mm thick. The lower edge was clearly formed when the original object was cut up for re-use and other edges may also have been produced in this way. An irregular line of opened-up slits, 4-5mm long, was probably intended for leather thonging and a line of larger irregular holes was formed by iron nails, although all that remain of these are two corroded lumps. A heavily worn area in one corner is surrounded by a quarter-circle of opened-up slits; possibly for the stitching of a repair piece. From Context 412 and therefore not later than *c.* A.D. 125 (illustrated).

497. (4078/196) Two pieces of used goat(?)-leather, cut up for re-use. One or two stitch-holes may belong to the original article, about which there is no further evidence. Some irregular cut-out shapes on the lower edge are possibly trial runs for a decoratively-cut edge (*cf.* Nos. 494 and 509). Date and provenance as for No. 496 (illustrated).

498. (4078/221) Strip of goat-leather; cracked and worn. Stitch holes, 1.5mm long, 3-4mm apart, run down both edges, probably a narrow strap. For a similar article see Curle (1911, Pl. 19 No. 5). Date and provenance as for No. 496 (illustrated).

499. (4078/220) Part of a goat-leather article, made by folding the leather and stitching the two sides together. A knife-cut edge at the top indicates that the object was cut up for re-use. Fairly worn, apart from an 8mm border around the edges, suggesting that they were held together with a hem of Groenman-van Waateringe Type IVa. The stitch-holes are 2mm long, mostly *c.* 12mm apart. Possibly a pouch or pocket, see Curle (1911, Pl. 19 Nos. 2 and 4). Date and provenance as for No. 496 (illustrated).

500. (4078/222) Part of a goat-leather article, cut for re-use on the top and left sides. Fairly worn apart from the bottom 20mm which is slightly darker and depressed, probably indicating that it was overlapped by another piece of leather; perhaps a hem-binding of Groenman-van Waateringe Type IVb. The stitch holes are *c.* 1.5mm long, 2mm apart in two rows 8mm apart. On the right edge is a seam of Groenman-van Waateringe Type 1; stitch-holes *c.* 1mm long, 3mm apart. More stitch holes along the top are *c.* 1.5mm long, 5mm apart. In the middle is a cut-out dumbell shape surrounded by stitch-holes *c.* 2mm long, 2.5mm apart in a diamond arrangement. This is probably where a patch, now missing, was used to reinforce two holes for some kind of fastening (*cf.* Curle, 1911, Fig. 19 Nos. 1, 6-8 and 10), the leather between the holes having worn and/or torn due to strain. The patch closely resembles a type found on bags at Valkenburg (Groenman-van Waateringe, 1967, 171-3, Fig. 66 Nos. 4 and 23, and Fig. 68). Date and provenance as for No. 496 (illustrated).

501. (4078/341) Piece of goat-leather with one straight, seamed edge; the others torn. Fairly worn apart from a 6.5mm strip along the original edge. bordered by a line of stitch-holes 2mm long, 2.5mm apart; probably a seam of McIntyre and Richmond Style 1. Date and provenance as for No. 496 (illustrated).

502. (4079/379.1) Part of a goat-leather artefact with one straight edge, the others cut and torn. A line of stitch-holes *c.* 1.5mm long and 3-4mm apart runs parallel to the straight edge, probably indicating a seam of McIntyre and Richmond Style 1. In the remaining area is a 50 x 50mm square of 1mm long stitch-holes, *c.* 2-3mm apart, and within this a circle of similar holes but more closely spaced and slanting. In the middle of this circle is a rectangular slot. This probably indicates a patch to reinforce the slot which probably accommodated some kind of fastening. The surface is fairly worn except along the seamed edge and within the square. Perhaps a piece of tent from where a guy rope was attached. From Context 412A and therefore not later than *c.* A.D. 125 (illustrated).

503. (4079/379.2) Piece of goat-leather with a curved seam of Groenman-van Waateringe Type IIIb. Another edge was produced when the object was cut up for re-use and there is a shorter, torn edge. The grain surface is worn except for a 7mm wide strip along the seam edge, bordered by stitch-holes *c.* 2mm long and 5mm apart. The second parallel row of stitching, 14mm from the first, may be observed on the flesh-side only as the holes do not penetrate to the grain surface. Date and provenance as for No. 502 (illustrated).

504. (4007/174) Piece of goat-leather with an original, straight, seamed edge and a long, cut edge, produced when the object was divided for re-use. The other edges are torn. A line of wear runs *c.* 13mm from and parallel to the seamed edge. The seam uses two rows of *c.* 2.5mm long stitch-holes, spaced at 5-6mm and 9-11mm intervals. These run parallel for part of the way and then merge, appearing as one row of more closely spaced holes. 28mm in from the edge is a double row of *c.* 2mm long stitch holes, with thread impressions between the holes on the grain side. From Context 208 and therefore not later than *c.* A.D. 140 (illustrated).

505. (4007/189) Part of a goat-leather article, cut up for re-use. Two cut sides, the others torn. Fairly worn. Decorated with a lattice pattern which is embossed, but by what method is not clear. Perhaps a piece of garment or upholstery. Date and provenance as for No. 504 (illustrated).

506. (4067/336) Fragment of goat-leather with a hem of Groenman-van Waateringe Type IIa or IIIa. Fairly worn and now in poor condition. The stitch-holes in the fold are 2mm long and 4mm apart. The second row (stitch-hole length *c.* 1.5mm) may be seen on the flesh side only, *c.* 15mm from the edge of the fold. From Context 394 and therefore not later than *c.* A.D. 140 (illustrated).

507. (4076/203) Piece of goat-leather article in poor condition with two original straight edges, the others torn. In the corner is a 3mm awl-hole surrounded by a rough semi-circle of 1mm long stitch-holes which seem to indicate the position of a fastening. Along the longer surviving edge are a series of decorative punch holes composed of two overlapping diamonds. Although the leather is too fragmentary to be certain, these seem to be arranged in blocks of five, mainly chevrons. Perhaps from a garment. From Context 408 and therefore not later than *c.* A.D. 140 (illustrated).

508. (4065/194) Fragment of goat-leather hem-binder for a hem of Groenman-van Waateringe Type IVb. The fold is not exactly down the centre so that one side overlaps the other by 5mm. Two rows of stitch-holes, *c.* 2mm long and 6-7mm apart pierce both thicknesses of leather. From Context 382 and therefore not later than *c.* A.D. 160 (illustrated).

509. (4065/183.1) Part of a goat-leather article with two original edges and two cut edges produced when the object was cut up for re-use. 6-7mm from the original straight edge is a line of 2mm long stitch-holes, 2-3mm apart, and running 4-10mm in from this is a second row of stitch-holes, this time slanting, 2-4mm long and again 2-3mm apart. These probably indicate an especially strong seam perhaps of McIntyre and Richmond Style 2 with a variant stitch pattern. Traces of two impressed parallel lines, *c.* 7mm apart, may be seen towards the right hand side. The bottom edge is serrated (*cf.* Waterer 1977, 74 and Fig. 24 No. 525), suggesting this may be from a garment. Date and provenance as for No. 508 (illustrated).

510. (4065/183.2) Goat-leather fragment with one straight hemmed edge, the others torn. Worn apart from an 8mm strip along the edge which is bordered by a row of stitch-holes *c.* 2mm long and 2mm apart; probably a hem of Groenman-van Waateringe Type IVa. Date and provenance as for No. 508 (illustrated).

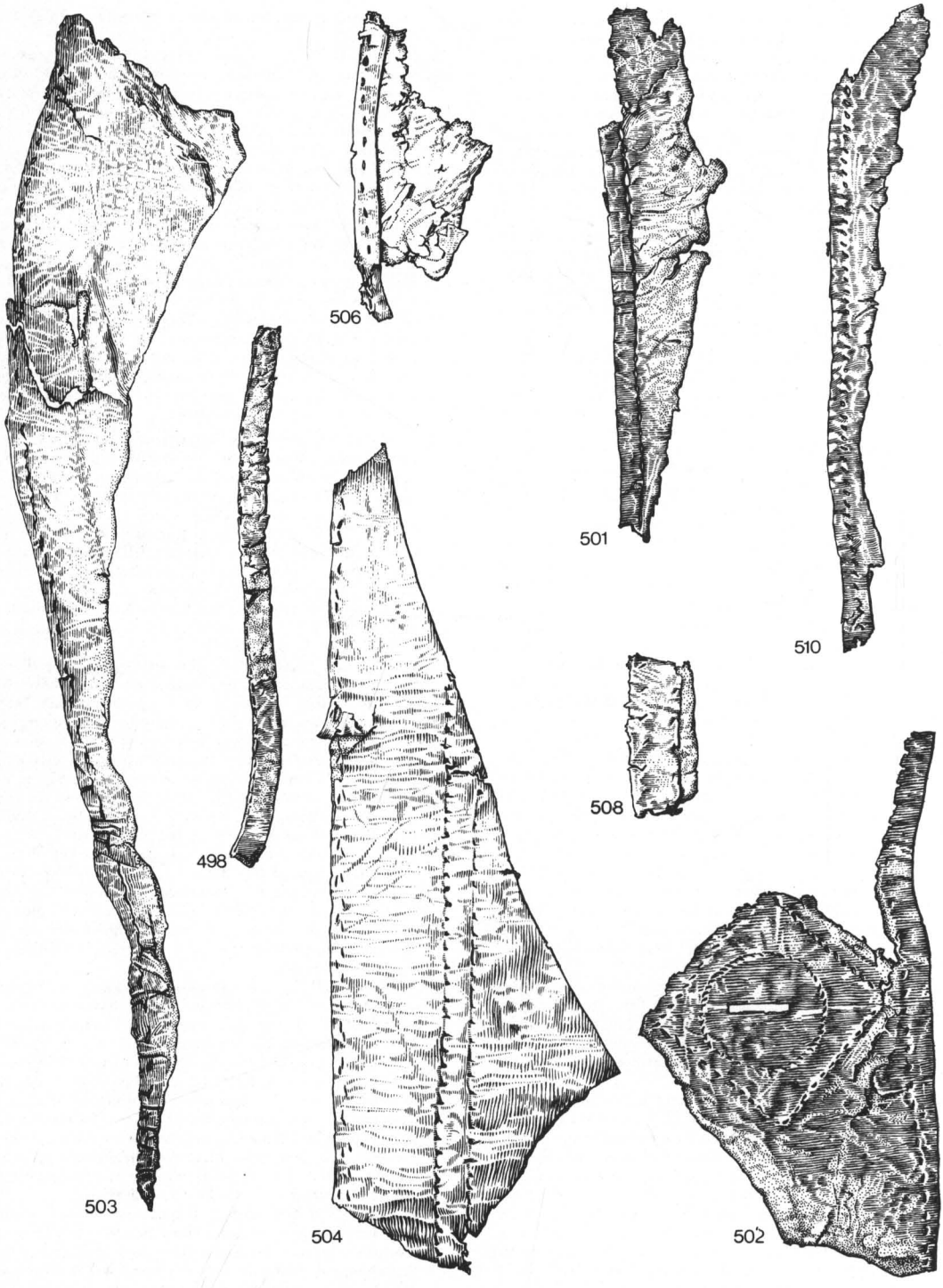


Fig. 57. Billingsgate Buildings, 1974: Roman leather Nos. 498, 501-504, 506, 508 and 510 ($\frac{1}{2}$).

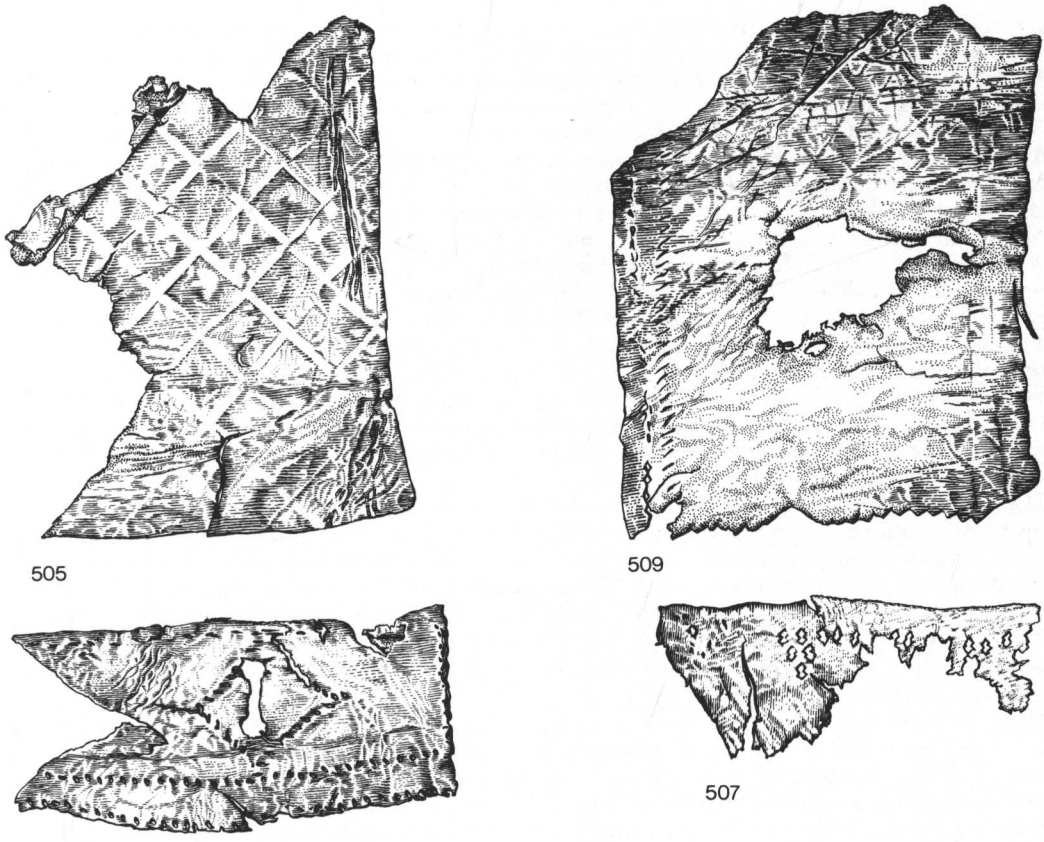


Fig. 58. Billingsgate Buildings, 1974: Roman leather Nos. 500, 505, 507 and 509 (½).

(m) LEATHER FOOTWEAR

by Michael Rhodes

INTRODUCTION

Shoes were recovered from eleven of the waterlogged dumped layers, dating between A.D. 70 and A.D. 160. Over one half come from Contexts 412 and 412A. There seem to be no significant differences in the types of shoe present, or in the relative proportions of the various types in layers of different date, and for this reason the shoes are treated more or less as one assemblage.

The exact number of shoes which are represented by the fragments cannot be determined. This is because once they have been separated in the ground or accidentally in the process of recovery, it is virtually impossible to tell which sections of a nailed Roman shoe belong together. Furthermore, in addition to the relatively complete sections listed in the tables (Figs. 62-65, 67 and 71) there are a large number of small deteriorated scraps which, although clearly from shoes, cannot be classified or described in other than the broadest terms, and have therefore been ignored. If it is accepted that these two factors may to some extent cancel each other out, then the 147 groups of related shoe parts probably give a fair indication of the number of shoes which were originally buried in the area of the excavation trench.

The City of London has produced nearly seven hundred Roman shoes over the last century, the majority of which are now held by the British Museum and the Museum of London. Although these form one of the principal collections, second only to those of the Saalburg Museum (see Busch, 1965, 161) surprisingly little has been published. They have nevertheless been the subject of an M.A. dissertation (Ross, 1971) and A. V.

Goodfellow and J. H. Thornton (1966) have produced a typescript account of the Roman shoes then in the possession of the Guildhall Museum and now in the Museum of London. There has, unfortunately, not been time to re-examine this previously-excavated material and where London parallels are given to the shoes under discussion, the author is relying on the observations of these writers, unless another source is cited.

The lack of detailed published information concerning Roman shoes, both from London and elsewhere, and confusion over a number of issues, for example, the terminology, is such that the writer has thought it necessary, using a consideration of the shoes from this site as a framework, to summarise and sift the available evidence, and it is hoped that this work will provide a useful starting-point for further research.

Most Roman shoes in London have been found in the 1st to mid 2nd-century waterlogged rubbish and dumped deposits of the Walbrook stream and flood plain (for a gazetteer of London shoe find-spots, see Ross, 1971, 22-32), although about 140 shoes were found during excavations of the Roman waterfront at New Fresh Wharf, a few metres south-west of the Billingsgate Buildings site, in 1974 and 1975 (for a summary of the excavations see Schofield and Miller (1976) and Hobley and Schofield (1977, 33-37). In the light of these finds, the large number of shoes from the relatively small trench at Billingsgate Buildings is rather surprising. It may be that in addition to the worn-out shoes thrown away in the normal manner, there are some which have been discarded by shoe-repairers. At least two of the moccasins (Nos. 131 and 134) have clearly been cut up for re-useable leather and the discovery of pieces of shoemakers' waste (see Miller and Rhodes, above, pp. 95-99) and a possible leather-worker's tool (No. 466) also support this theory.

The condition of the shoes is not good. Not one shoe is complete; certain parts have disappeared or rotted away in every case. The pieces that remain are frequently incomplete and distorted, and the iron nails which studded many of the soles have turned into lumps of corrosion or entirely disappeared. In places the leather has delaminated, separating into two layers. This is thought to be due to an incomplete penetration of the tan-liquor when the hide was being prepared (see Haines, 1959). A microscope examination of the grain pattern shows that the remaining leather is probably all of cattle-hide. The flesh surfaces are surprisingly smooth and shiny as if, perhaps, they have been beaten to make them more compact.

Reasons for the disappearance of the Uppers

None of the stitching materials and none of the uppers of the nailed and stitched shoes have survived. This is usually the case with Roman shoes, excluding one-piece shoes, from London excavations (Goodfellow and Thornton, 1966, 6 and Ross, 1971, I, 22), and many writers elsewhere have commented on the scarcity of uppers in comparison with bottom-units, e.g. Miller (1922, 99 and 100), Richardson (1959, 54) and Gansser-Burckhardt (1942, 58). Why the bottom-units survive and not their uppers is not clear, but there are several possible reasons:

(i) Some of the uppers may not have been of leather at all but of cloth; a suggestion by Liversidge (1968, 129) and Swan (1975a, 15) for which there is, so far, no firm evidence. This is unlikely to be the case here, since several specimens (e.g. No. 545) have fragments of thin, deteriorated, crumbly leather between and adhering to their bottom-unit layers, and these are best explained as fragments of shoe-upper from where they joined the bottom unit.

(ii) Whilst the bottom-unit layers are of cattle-hide, the uppers might have been of a different leather. In support of this, the leather of other species is known to have been employed in shoes; for example, women's shoes from Les Martres-de-Veyre include slippers of goat-skin and shoes with wool-linings (Liversidge, 1968, 131) and Martial mentions wool-lined slippers *(Epigrams* I. 14.65). Since a considerable number of pieces of goat-skin objects have been recovered (see Miller and Rhodes, pp. 95-99) there is no reason why shoe-uppers of this same material should not have survived, although none of the excavated leather articles from London has been shown to be of pig or sheepskin, both of which must have been extensively used. Mule, donkey or horse skin may also have been employed (Busch, 1965, 159).

(iii) The leather of which the uppers were made may have been tanned and prepared differently from that used in the bottom-units, and may, for this reason, have been more prone to rotting. There are one or two literary references to Roman shoe-uppers of *aluta* (see Purser, 1901, 333 and 334), the term used for alum-dressed leather (Forbes, 1957, 48). Waterer (1976, 181) has commented that as this will not withstand water it is unlikely to survive immersion or prolonged burial. Forbes, however, says that bottom-units of *caligae* were made of vegetable-tanned leather (Forbes, 1957, 48), so it is possible that these two tanning processes were widely used and that the different properties of the leather that they produced could have been exploited in the production of different shoe parts.

(iv) It is possible that either the bottom-units or the uppers were of untanned hide. This is perhaps unlikely since untanned hide is subject to putrifaction when wet and is stiff and horny when dry *(ibid,* 5), and is therefore not likely to have been used in preference to tanned hide when this was widely available. Nevertheless Aeneas is said to have worn both boots and gloves of raw-hide (Virgil *Aeneid,* 7, 690; 5, 69) and raw-hide is known to have been used in primitive shoes of the recent past in Ireland (Hald, 1972, 83, 155-6, 161-7) and Finland *(ibid,* 188-190).

(v) It is known that some Roman shoes were dyed black with a copper-vitriol substance (Forbes, 1957, 59). If the uppers only were treated in this way, then the acidic character of this substance might have rotted them more extensively than other shoe parts.

(vi) The uppers might have been treated with oils and greases to keep them clean and supple in the way that modern shoe-polish and dubbin is used, and this encouraged differential rotting. The practice of cleaning footware in Roman times is illustrated by a bronze statuette of a negro slave engaged in this activity (Fosdyke, 1920, 130, No. 142). This explanation does not, however, allow for the fact that many sole units have quite clearly lost a layer of material (presumably part of the upper) from between their soles and insoles, and clearly a layer of leather in this position would not have been affected by oils and greases applied to the shoe after its manufacture was complete.

(vii) As the uppers were required to be more flexible than the bottom-unit layers, it may simply be that they were of very thin leather which has not survived for this reason alone.

Conservation methods

The shoes were treated in the Guildhall Museum Conservation Laboratory, using in most cases a method developed by W. K. Rector for medieval leather (see Rector, 1975). Although this procedure has clear advantages over the earlier one, which used sulphonated castor oil and left the objects with a sticky black surface and unpleasant smell, the results are not as satisfactory for Roman as for medieval leather, and in contrast with the supple suede-like medieval specimens, the shoes are inflexible and rather friable. This is perhaps because they were buried for much longer and/or in less favourable conditions than the medieval examples though it is more likely to be due to differences between Roman and medieval methods of leather preparation, which has affected both their ability to survive in the earth and their response to this laboratory treatment. The Roman shoes are also generally much darker than their medieval counterparts, and although this makes the leather appear less natural it may be that the shoes were blackened in antiquity with a copper-vitriol substance (Forbes, 1957, 59) or by bees-wax and soot (Gansser-Burckhardt, 1942, 63).

Shrinkage

The distortion of the leather is apparently due to shrinkage during burial and/or treatment, which in some cases was different for the various layers of the sole-units, causing them to curl. It has obviously been important to make an allowance for any loss in length when working out the foot sizes, and for this reason careful consideration has to be given to the probable rate of shrinkage.

During his treatment of the medieval shoes from Blackfriars, Rector found that the soles sustained a loss in length of between 3 and 6% (Rector, 1975, 36). Unfortunately, no comparison could be made between the rate of shrinkage of medieval shoes dried out as part of Rector's treatment and shoes dried out in the normal way without precluding the opportunity of treating those specimens. This is because the method involved keeping leather specimens in their wet state (as excavated) until they were treated. J. H. Thornton (1977a), however, monitored the natural shrinkage of three newly-excavated medieval shoes from the Tower of London moat in 1959, and found that their overall loss in length varied between 4⅓ and 5½%. It is therefore apparent that Rector's treatment does not significantly alter the amount of shrinkage which leather preserved in waterlogged conditions undergoes on drying out, although it remains to be seen whether or not it will reduce future shrinkage. Bush (1965, 160-161) found that some of the Saalburg shoes had shrunk by up to 10% since they were originally catalogued at the turn of the century.

There is, unfortunately, very little reliable information concerning the shrinkage of waterlogged leather during its period of burial, although some indications come from an interesting experiment by J. H. Thornton (1977 a). In 1959, he decided to bury some strips of cattle-leather in wet soil so that they could be examined at intervals of 1, 2, 4, 8, 16, 32, 64 and 128 years. Strips of oak-tanned leather (6 x 1 inch (154 x 26mm)) were removed from the standard sample positions on a hide, soaked and dried to remove water solubles, and carefully measured. They were then buried in garden earth and stored in carefully-sealed kilner jars, to which water had been added until it covered the earth. After appropriate intervals, these samples are being opened and measured and, although the experiment will not be complete until A.D. 2087, some interesting results have already been obtained. On drying each sample for *c.* 8 weeks before measurement,

Thornton found that they shrank by *c.* 3% after storage for one year, by *c.* 7% after four years, by 9¼% after eight years and by 9½% after 16 years. The figures seem to suggest that buried leather will develop an increasing tendency to shrink for a few years, but that this slows down asymptotically; tending perhaps to a 10% shrinkage.

Shoe-sizes

On the basis of this research, in calculating shoe sizes from the sole lengths, allowance has been made for a 10% shrinkage and all the shoe-sizes quoted in this report are adjusted appropriately. The sizes are given according to the English Shoe-Size Scales for child and adult shoes. The children's scale starts at size 0 and runs to size 13. Size 0 shoes are the smallest having sole-lengths of four inches (102mm). Each subsequent size is ⅓ inch (8.55mm) larger than the one before. The adult scale starts with size 1 for shoes with sole-lengths of 8⅔ (222mm) and increases similarly in ⅓ inch (8.55mm) steps. Half sizes are not used and where a shoe falls between sizes, the size above is quoted.

It has not been possible to make any conclusions about the physical characteristics of the population who wore these shoes from an examination of the number of shoes in each size class. This is because over one half of the shoes of adult size are too deteriorated to give anything other than the vaguest suggestion of their size, and many other factors remain unknown, e.g. whether the material is domestic refuse or workshop waste, the exact rate of shrinkage of the leather and the relationship between foot-size and height and gender in the Roman period, etc.

The shoe sizes, where they can be accurately determined are nonetheless important because with material in bad condition the size of a shoe can provide an indication of the sex of the wearer. If the material were more complete, however, it is likely that other differences between men's and women's shoes would emerge, and it is clear from a passage in Varro *(De Lingua Latina,* 9.40) that Roman men's and women's shoes were readily distinguishable on stylistic criteria. Some work by Groenman-van Waateringe (1974, 79-80 and 1975, 33) suggests that Roman shoe sizes were not significantly different from those of today (see also Keppie, 1975, 80). It is therefore suggested that those in the range of Adult Size 1 to 5 are likely to be women's shoes and that shoes larger than Size 5 were probably worn by men.

The partially decayed state of the shoes also makes it difficult to establish how worn they were before they were thrown away, or to what extent they were repaired. Some of the moccasins were clearly used until they had holes in their heels and a number of repairs, both to the nailed shoes and the moccasins may be observed. Some wear patterns (see Swallow, 1975) can be seen on the soles of children's shoes and on the insoles of the sandals, but these appear to be normal. Most of the adult shoe soles were studded with nails and this prevented clear wear patterns from forming.

Problems of classification and interpretation

The shoes are of several distinct types and are described in detail below under headings based on their type of construction. A number of articles hitherto have attempted to classify Roman shoes according to Roman terminology, but this is avoided because of the dangers inherent in firmly linking partial shoe-remains with the apparently rather loosely-used names employed by Roman writers (see Anderson, 1902, 684 and Becker, 1876, 424). After the description of each shoe-category is a discussion with an examination of the evidence for the probable Roman names, although a more comprehensive and exacting reconsideration of the textural references and artistic representations of Roman footwear is necessary in the light of the growing number of shoe-finds from the northern Roman provinces.

An even more serious difficulty in the interpretation of this collection arises from the lack of publication of other excavated examples, especially from this country (for a comprehensive bibliography, see Swan, 1975b) and it is not possible therefore fully to place these shoes in their Romano-British context. A widely-based comparative survey of British finds is needed if we are to establish changes in fashion and construction over the period of Roman occupation, regional variations, distinguishing features of individual workshops, evidence for trade and their mode of distribution. Consideration should also be given to the extent to which it is possible to make deductions concerning the social role and status of the wearers, and of the overall pattern of manufacture and repair as evidenced by workshop waste on sites of different types and date. Finally, some experimental reconstructions will have to be made of the various types of shoe, continuing the work of Busch (1965, 169-170), if we are to understand better the possible methods of construction and to interpret adequately the many stitch-holes described below.

NAILED SHOES

(Figs. 59-64, Nos. 511-593)

These are shoes in which nails are the primary means by which the soles are held to the other bottom-unit layers, having uppers which partially or wholly cover the foot. They form the largest category with 79 examples forming *c.* 54% of the total number of catalogued groups of shoe remains. The uppers of these shoes have almost completely disappeared, leaving behind a few heel stiffeners and the separately cut, nailed, bottom-units. These mainly consist of two layers of leather, insoles and soles, although there are 11 middle-soles and 5 wedges. These bottom-unit parts are denoted by the letters I, S, M and W, respectively, in Column 7 of the Catalogues (Figs. 62-64).

Bottom units

The soles were always used grain-side down because this surface is more compact and water-resistant, though the insoles are always the reverse. In general the insoles are a little shorter and narrower than the soles, and often have chamfered edges on the flesh side, evidently to make room for the upper to curl smoothly around the edge where it tucked in between the sole and insole. Where any of the bottom-unit layers are reasonably complete it is nearly always possible to tell whether they were intended for a left or right foot and this information is given in Column 6 of the Catalogues (Figs. 62-64).

Most of the bottom-units are of a more or less standard shape (see e.g. Fig. 59, Nos. 532, 552 and Fig. 61, Nos. 568 and 570) although some of the smaller, women's (?) shoes are more "streamlined" (see e.g. Fig. 59, Nos. 526 and 545). In addition there are two examples (Nos. 523, Figs. 59 and 60 and 527, Fig. 59) whose fore-parts are displaced inwards. Similar shoe-bottoms come from *Vindonissa* and Gansser-Burckhardt (1942, 68-73) in describing this material suggests that they are orthopaedic shoes for wearers suffering from a congenital deformity known as "clubbed foot" *(talpes equines)*. The condition known as *pes cavus* causes a similar fore-part displacement. Gansser-Burckhardt also notes that the *Vindonissa* shoe-bottoms of this type are associated with a circular nailing pattern in the fore-part of the tread. Ross (1971, I, 21) however does not accept that these shoes are orthopaedic and prefers to interpret the association between this unusual shape and the circle nail-pattern as an indication that they were produced by the same workshop. This explanation is preferable in view of the fact that seven out of twenty-nine shoes at *Vindonissa* are of this shape, and this, if Gansser-Burckhardt were correct, would have a very curious implication.

It is interesting to note that of the two examples of "orthopaedic" shoes from the Billingsgate Buildings site, No. 523 has a diagonal line of nails which is paralleled on an "orthopaedic" bottom-unit from *Vindonissa* (Gansser-Burckhardt, 1942, 69, Abb. 44) and that No. 527 has a circular nailing pattern also paralleled at *Vindonissa*. A London shoe-bottom with a similar circular nailing pattern is in the collection of the Museum of London (Acc. No. 14176). Could it be that the products of one workshop were spread as far apart as London and *Vindonissa*? Certainly if Waterer (1956, 168) is correct in his assertion that Roman footwear was factory-produced in large quantities and that a substantial export trade was involved, the suggestion is plausible, though it would be difficult to prove conclusively.

Of the insoles, three (Nos. 529, 550 and No. 568 (illustrated, Fig. 61)) have impressed lines along some of their grain-side edges where the required shapes were marked prior to cutting-out. One of the insole fragments from Context 430 (4082/785), too small to be included in the catalogues, is stamped in the centre at the waist (?) with what appears to be a motif in the form of an urn (illustrated, Fig. 60, No. 511). A sandal from this site (No. 623, p. 119 and Fig. 66) and another from London (M.O.L. Acc. No. 14108) also have urn stamps although all three are different.

A middle-sole can be several layers thick depending on how hardy or rigid a shoe was required, but on this site only two shoes, Nos. 523 and 581, definitely have middle-soles of more than one layer. No. 581 is of particular interest in that it has three layers, the outer two of which have a border composed of several curved strips about 20mm wide, with a small sole-shaped piece inside. The specimen is, unfortunately, very fragmentary and it is impossible to deduce from the rest of the shoe why the sole unit was made in this way, although it may be comparable with Gansser-Burckhardt's *Rahmenschuhe* from *Vindonissa* and Petersburg (Gansser-Burckhardt, 1942, 62). Where the middles are of only one layer they are generally grain-side up, although there are one or two exceptions.

Wedges consist of pieces of leather, of the same thickness as the other layers of the bottom-unit, but not covering the entire sole area. They are intended to give extra thickness for medically corrective reasons or to reinforce places liable to the most stress and wear, or they may be inserted as repair pieces. They are usually heavily chamfered on the flesh side to allow the layers of leather above and below to rest closely against both

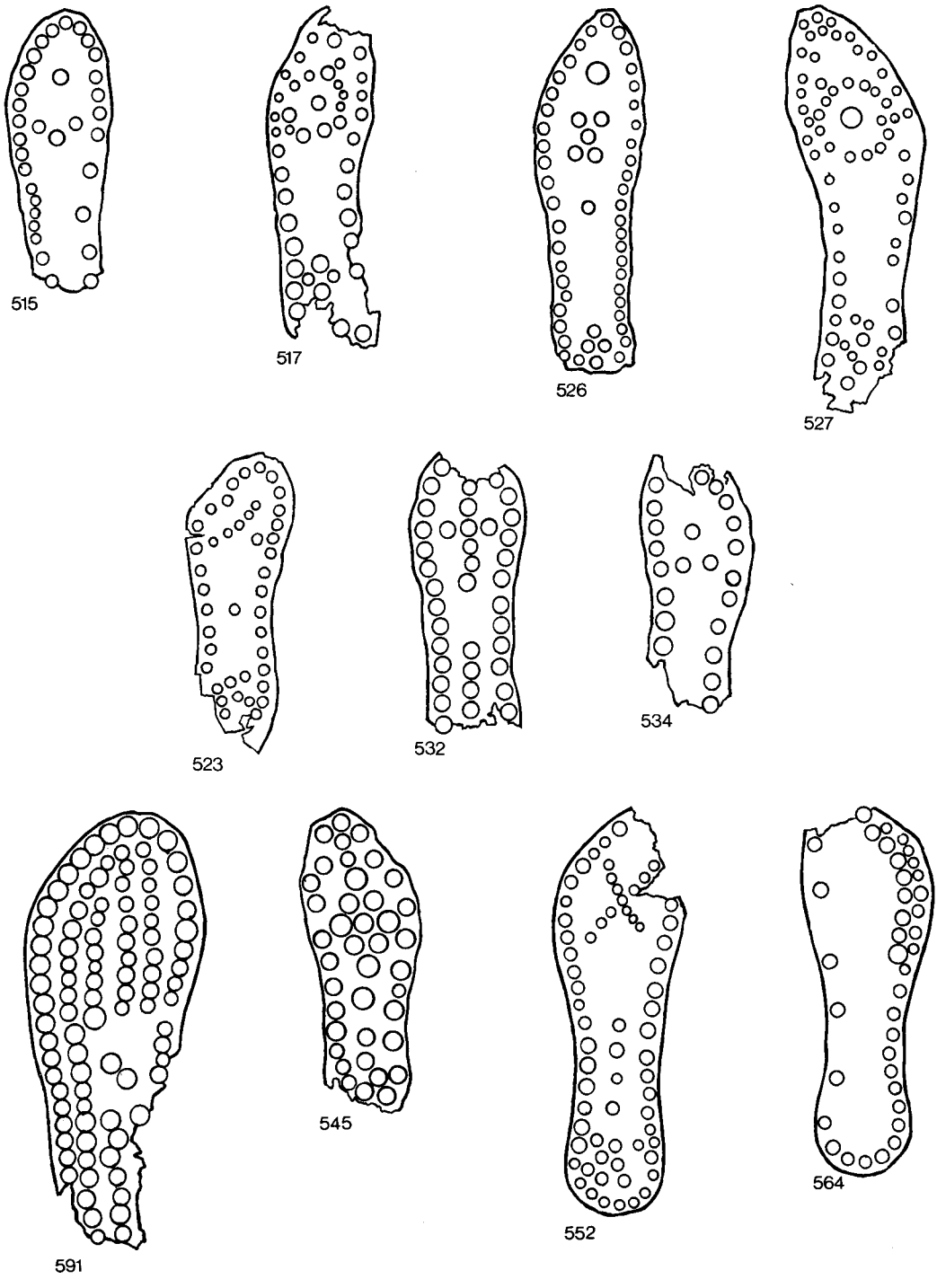


Fig. 59. Billingsgate Buildings, 1974: Nail patterns on Roman shoes Nos. 515, 517, 523, 526, 527, 532, 534, 545, 552, 564 and 591 ($\frac{1}{4}$).

surfaces. There are five wedges from this site and four of these, Nos. 512 (4000/438, Unstratified), 513 (4068/127, from Context 394), 534 and No. 556 (illustrated, Fig. 60) are thought to be repair-pieces for worn fore-parts. The other is *in situ* between the sole and insole at the heel of a small, lady's (?) shoe and was probably intended to give a little extra height (illustrated, No. 571, Fig. 61). A similar London example comes from Angel Court; see Thornton (1977b, 74-75, No. 522).

Nailing

The various bottom-unit sections were united primarily by iron nails. After being driven through all the sole layers, their points clearly encountered a very hard surface which caused them to curl over and be driven back into the sole. This indicates that the shoes were constructed using an implement such as the ones found at Saalburg (Busch, 1965, 170, Abb. 5) and at Sandy, Beds. (Brailsford, 1964, Fig. 24, No. 10 p. 53). These tools are sometimes described as iron lasts, but as a last is a foot-shaped form around which the shoe is moulded, this is liable to cause confusion. It is suggested that the term "shoe-maker's anvil" should be used instead.

Most of the nails are now heavily encrusted with iron corrosion products or have completely disappeared leaving clean holes in the leather. The size and shape of their heads may, however, be deduced from the impressions they have left in the sole surface. These show that they were roughly circular and varied between 6 mm (as in Nos. 579 and 588) and 12 mm in diameter (as in No. 536), although most were in the region of 9 to 11 mm. Several of the shoes (e.g. Nos. 517, 527, 552, 564 and 591, Fig. 59) had nail-heads of more than one size, which in some instances may represent repairs.

In a considerable number of cases the corrosion products have survived even though the iron has entirely disappeared and it is possible to tell from the hollows left in the encrustations that the nail-shanks were square in section. The sparse use of nails on some of the shoes suggests that their nails must have had fairly flat or shallow heads if the shoes were not to be very uncomfortable. Shoe No. 564 has relatively well-preserved nails and one of these has been illustrated (Fig. 60). The shank of this nail may have broken off short, however, and as the shoe has some unusual features, it should not be assumed to be a typical example.

The exact number of nails in a bottom-unit obviously varies according to the size of a shoe, but with regard to the general pattern of the nailing, three broad categories are apparent. These are used as a basic sub-division for the nailed shoes because, as the nails penetrate every layer of the bottom-unit, individual soles, insoles and middle-soles may be categorised with as much certainty as complete shoes. This is clearly a big advantage when dealing with specimens as fragmentary as the Billingsgate Buildings shoes although if they were more complete, it would probably be better to subdivide them according to the type of upper they had or other aspects of their construction. The three types of nailing pattern have been termed A, B and C and a list of the shoe fragments belonging to each category may be found in Figs. 62-64, respectively. Fig. 59 shows the nail-patterns as they would have appeared on the sole with all the nails in place. In some specimens the position of the nails has been deduced from other layers of the sole unit.

Type A nailed shoes have a single row of nails around the outside of the sole spaced between 10 and 15 mm apart. Within this border are a cluster of nails in the tread, perhaps one or two in the waist and usually another small cluster at the heel. Of the 39 shoes in this category, about one half are so fragmentary that the position of the tread nails cannot be determined, but in the remaining shoes, about one half appear to be at random whilst the other half are arranged in simple geometric patterns. Some of these may be paralleled on other sites from London and elsewhere and may be associated with certain workshops (see p. 103 above and Marschalleck 1959, 77). There are eight designs as follows:

(i) A triangle of equidistant nails (No. 534, illustrated, Fig. 59; and No. 521).

(ii) A regular group of four nails (No. 515, illustrated, Fig. 59). For a parallel from Bar Hill, see Keppie (1975, No. 53, 76 & Fig. 25).

(iii) A dice five (No. 526, illustrated, Fig. 59; and No. 546). For similar shoes from London see Thornton (1977, 67 and Fig. 20, No. 494) and Brailsford (1964, 10-11, Fig. 4, No. 5).

(iv) A diagonal line (No. 523; illustrated, Fig. 59; and No. 525). A similar London shoe is in the Museum of London (old Guildhall Museum collection; no Acc. No.: see Ross, 1971, Pl. 29, No. 152) and there is an example from *Vindonissa* (Gansser-Burckhardt, 1942, 69, Abb. 44, and see above p. 103).

(v) A vertical cross (No. 523, Fig. 59).

(vi) A diagonal cross (No. 552, illustrated, Fig. 59; and No. 531). For a similar example from *Vindonissa* see Gansser-Burckhardt (1942, Abb. 42a).

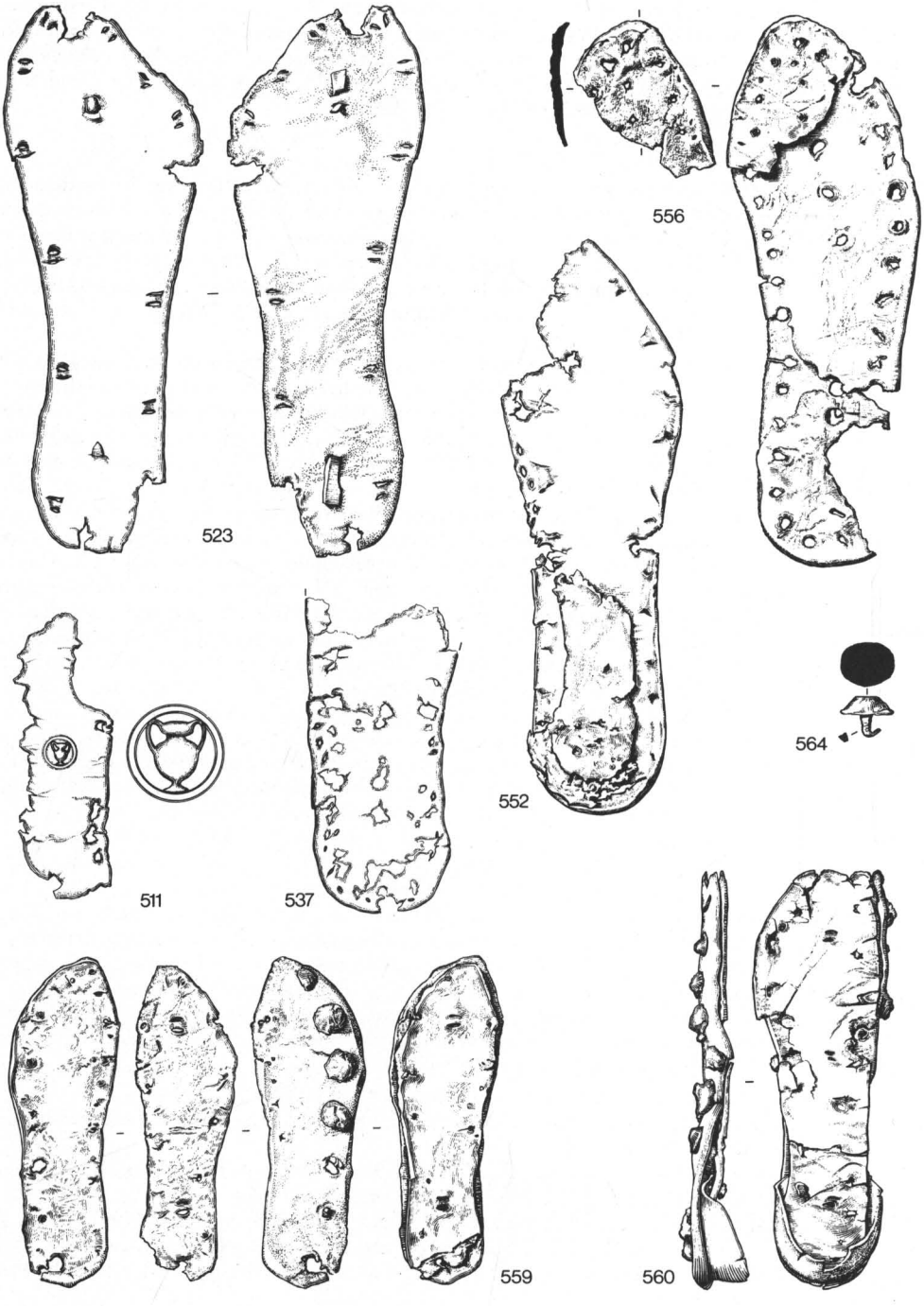


Fig. 60. Billingsgate Buildings, 1974: Details of Roman nailed shoes Nos. 511, 523, 537, 552, 556, 559 and 560 (⅓); typical hob-nail from No. 564 (1/1).

(vii) A circle with central nail (No. 527 see above, p. 000 and Fig. 59; No. 553; and No. 517, illustrated, Fig. 59). Continental parallels come from Valkenburg, where they are incorporated into more elaborate designs (see Groenman van Waateringe, 1967, Fig. 45, No. 4 and Fig. 49, No. 89), and *Vindonissa* (Gansser-Burckhardt, 1942, 64, Abb. 39 and Abb. 41, No. 23).

(viii) A diamond (No. 545, illustrated, Fig. 59). This is the most common pattern from London with at least twelve known examples (M.O.L. Acc. Nos. 976, 14103, A12402, A24771; B.M. Acc. No. CRS 1045; Marsden (1965, 51-54, Nos. 2, 7, 8, 9, 10 and 11) and Thornton (1977b, No. 513, 67 and Fig. 23)). Ross (1971, 25) comments that this pattern occurs in the 2nd century but not in the 1st. Parallels come from Bar Hill (Keppie, 1975, No. 51, 75 and Fig. 25) and Kastell Zugmantel (Busch, 1965, Taf. 35, Nos. 770, 771, 775 and 781).

Type A shoes are the most common with about half of the nailed shoes coming into this category. They include shoes of all sizes except for small children's shoes, and were clearly for men, women and children.

Type B nailed shoes also have a single row of nails around the outside but these are spaced more widely (*c.* 15-25 mm) than the Type A nails. Some shoes have no nails at all within this border while others have a few spaced out in a line along the centre. Although these shoes are of all sizes, it is thought that they contain a high percentage of women's and children's shoes and many of the bottom-units are of the "streamlined" shape mentioned earlier.

Type C shoes are the most heavily nailed, with at least two rows around the outer edge and at least one row around the rest of the bottom-unit. Inside this border are 2-3 straight rows of closely-spaced nails extending either along the whole length of the sole or just along the tread or heel (see e.g. Fig. 59, No. 591 and Fig. 61, No. 577). This heavy nailing was clearly intended to reinforce the bottom-unit and implies that the shoes were for strenuous activities. Type C shoes are generally large, ranging between *c.* Adult Size 3 and 12, and it is suggested they are army boots or *caligae* (see below, pp. 113-4).

Two of the shoes do not fit this tri-partite classification particularly well. These are No. 564 (illustrated, Fig. 59) which is basically a Type B shoe with two rows of small studs on the outside and No. 515 (illustrated, Fig. 59) which has widely-spaced border nails and could alternatively be classified as a Type B shoe with a simple design in the tread instead of a row of nails down the centre.

Evidence for the Uppers: thong slots

Although the uppers of these shoes have disappeared, we may deduce certain things about them from impressions and stitch holes in the sole-units which suggest how they may have been attached.

A large number of the insoles (about ⅔ of those which are complete enough to give definite information) have two or three pairs of thong-slots, consisting of widely-opened slits, 4 to 5 mm in width, at right-angles to the length of the shoe along the centre, usually in the tread and waist and sometimes in the seat also (see e.g. Nos. 523, 559, 560, Fig. 60 and No. 577, Fig. 61). Where such insoles have accompanying middle-soles, these have matching slots, although there are none in the soles, and it has been suggested that the main purpose of this thonging was to unite insoles and middle-soles to make handling easier whilst the upper and sole were being attached (Goodfellow and Thornton, 1966, 14-15). Whilst this is clearly the case in the Antonine military *calcei(?)* from *Mediobogdum*, (Charlesworth and Thornton, 1973, Figs. 1e, 2f, 3f and 4e) and Bar Hill (Keppie, 1975, 68 et seq. See also below p. 115), it is not a satisfactory explanation for the majority of shoes from Billingsgate Buildings since here the majority of nailed bottom-units appear to have only two layers, soles and insoles, and yet they still have thong slots in their insoles. This is particularly well shown by shoe No. 560 (illustrated, Fig. 60) in which an insole with thong-slots was recovered still attached to a sole, held closely to it by nails around the heel. When the sections were prised apart it became evident that the thongs did not attach the insole to any surviving pieces of leather and as the main bottom-unit parts are all present, it can be certain that the thong was not intended to unite the insole with a middle-sole of the usual type, which was somehow separated from the other parts.

A possible explanation of this is that such shoes had middle-soles of the same sort of leather as the uppers which have likewise rotted away (this is clearly the case, for example, in No. 523, but this is an exceptional shoe in several respects) although a more likely reason is that the thonging was primarily intended, in the majority of shoes, to hold a one-piece or "moccasin" style upper to the insole and middle-sole (if present) whilst the sole was being nailed on. Such an upper is one in which the upper material passes right under the foot, the sides and quarters being shaped from the edges of the same piece. In support of this idea, the thong of No. 545 clearly passed through the insole and then through a thin layer of leather, now shrivelled, which stretches across the width of the bottom-unit. There is also no evidence for lasting margins in the shoes with thong-slots (with the possible exception again of No. 523) which might be expected if the uppers were not of

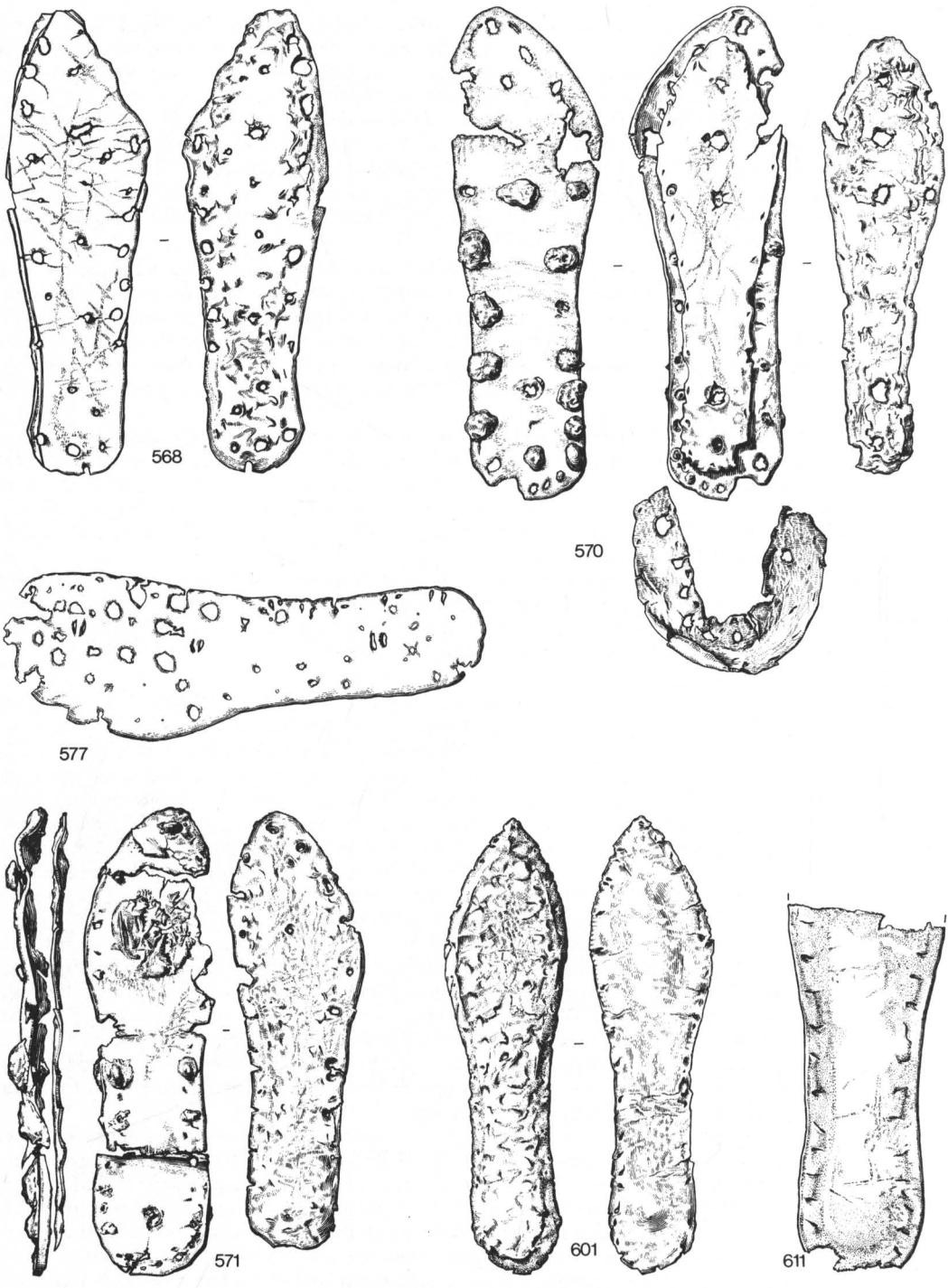


Fig. 61. Billingsgate Buildings, 1974: Details of Roman nailed shoes Nos. 568, 570, 571 and 577 (⅓); details of Roman stitched shoes Nos. 601 and 611 (⅓).

the one-piece variety. (A lasting margin is the edge of the shoe upper which is turned under and fixed between the bottom-unit layers, usually leaving a small depression where it disappears from view).

Where the bottom-units have middle-soles these appear to have been treated, in general, as insole thickeners. The uppers seem to have been inserted below them, immediately above the sole (e.g. No. 588). There are exceptions to this, however, such as No. 579, where the upper was positioned between the missing insole and the middle-sole, which might perhaps be better thought of as the top part of a double-layered sole.

Like the uppers, all the thongs have disappeared with the exception of No. 523 in which short, flat, strips of leather may be seen *in situ* (see Fig. 60 in which the nail-holes are not shown to make this clearer), although clearly part of this thong is also missing. Goodfellow and Thornton (1966, 14-15) record that the thongs have disappeared in the nailed shoes they examined from other London sites and surmise that this is because they were of raw hide. They point out that raw hide when dry is stiff, thin, and capable of being pointed and pushed through a slot without a needle, and for this reason is used to unite the sole-sections of African sandals to this day. Six examples of the London shoes with well preserved thongs are in the Museum of London (Acc. Nos. 12660, 21195, 61.15/1) and Marsden (1965, 51-54), Shoe Nos. 2, 8 and 10). They show that the thongs consisted of a single long strip of leather, running down the entire length of the insole usually just along the centre line, which relied solely on the thong slots to hold them in place. It is suggested that those which have survived have done so because they are of tanned leather whilst the missing ones were of raw hide.

The presence or absence of the thong holes is indicated in column 8 of the catalogues (Figs. 62, 63 and 64).

Evidence for the uppers: tunnel-stitching

About 13 of the nailed shoes definitely have insoles without thong holes, and have instead a series of tunnel-stitch holes between 4 and 8 mm long on the underside (a tunnel-stitch hole is one which enters the surface of the leather, passes for a short distance through the substances of the material to reappear on the same side). These run at right-angles to the edge and a few mm from it, and are spaced at about 10 to 15 mm intervals. It seems clear that these features represent a method of attachment for uppers of a quite different sort which were held in place primarily by a margin *c.* 10 to 15 mm wide stitched to the insole and, judging from the crinkled impressions on the underside of the insole of No. 568 (illustrated, Fig. 61) must have been of thin, supple leather or (less likely) of cloth. Because the uppers seem to have been so thin, and the tunnel-stitch holes run round the edge, it is suggested that they were of the closed variety (i.e., they completely covered the foot).

One of the shoes, No. 538, is exceptional in that the tunnel-stitches are found on the underside of the middle-sole and not on the insole.

The presence or absence of these tunnel-stitch holes is indicated in column 9 of the catalogues (Figs. 62-4), and it can be seen *(cf.* column 8) that insoles with tunnel-stitch holes do not usually have thong-slots. This would seem to confirm the suggestion that the nailed shoe uppers were of two basic types and attached to the bottom units in two ways *(i.e.* one piece uppers held between the bottom unit layers by the nails, and closed uppers held in place by a lasting margin stitched to the insole), although three of the insoles (Nos. 256, 546 and 560) which were both stitched and thonged are exceptions to the rule. With these it seems likely that the uppers were stitched on, but to prevent a shallow hollow forming inside the margin, an additional small insole of the same thin, easily-rotted material as the upper, was inserted in the central area, and it was this that was held in position during construction by the thongs. Another point of interest is that two of the tunnel-stitched shoes (Nos. 536 and 580) have middle-soles but no thong-slots, indicating that it was not essential to thong middle-soles and insoles in order to nail the sections together. It also adds weight to the suggestion that the thong-slots were primarily used for holding moccasin-type uppers in position.

Neither thong-slots or tunnel-stitches are associated with shoes of any particular size, although it is interesting to note that over half of the shoes with Type B nailing patterns have tunnel-stitches, which is a relatively high proportion, compared with only one Type C shoe.

Clearly there is some correlation between the sort of nailing-patterns that were used and the various types of shoe upper represented by these features.

Evidence for the Uppers: other stitch-holes

Evidence for other sorts of stitch-holes associated with the attached uppers is apparent. Two of the insoles (No. 537, illustrated, Fig. 60 and No. 543) have *c.* 1.5 to 2 mm long running-stitch holes of a seam around their edges, presumably for attachment to the upper, though in both cases the insoles were probably also thonged. Also, three of the tunnel-stitched insoles (Nos. 531, 558 and No. 570, illustrated, Fig. 61) are pierced by stitch-holes in the form of 2 mm long, opened-up slits, usually opposite the tunnel-stitches and

which probably represent a more elaborate variation of the seam. Insole No. 577 (Fig. 61) is also pierced by pairs of 2 to 3mm long awl-holes for stitching along the inside edge, but these are irregularly spaced and may represent repair-work. No. 552 (Fig. 60) is quite exceptional in that it is not the insole but the sole which appears to have been attached to the upper margin. This was done by a series of 12 to 15mm long tunnel-stitches parallel with the edge. There is also a small single-layered middle-sole inside the margin to prevent a hollow from forming in the centre.

In two examples (Nos. 553 and No. 559, illustrated, Fig. 60) it is clear that the soles and insoles were stitched together after the upper was attached and before they were nailed. Tunnel-stitches were used for this seam (as in Thornton 1975b, 47) which penetrated neither the grain surface of the insole nor that of the sole. These shoes may be alternatively classified as stitched shoes which were also nailed (see below, p. 000).

Another shoe which may represent a "hybrid" type is No. 523 which has closely-spaced (4 to 5mm) pairs of 4mm long slits for thonging at right-angles to the edge (see Fig. 59, where it is illustrated without nail-holes to make this feature clearer). These are usually the characteristic mark of a sandal, but unlike a sandal, they do not appear in the sole of this example. It is again unlikely to be a sandal because there are no thong slots between the big and second toes and the toes are not marked out. The shoe is also unusual in that it has the only thonged insole in which the leather thongs have survived, although these were clearly not intended for the upper, but to fix a small middle-sole, whose impression may be seen between the full-sized surviving middle-sole and the insole. There are fragments of extremely thin leather adhering to the upper-side of the sole which are probably the remains of a moccasin-type upper, but whether this was stitched on using the pairs of thong-slots around the edge is not clear, and their purpose remains uncertain.

Heel-stiffeners

Brief mention must be made of the only upper parts to have survived, the heel-stiffeners. These are crescent-shaped pieces of leather which were occasionally used to reinforce the quarters, preventing them from being squashed-down by the continual putting-on and taking-off of the shoe (Goodfellow and Thornton, 1966, 25). There are 15 from this site, 14 of which were found with other parts of the same shoe and are denoted by the letter H in Column 7 of the Catalogues (Figs. 62, 63 and 64). They are held in place by a margin inserted between sole and insole and nailed together with them. This can be seen most clearly in No. 560 (illustrated, Fig. 60) where the heel-stiffener is *in situ*. In sole-unit No. 588, which has a middle-sole, the heel-stiffener is inserted below this and immediately above the sole. The margins of No. 514 (4007/290, from Context 208) and No. 570 (Fig. 61) are pierced by 4 to 5mm holes, presumably for a bracing thong used to hold the margin in position on a last until the sole was attached (see Thornton, 1975b, 44).

All of the heel-stiffeners, with the exception of No. 573, have a grain surface on the inside and it seems almost certain that the missing shoe upper parts went outside them. The stiffener of shoe No. 570 has a line of 2mm slits around its top edge, presumably for a thread which stitched it to the rest of the upper (illustrated, Fig. 61).

Repairs

The possibility that some of these shoes have been repaired has already been mentioned and the evidence for this must now be drawn together. Where a bottom-unit became worn the only way to effect a repair would be to remove the nails and replace the affected part with a wedge of leather. The shoe-remains from this site include four wedges (see pp. 103-5) all from bottom-unit fore-parts, which are thought to be repair-pieces. These are No. 512 (4000/438, Unstratified), No. 513 (4068/127, from Context 394) and Nos. 534, and 556 (illustrated, Fig. 60). Unlike Nos. 512 and 513, which are not associated with any other shoe-fragments, Nos. 534 and 556 are grouped with bottom-units which clearly have worn fore-parts. In No. 556 the repair-wedge was obviously inserted grain-side down and has 7 to 10mm long tunnel-stitch holes on the flesh side by which it must have been stitched to the upper part of the bottom unit, and smaller tunnel-stitch holes around the edge by which the upper was probably joined. No. 512 is also pierced by some 2mm long awl-holes for a running seam whose function is not certain. Several shoes show evidence of having had nail-heads of more than one size which may in some cases indicate that they have been repaired, perhaps just by replacing lost nails. Finally No. 542, an insole, and No. 525, which may be either a sole or an insole, both have opened-up slits, *c.* 1.5 to 2mm long, for a small running seam around their fore-parts. These may be connected with the construction but could equally be repairs where the upper pulled away from the bottom-unit and had to be stitched back in place.

1 No.	2 Accession No.	3 Context	4 Length in mm	5 Size	6 Foot	7 Parts Present	8 Thong	9 Tunnel-stitches	10 Nail pattern and details of illustrations
515	4080/319	423	*c.* 182	*c.* Child II	R	S	?	Yes	4 nails as illustrated (Fig. 59)
516	4080/323	423	*c.* 220	*c.* Adult 3	L	I	Yes	No	
517	4082/328	430	214	Adult 3	R	S I	Yes	No	A circle with a central nail (Fig. 59)
518	4082/329	430	*c.* 204	*c.* Adult 1	L	I	?	?	Random
519	4082/784	430		Large child or small adult	R	I	Yes	No	
520	4082/786	430		Adult	?	I	Yes	No	
521	4007/188.1	208		Large adult	?	S or I	?	?	As for No. 534
522	4007/313	208	*c.* 228	*c.* Adult 4	R	I	Yes	No	Random
523	4007/314	208	248	Adult 7	L	S M I	Yes	No	A diagonal line (Fig. 59). Also illustrated without nail holes to show stitch holes as for sandals around edges and pieces of thong *in situ* (Fig. 60)
524	4078/157	412		Large adult	?	S	?	?	
525	4078/229	412	222	Adult 4	?	I or S, H	?	No	As for No. 523
526	4078/279	412	212	Adult 2	R	S I	Yes	Yes	A dice-five (Fig. 59)
527	4078/281	412	*c.* 242	*c.* Adult 6	L	S I	Yes	No	A circle with a central nail (Fig. 59) sole shape unusual
528	4078/283	412		Small adult	L	S I	No	Yes	
529	4078/286	412	158	Child 8	L	I	Yes	No	
530	4078/288	412		Adult	L	S H	?	?	
531	4078/293	412		Large adult	R	I H	?	No	As for No. 552
532	4078/295.1	412	*c.* 225	*c.* Adult 4	R	S	?	?	A vertical cross (Fig. 59)
533	4078/297	412	*c.* 190	*c.* Child 12	R	I M	Yes	No	Random
534	4078/299	412		Small adult	L	S W	?	?	Three equidistant nails (Fig. 59)
535	4078/301	412		Large adult	L	S I	?	?	
536	4078/302	412	*c.* 205	*c.* Adult 1	R	S I	Yes	No	Random
537	4078/304	412		Adult	R	I	?	No	Stitches of running seam around heel edge (Fig. 60)
538	4078/306	412	*c.* 200	*c.* Adult 1	R	S M I	No	Yes	
539	4078/307.1	412	*c.* 184	*c.* Child 9	L	S	?	?	
540	4078/307.2	412		Small adult	?	I	Yes	No	
541	4078/749	412	208	Adult 2	L	I S	No	Yes	Random
542	4078/754	412		Adult	L	I	?	No	
543	4078/757	412		Adult	R	I	Yes	No	
544	4078/774	412	216	Adult 3	R	I	Yes	No	Random
545	4079/238	412A	*c.* 185	*c.* Child 12	L	S I H	Yes	?	A diamond (Fig. 59)
546	4079/756	412A	*c.* 175	*c.* Child 10	L	I	Yes	Yes	As for No. 526
547	4079/770	412A		Small adult	R	M I	Yes	No	
548	4076/152	408	*c.* 208	*c.* Adult 2	L	S I	Yes	No	Random
549	4076/186	408	*c.* 148	*c.* Child 7	L	S I	Yes	No	
550	4072/128	402	*c.* 217	*c.* Adult 3	L	I	No	Yes	Random
551	4072/176	402		Adult	R	S I H	Yes	No	
552	4000/149	Unstrat.	248	Adult 7	R	S M I	Yes	No	A diagonal cross (Fig. 59). Also illustrated without nail-holes to show tunnel-stitches on inside of sole (Fig. 60)
553	4000/760	Unstrat.	*c.* 220	*c.* Adult 3	L	I	Yes	No	As for No. 527

Fig. 62. Billingsgate Buildings, 1974: Catalogue of nailed shoes with Type A nail patterns.

1 No.	2 Accession No.	3 Context	4 Length in mm	5 Size	6 Foot	7 Parts Present	8 Thong	9 Tunnel-stitches	10 Details of illustrations
554	4080/310	423	178	Child 11	L	M I	Yes	No	
555	4080/788	423	160	Child 8	L	I	?	Yes	
556	4082/331	430	230	Adult 5	R	S I H W	Yes	No	Wedge/repair piece shown *in situ* on upper side of sole (Fig. 60)
557	4007/172	208	178	Child 11	L	S M H	Yes	?	
558	4007/316	208		Small adult	L	S I	No	Yes	
559	4007/317	208	137	Child 6	L	S I	Yes	No	Sole and insole stitched together with tunnel-stitches (Fig. 60)
560	4078/122	412	182	Child 11	L	S I H	Yes	Yes	Heel stiffener *in situ* (Fig. 60)
561	4078/227	412	180	Child 11	L	S	?	?	
562	4078/280	412	216	Adult 3	R	I	No	Yes	
563	4078/282	412	180	Child 11	R	I	No	Yes	
564	4078/287	412	215	Adult 3	L	S I	No	Yes	Variant nail pattern (Fig. 59) and a nail (Fig. 60)
565	4078/340	412		Adult	L	S	?	?	
566	4078/758	412	*c.* 205	*c.* Adult 1	L	I	?	No	
567	4078/769	412		Small child	?	I	Yes	No	
568	4079/242	412A	225	Adult 4	R	S I	No	Yes	Tunnel-stitches on insole and marking-out lines (Fig. 61)
569	4079/776	412A		Small adult	?	M I	Yes	No	
570	4076/129	408	222	Adult 4	L	S I H	No	Yes	Tunnel-stitches and additional stitch-holes around edge of insole and around edge of heel stiffener (Fig. 61)
571	4076/146	408	200	Adult 1	L	S I W	No	Yes	Heel-wedge (Fig. 61)
572	4076/201	408		Very large adult	L	S	?	?	
573	4076/204	408	224	Adult 4	L	S I H	Yes	No	
574	4065/783	382		Adult	?	I	Yes	No	
575	4000/753	Unstrat.	226	Adult 4	R	I	No	Yes	

Fig. 63. Billingsgate Buildings, 1974: Catalogue of nailed shoes with Type B nail patterns.

1 No.	2 Accession No.	3 Context	4 Length in mm	5 Size	6 Foot	7 Parts Present	8 Thong	9 Tunnel-stitches	10 Details of illustrations
576	4083/363.1	433		Adult	L	S	?	?	
577	4082/330	430	*c.* 220	*c.* Adult 3	L	I	Yes	No	Awl-holes for stitching along inside edge (Fig. 61)
578	4082/762	430		Small adult	R	I	Yes	No	
579	4058/151	349A	225	Adult 4	R	S I	Yes	?	
580	4007/193	208		Adult	R	M I	No	Yes	
581	4007/312	208		Large Adult	L	S Mx3 I	Yes	No	
582	4078/195	412		Adult	L	I	?	No	
583	4078/228	412		Large adult	L	S I H	Yes	No	
584	4078/233	412	*c.* 285	*c.* Adult 12	R	S I	Yes	No	
585	4078/284	412		Large adult	?	I	Yes	No	
586	4078/296	412		Large adult	R	S	?	?	
587	4079/234	412A	*c.* 248	*c.* Adult 7	R	S I H	Yes	No	
588	4079/237	412A	236	Adult 5	R	S M I H	Yes	No	
589	4079/377	412A	*c.* 240	*c.* Adult 6	L	S I H	Yes	No	
590	4076/750	408		Very large adult	?	S M	?	?	
591	4000/342	Unstrat.	*c.* 270	*c.* Adult 10	R	S I	?	?	Sole shape and stud pattern (Fig. 59)
592	4000/343	Unstrat.	*c.* 225	*c.* Adult 4	?	I	Yes	No	
593	4000/368	Unstrat.		Large adult	L?	S	?	?	

Fig. 64. Billingsgate Buildings, 1974: Catalogue of nailed shoes with Type C nailing patterns.

DISCUSSION

Nailed shoes are undoubtedly by far the most common type of excavated Roman shoe, with many examples from Britain and the Continent. The interpretation of the nailed shoes from this site is none the less especially difficult because it is apparent from a close examination of the bottom-unit layers (pp. 103-110) that shoes of more than one construction are present and, unfortunately, most of the nailed bottom-units which have been reported in the past have not been illustrated, photographed or described in sufficient detail to allow meaningful comparisons to be made. In addition to this problem, there are four Roman terms associated with nailed shoes, and the literary references are too vague to distinguish between these in such a way that we are able to name excavated shoe-types with any certainty. The written evidence nevertheless has to be considered.

Literary references

The *calceus* has been described as "a real shoe, which covered the foot entirely or in great measure" (Becker, 1876, 426) although it also seems to have been used as a more general term for other types of footwear (*ibid.*, 425). Etiquette prescribed that for outdoor wear the Roman male should wear *calcei* and a toga, although *calcei* were not worn in the house. They were also used by women, and could be brightly coloured as in the case of senatorial and patrician *calcei* which differed according to rank (*ibid.*, 426-7 and Purser, 1901, 333-335). Those of ordinary citizens sometimes had a piece of blackened leather which extended from the side of the shoe and fastened over the instep. This was called the *lingula* (Purser, 1901, 335).

The Price Edict of Diocletian (9. 1-25) fixed the cost of *calcei* for the equestrian, senatorial and patrician classes at 70, 100, and 150 *denarii* respectively and the price of adult *caliga*-type shoes at between 60 and 100 *denarii*. This information is however of limited value in estimating whether or not shoes were an expensive item to buy because there are difficulties in establishing the buying power of the Diocletian *denarius* (Bolin, 1958, 291-333). It is, nevertheless, useful to compare these prices with the fixed rates that the Edict set for various classes of worker (*ibid.* 7.1 *et.seq*); for example a herdsman was to be paid 25 *denarii* per day, a waggoner 50 *denarii* per day and a good scribe was to be paid 25 *denarii* per 100 lines of writing. It seems therefore that the average Roman citizen would have had little cause to go un-shod, although the poor were still likely to have worn their shoes until they fell apart. Juvenal (*Satire* 3.147) speaks of the poor man who gives occasion for jest . . . if one of his *calcei* gapes where the leather is split and Martial (*Epigrams* 1.104) speaks of a *calceus* that is three or four-times patched. Unfortunately the shoe-material from this site is too deteriorated to show much evidence of repair (p. 110).

The *pero* is usually thought to be a boot worn by country-folk, of untanned leather (see Anderson, 1902, 373, and Purser, 1901, 333) although Daremberg and Saglio (1887, 815) point out that a passage from Cato the Elder suggests that the term should be applied to any *calceus* of the ordinary Roman population. The notion that the *pero* is necessarily of untanned hide seems to derive from a passage in Virgil (*Aeneid*, 7.690) which is surely liable to have been infused with poetic licence.

The *caliga* is a strong, nailed shoe; primarily the footwear of the common Roman soldier, excluding superior officers, although by the time of Diocletian shoes of similar form appear to have been widely adopted by the civil population (*Diocletian's Edict* 9. 1-6 and 10). On triumphal monuments in Rome *caligae* are depicted with a number of straps through which the foot is partially visible (Wayte, 1901, 346). The sole is thickly studded with hobnails or *clavi caligarii* which not only strengthened the sole and held the bottom-unit together, but must have caused a considerable clatter when a group of soldiers were marching on hard ground (D. Junius Juvenalis, *Juvenal and Persius* 16.24). Documentary evidence suggests that worn *caligae* were replaced by the military command and paid for by deductions from the soldiers' salaries (Webster, 1969, 258-9).

The *crepida* is considered to occupy a middle position between the closed boot and plain sandal (Purser, 1901, 562-563). Its upper consists of a series of loops *(ansae)* through which the fastening thong or thongs were passed. There appear to have been a specific number of these for certain kinds of *crepidae*. They were the typical Greek shoe, and Romans who adopted them were subject to derision (Anderson, 1902, 685). Although they are not likely to have been worn in the Northern provinces, their occasional use cannot be ruled out.

Shoes thought to be military caligae

Of the nailed shoes from Billingsgate Buildings, the most readily-identified group are the shoes with Type C nailing patterns which, as the most heavily-nailed shoes, must surely be military *caligae*. The size-range of

these shoes confirms that they were for men. Comparable shoes come from Angel Court (Thornton, 1977b, Nos. 502, 505, 511, 512 and 515. Figs. 21-23 and pp. 70 and 72) and other London sites (M.O.L. Acc. Nos. 1018, 1020, 1021, 12656, 14100, 14120, 14169, 14170, 14182, 21197, 21199, 25007 and in the B.M.: Ross (1971) Cat. No. 114), Valkenburg (Groenman-van Waateringe, 1967, Fig. 45, Nos. 6 and 13; Fig. 47, No. 42 and Fig. 48, No. 67) and Saalburg (Busch, 1965, 175 and Taf. 19-24).

The *caliga,* as we have seen, appears to have had an openwork upper, and although nailed shoes are usually recovered as bottom-units alone, one or two examples have been recovered with uppers of this sort still intact. Perhaps the most notable examples come from Valkenburg (see Groenman-van Waateringe, 1967, Fig. 47, No. 30 and p. 132; also Fig. 49, Nos. 90 and 91 and p. 138), although similar shoes come from London (M.O.L. Acc. No. 984; see Borrajo (1908, Pl. 35, No. 7) or Merrifield (1965, Pl. 130) also M.O.L. Acc. Nos. 12650 and 14182; B.M. Acc. Nos. CRS 1008 and 1935/11-6/6; and Ross (1971) Cat. No. 100) and Newstead (Curle, 1911, Pl. 20, No. 6 and p. 152). The uppers of these shoes are of the one-piece or "moccasin" type, in which the upper material passes under the foot between the bottom-unit layers, and the open-work top parts are cut from the edges of the same piece. This seems to be a distinctive feature of *caligae* (Charlesworth and Thornton, 1973, 150; and Hald, 1972, 55-63 Figs. 52-54) although shoes in which *caliga* type uppers attached by margins inserted between the bottom-unit layers and held in place by the nailing are also known (e.g. M.O.L. Acc. No. 985).

It is interesting to note that the bottom-units with Type C nailing patterns (with one exception; No. 580) seem to have had central thongs. It has already been suggested that this probably means that the uppers were of one-piece construction (pp. 107-9).

There is evidence (Keppie, 1965, 78) especially from Bar Hill (*ibid.*) and *Mediobogdum* (Charlesworth and Thornton, 1973) that suggests that the *caliga* was no longer the normal footwear for auxiliary soldiers of the north-western provinces by the Antonine period. On these two sites, at least, it seems to have been replaced by a particularly hardy shoe of *calceus* type, having an especially thick bottom unit of 4-5 layers of leather, held together with centre-thonging. Such shoes have not, so far, been identified from London (*ibid.* 151) but the reason for this, as in the case of this site, may be that the majority of London shoes so far recovered are likely to be of an earlier date.

Other types of nailed shoes

The shoes with Type A and Type B nailing patterns are more difficult to interpret. There is a strong suggestion that the uppers were of two types (pp. 107-9), closed uppers attached by a margin sewn to the insole as evidenced by tunnel-stitch holes on the underside of the insoles, and one-piece or "moccasin" type uppers as evidenced by the central thong-slots, one or two friable pieces of leather stretched across the sole area and a lack of margin-impressions (which might be expected if the uppers were not of the one-piece variety).

The shoes with Type A nailing patterns and centre-thongs of adult male size may be true military *caligae* of a less heavily nailed type. The decorative nailing does not preclude this possibility as *caligae* with nail-patterns have been recovered from Valkenburg (Groenman-van Waateringe, 1967, Fig. 45, No. 4; Fig. 47, No. 30 and Fig. 48, No. 69). They may, however, with the other thonged shoes of women's and children's size, simply be *caliga*-type shoes worn by the civilian population. Gansser-Burckhardt (1942, 67) has commented that the army shoe-maker at *Vindonissa* seems to have been making military-style shoes for the women and children who lived there, and Diocletian's Price Edict (9. 1-6 and 10) shows that *caliga*-type shoes were widely used in everyday life at the beginning of the 4th century. *Caliga*-type women's shoes have been recovered from Newstead (Curle, 1911, Pl. 20, No. 6 and p. 152) and the "sandals of *calceus*-type" from *Vindolanda* are also probably of this sort (see Metcalfe and Longmore, 1975, 39, Fig. 2).

Calceus uppers from London

It is hazardous to make inferences about the sort of uppers which were attached to the tunnel-stitched insoles, from uppers which have survived on other London sites and elsewhere. This is because, since they have survived at all, they must be considered exceptional (pp 100-1). Nevertheless in the absence of any firm evidence to suggest that their survival is due to any factor other than an exceptionally favourable environment on burial, they are worthy of consideration. The only known closed, nailed-shoe uppers from London fall into two categories, although shoe uppers of several other sorts are known at Newstead (Curle 1911, Pl. 20, Nos. 4, 5 and 6), Bar Hill (Keppie 1975, 68-81), *Mediobogdum* (Charlesworth and Thornton, 1973), Aardenburg (Marschalleck, 1959, Abb. 4-5) and Saalburg (Busch, 1965, Taf. 10, No. 209; Taf. 11, Nos. 210 and 211; Taf. 12, Nos. 213, 215 and 216; and Taf. 18, No. 282).

The known London types are:

i) Shoes of a highly decorative character; the decoration taking the form of an intricate pattern of small stamped-out geometric shapes, (M.O.L. Acc. Nos. 3494 and 20.004, see Hald, 1972, Figs. 65 and 66). These have also been found at Saalburg (Busch, 1965, Taf. 14-15) where they are of one piece, seamed at the base of the great toe. The Roman term for such shoes would undoubtedly be that of *calceus*, and from their decorative character, their owners are not likely to have been of the labouring classes.

ii) Plain ankle-boots, seamed at the front from throat to toe, with a series of large thong-holes for a tie up the centre of the instep. Examples come from London (M.O.L. Acc. Nos. 963, 964(?), 14098 and 34521), Newstead (Curle, 1911, Pl. 20, No. 4), *Vindolanda* (Metcalfe and Longmore, 1975, Figs. 1 and 4) and Saalburg (Busch, 1965, No. 222; Pl. 3.9 and Taf. 10). These are the only shoes so far discovered to which the name *pero* might be applied although, in any case, the use of *calceus* in its general sense would not be wrong for these shoes.

There is little indication as to whether any of the Billingsgate Building shoe uppers belong to either of these categories. The only evidence comes from the line of insole tunnel-stitch holes, which on a number of insoles (see Nos. 568 and 571, Fig. 61) are less-regularly spaced, or appear to over-lap, at the base of the great toe. This suggests that uppers may have been stitched in the same manner as the uppers of Type (i). (This feature is best seen on the inside of a "stitched shoe", Fig. 61, No. 601).

Suggested methods of manufacture

It seems likely that those of the closed variety were made on a wooden last for whose use there is ample evidence in the literature and on statuary (see e.g. Forbes, 1957, 59). Busch (1965, 169-170) has detailed a likely method and has proved its practicability by constructing some shoes. There is, however, no evidence in the shoe material from this site to confirm her assertion that the insoles were nailed to the last before the uppers were attached; nevertheless if the nails were placed around the edge of the insole and not in the centre of the tread, their holes would probably not be distinguishable from those caused by the hob-nails. There is no reason to suggest that *caligae* were also made using a last; the uppers could be marked out using a template, cut from the hide or skin and nailed to the sole and insole using a shoe-maker's anvil (p. 105). Indeed, if a last were used there would be little point in thonging the insole to the upper to prevent it from slipping as the upper itself would hold it in place. On the other hand, if the *caligae* were made using a shoe-maker's anvil alone, some method of fixing the insole to the upper would be absolutely necessary as every hammer-blow, until the first few nails were driven home, would tend to cause the insole to move out of its correct position.

There is, finally, little evidence to suggest whether or not the nailed shoes have a common source, although the diamond nailing pattern does seem to be a local feature.

STITCHED SHOES

(Figs. 61 and 62, Nos. 594-613)

These are shoes with separately-cut bottom-units, constructed entirely without nails. There are 20 examples from the Billingsgate Buildings Site, which form *c.* 14% of the total number of related shoe fragments. For a complete list of the stitched shoes see Fig. 65. The remaining shoe-parts consist of soles, insoles, a wedge and a heel-stiffener which leaving aside the nail-, thong- and stitch-holes are similar to the nailed-shoe parts already described. Here also the shoe-uppers have entirely disappeared and probably for the same reason.

The insoles do not have thong-slots (pp. 107-9) but have tunnel-stitches on the underside of their insoles instead, corresponding exactly to the tunnel-stitches on the insoles of nailed shoes which do not have thong slots. Again it seems almost certain that these were to attach the margin of a closed upper, probably of thin supple leather. A shoe-maker's marking-out line is to be found on insole No. 613.

When the upper had been attached to the insole, the shoe could be completed by stitching the sole in position. This was usually done with a series of tunnel-stitches parallel to the edge on the upper (flesh) side of the sole, to prevent the thread from being worn by contact with the ground. In most of the soles, the tunnel-stitch holes were produced by pushing a round awl or needle through the leather, although in Nos. 611 (illustrated, Fig. 61), 605 and 606, a knife-slit, *c.* 5 mm long, was first cut into the surface of the leather at both ends of each intended tunnel-stitch. This presumably made it easier to raise a flap and helped to form a more regular "tunnel". In order to attach a sole by tunnel-stitching, the thread must be sewn very loosely

until all the stitches are made when the sole can be drawn into position and held in place by pulling and tying the thread ends.

Two of the insoles (No. 601, illustrated, Fig. 61; and No. 594) have the *c.* 1 mm wide stitch-holes of a running seam around their edges. These seem to indicate that in these shoes at least the sole was not stitched on using tunnel-stitches on the insole-underside, but with stitching that pierced the insole, exposing the thread on the inside of the shoe. The other insoles do not reveal where they were stitched to the sole and it may well be that the sole seam was made onto the upper-margins alone.

Shoe No. 609 is of special interest because it has a heel-stiffener whose margin, inserted between the sole and insole, is held in position by a row of nails around the outside of the heel. This is comparable with two of the nailed shoes, No. 557 (illustrated Fig. 60) and No. 553, in which the soles were stitched on before they were nailed. These may either represent a "hybrid" variety, or could be stitched shoes which were nailed at some point during that use, either to make a sturdier shoe or to fix a loose sole without removing it completely.

The stitched shoes come in a range between Child Size 5 and Adult Size 3, and because of their small size and light-weight construction it is suggested that they were intended only for women and children.

1 No.	2 Accession No.	3 Context	4 Length in mm	5 Size	6 Foot	7 Parts Present	8 Tunnel stitches	9 Details of Illustrations (Fig. 61)
594	4080/322	423	*c.* 190	Child 12	R?	I	Yes	
595	4080/771	423	*c.* 160	Child 8	R	S	?	
596	4082/325	430	*c.* 135	Child 5	R	S	?	
597	4082/751	430	220	Adult 3	R	I	Yes	
598	4068/337	394	*c.* 160	Child 8	L	I	Yes	
599	4007/367	208		Small adult	R	I W	Yes	
600	4078/155	412	*c.* 200	*c.* Adult 1	?	S	?	
601	4078/156	412	200	Adult 1	R	I	Yes	Running stitches of a seam around edge.
602	4078/223	412	*c.* 145	*c.* Child 7	L	S	?	
603	4078/295.2	412		Adult	L	I	Yes	
604	4078/305	412	*c.* 185	Child 12	L	I	Yes	
605	4078/755	412		Adult	?	S	?	
606	4078/765	412		Large child-adult	?	S	?	
607	4078/768	412	*c.* 160	*c.* Child 8	R	I	?	
608	4079/236	412A	216	Adult 3	R	S	?	
609	4079/376	412A	*c.* 208	*c.* Adult 2	L	S I H	Yes	
610	4076/150	408	216	Adult 3	L	S	?	
611	4000/752	Unstrat.		Adult	R	S	?	Upper surface of sole, showing tunnel-stitch holes.
612	4000/778	Unstrat.	*c.* 115	*c.* Child 8	L	S	?	
613	4000/779	Unstrat.	*c.* 140	*c.* Child 6	L	I	Yes	

Fig. 65. Billingsgate Buildings, 1974: Catalogue of stitched shoes.

DISCUSSION

These are the first shoes of this kind to be recognised from London although there are parallels from Southfleet, Kent (see below), Bar Hill (Keppie, 1975, 65 and Fig 21), Saalburg and Zugmantel (Busch, 1965, 166 and 168-9). Some children's insoles from *Vindonissa* may also be of this variety (Gansser-Burckhardt, 1942, 67).

The Roman term most likely to have been used for this sort of footwear is *soccus*, as suggested by Busch (1965, 168). This seems to have been a slipper or low shoe which did not fit closely and was not fastened with a tie. Its origin is to be found in classical Greece where it was worn especially by comic actors. In the Roman era versions of this shoe were worn by both sexes although it was considered unbefitting for an adult male to be seen wearing them in public (Marindin, 1902, 679). The Emperor Gaius Caligula, despite his nickname, was subject to particular disapproval for wearing them (Pliny *Hist. Nat.*, 37.6.17., and Suetonius *Caius Caligula*, 52). The Price Edict of Diocletian (9. 18-23) fixed the price of women's *socci* at 50 *denarii* and some other special types at prices up to 80 *denarii*.

Like the stitched shoes from this site, the uppers of those from Bar Hill (Keppie, 1975, 65), Saalburg and Zugmantel (Busch, 1965, 168-9) have also disappeared (Busch, 1965, 168-9) although the upper of the shoe from Southfleet is intact. This is of purple leather and has an elaborate openwork upper with traces of gold-thread embroidery (see Brailsford, 1964, 10-11, Fig. 4, No. 3). There is, of course, no way of knowing whether the soles from Billingsgate Buildings are from shoes as fine as this.

So far no men's shoes of this sort appear to have been recovered and they were probably used as house-shoes or slippers by women and children, although Busch (1965, 169) has suggested that they could also have been worn as supplementary inner shoes.

SANDALS

(Figs. 66 and 67, Nos. 614-631)

These consist of bottom-units, held together primarily by stitching, that were laced to the foot in a simple manner. There are 18 examples from the Billingsgate Buildings site which form *c.* 12 per cent of the total number of related shoe-fragments. They vary in size between Child size 2 and Adult size 5 showing that they were worn predominantly by women and children although one or two of the large sandals could just possibly be men's. For a complete list of specimens see Fig. 67.

Bottom-unit layers

The bottom-units were originally between 2 and about 4 layers thick, although in most cases the exact number cannot be determined. This is partly because sandal middle-soles and insoles are all usually used grain-side up and have similar thong holes, making it difficult to tell which layers are present or whether any are definitely missing. The evidence for the number of layers in each bottom-unit is summarised in Column 7 of Fig. 67.

Most of the bottom-unit layers are made of one piece of leather, although No. 626 has a composite middle-sole consisting of at least two closely-abutting sections. There are also two examples (No. 625, illustrated, Fig. 66 and No. 630) of "cut-and-expanded" middle-soles (see Thornton, 1975a, 4-5). These are made by taking a narrow strip of leather, wetting it, making two or more slanting cuts and pulling the sides so that the slots open and the piece is wide enough for the shoe. The holes would probably have been filled when the sole unit was stitched together to prevent hollows from forming, but no traces of filling were recovered. This technique may have been used to save leather, although Goodfellow and Thornton (1966, 16) suggest that this economy would hardly be a worthwhile consideration when taking into account the extra labour involved. This, they believe, suggests that "cut-and-expanded" middle-soles may have been evolved primarily as an aid to flexibility. A number of these middle-soles have been recovered from previous excavations (including M.O.L. Acc. Nos. 1014, 14108 and 14207) although they do not seem to have been reported from elsewhere, and they may be a purely local feature.

Method of stitching bottom-units

The various bottom-unit layers were held together by stitching for which purpose there are incised slits between 2.5 and 5mm long around the edges and at right-angles to them (see Fig. 66, Nos. 614, 619, 622, 623, 628, 631). These have not been found on any other shoe type from this site (with the exception of No. 523 – a nailed shoe with several unusual features) and make it easy to recognise fragments of sandal which would otherwise probably be missed. Unfortunately, in every case the stitching has not survived leaving little indication of the sort(s) of thongs and/or threads that were used.

The exact pattern of these stitch-holes varies. At one extreme, single holes are doubled on the bottom surface of the sole, and this is usually the case with bottom-units of 2 to 3 layers (see for example No. 631, illustrated, Fig. 66; stitching pattern shown in Fig. 66(a)). At the other extreme, from the thicker bottom-units, the stitching holes are in pairs on both the insole and the sole (illustrated, Fig. 66(b)). There is an impressed line on the underside of the insole of No. 628 (illustrated, Fig. 66) which presumably marked the line along which the slits needed to be cut.

In two examples the stitch-holes are of a different sort. These are No. 620 (illustrated, Fig. 66) which has small (*c.* 2 to 3mm across), triangular awl-holes and No. 617 which has *c.* 2mm-wide, circular awl-holes. One very small child's insole, No. 616, has no stitch-holes at all and, although this could be from an unfinished article, it is suggested that it was stuck to the sole. As might be expected there is practically no material evidence for the use of glues in Roman shoe manufacture, although Busch (1965, 159-160) reports crusty traces of glue on shoe material in the Saalburg Museum, and it is possible that it was extensively used as a means of holding bottom-unit layers together in addition to nailing and stitching.

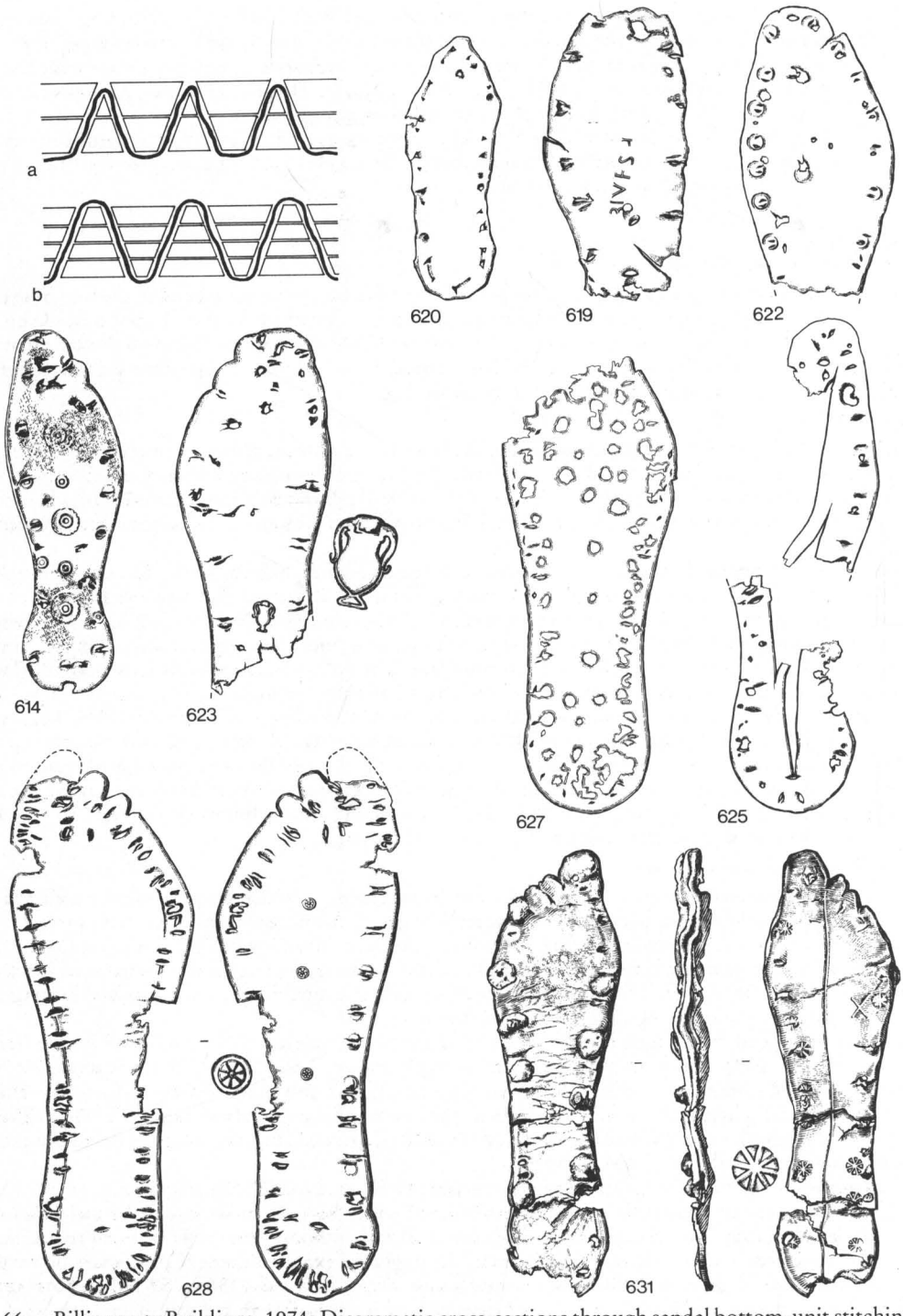


Fig. 66. Billingsgate Buildings, 1974: Diagramatic cross-sections through sandal bottom-unit stitching, (a) and (b); details of Roman sandals Nos. 614, 619, 620, 622, 623, 625, 627, 628 and 631 (1/3).

Sandal No. 619 (illustrated, Fig. 66) has two pairs of 5mm-wide thong-slots through the centre of the waist, rather similar to the thong-slots found in the nailed shoes. These were probably used to hold the various bottom-unit sections together prior to stitching, but could have been for attaching the insole to a one-piece upper (see pp. 107-9), but if so this upper would only have extended around the rear parts of the shoe, leaving the toes exposed.

Nailing

After the bottom-unit layers were stitched together, all but four were nailed in the same manner as the nailed shoes. According to the nail-pattern classification used for the nailed shoes (pp. 105-7) most are of Type B with a single row of spaced-out nails around the edge. No. 627 (illustrated, Fig. 66) has a Type A nailing pattern with a random cluster in the tread and No. 618 has a Type C pattern. No. 624 has nails with exceptionally small heads, *c.* 5mm across, although most seem to be in the 8-11mm range, much the same as the nailed shoes. Three of the unnailed sandals are children's, although No. 628 (illustrated, Fig. 66) is Adult Size 5, which illustrates that the stitching was strong enough to hold the sole-sections on its own. Unnailed sandals have also been recovered from *Vindonissa* (Gansser-Burckhardt, 1942, 63-64), although they have hitherto not been identified from London (Ross, 1971, 8).

Shape of bottom-units

The sandal bottom-units follow the foot closely in shape and all but one or two have indents marking individual toe positions. The number of toes marked out in this way varies between one and five; the details are given in Column 8 of Fig. 67. Goodfellow and Thornton (1966, 19) have commented on the close resemblance between such sandal shapes and modern "foot-drafts" made by tracing around a stockinged foot with a pencil, and have suggested that Roman sandal shapes were obtained in a similar way; each pair being "bespoke". This suggestion is supported by a *pelike* of the mid 5th century B.C. in the Ashmolean Museum (Acc. No. 563; see Boardman, 1974, Fig. 229 or Waterer, 1956, 166-7, Fig. 131) showing a shoe-maker's workshop in which a customer is standing on leather laid across a work-bench so that the shoemaker can cut a sole to the shape of his foot with a half-moon knife. A 6th-century B.C. amphora with a similar scene is in the Museum of Fine Arts, Boston, U.S.A. (Forbes, 1957, 58 and Fig. 13). If the sandal shapes were indeed determined by tracing around the purchasers, then it is evident that the owner of No. 628 (see Fig. 66) suffered from a bunion (*Hallux valgus*) as the first three toes are displaced outwards. The only marking-out lines which survive on the sandals from this site occur on one of the toeless children's sandals (No. 616) on the underside of the insole. If it is in fact true that these sandals were "made-to-measure" then it follows that they are likely to have been made in London for its inhabitants.

Marks on insides

Four of the insoles have punch marks positioned in a line along the centre and/or around the edges. These are all of decorative design although their primary purpose is not entirely clear. They could either be makers-marks or for decoration, or in some cases could have been produced as a by-product of punching down troublesome nails. The punch marks on Nos. 614 and 622 (illustrated, Fig. 66) are in the form of concentric circles. These are found on other London sandals, mainly from the Bank of England Site (Museum of London Acc. Nos. 986, 989, 12652, 14107, 14108, 14111, 14112, 14113, 14114, 14115, 14105, 14109 and another unaccessioned item from the former Guildhall Museum collection; Ross (1971) Cat. No. 69; also British Museum Acc. No. 1935/11-6/15), which Ross (1971, I, 8) suggests must all come from a particular workshop. No. 631 (illustrated, Fig. 66) has an eight-spoked wheel, of which there are four similar, though probably not identical, examples from the Bank of England Site (Museum of London Acc. Nos. 14116, 14117, 14118, 14106). No. 628 (illustrated, Fig. 66) has a seven-petalled rosette. As a result of her examination of London sandals, Ross (1971, I, 25) concludes that such stamps are only to be found on sandals of the 1st to mid 2nd century and not later. This is no way conflicts with the evidence from this site.

In the centre of the tread of No. 623 (illustrated, Fig. 66) is an urn-motif stamp which is most probably a makers-mark. Urn stamps, although of different patterns, occur on another London sandal in the Museum of London (Acc. No. 14108) and on one of the nailed shoes from this site (No. 511, Fig. 60).

The insole of No. 631 (illustrated, Fig. 66) has an impressed straight line running from toe to heel along its centre, for which there is no apparent reason, and an impressed figure X; perhaps a numeral. A close parallel to this find comes in the form of a sandal from the Bank of England Site, now in the British Museum (Acc. No. 1935/11-6/8). This too has a centre line and is inscribed with an XII in much the same position. Perhaps both are a product of the same workshop? The figure VIII was found on the insole of a nailed shoe from

Angel Court; see Thornton (1977b, No. 493, p. 67 and Fig. 21). No. 619 (illustrated, Fig. 66) has traces of an incised inscription, which is very difficult to decipher. Mark Hassall reads it as]MVBSNXO[although it has been read independently by the writer as ARMVHSI[·]MIM (for the critical conventions used here see Collingwood and Wright (1965, xxxiv). A list of other inscriptions on sandals from London is given by Ross (1971, 10-12). The only other insole markings from this site are in the form of wear patterns (*e.g.* on No. 623, illustrated Fig. 66) which presumably formed on the sandal insoles but not on other insoles because of the looser fit of this type of footwear. Their nature is, however, unremarkable.

Uppers

The uppers of the sandals, as with the nailed and the stitched shoes, have entirely disappeared leaving just a few holes and impressions in the sole-unit layers. Although they must have had other tie-straps, the principal thong started between the big and second toe and virtually every sandal has one or two pairs of attachment holes in this position. The only exception is No. 620, a small, child's sandal which has a single awl-hole instead. Sandal No. 618 has the remains of an upper margin between two of the sole layers on the inside of the waist. Impressions seem to suggest that this margin once extended all the way around the rear of the sandal and that only the toes were exposed. The inside of the sandal No. 627 (illustrated, Fig. 66) has rows of 2mm long incised stitch-holes on either side of the waist which were also probably for attaching part of the upper. This could have taken the form of a wide decorated band of leather over the instep as found on sandals from *Vindolanda* (Metcalfe and Longmore, 1975, 41, Fig. 3) and Saalburg (Busch, 1965, Taf. 6, No. 222 and Pl. 3.4). Of the other tie-straps which must have been used there is no trace and there is no evidence to suggest of what they were made.

1 No.	2 Accession No.	3 Context	4 Length in mm	5 Size	6 Foot	7 Layers	8 No. of toes	9 Nailing Pattern	10 Details of illustrations (Fig. 66)
614	4080/311	423	159	Child 8	R	3	3	B	Stamped concentric circles.
615	4068/127	394		Large adult	R	2 or more	?	?	
616	4068/780	394	*c.* 134	*c.* Child 5	L	2 or more	0	No nails	
617	4078/158	412	177	Child 11	R	3 or more	2	B	
618	4078/208	412	234	Adult 5	R	3	4-5	C	
619	4078/225	412		Large child or small adult	R	2 or more	0 or 1	B	Thong-slots in waist. Inscription on insole.
620	4078/285	412	114	Child 2	L	2 or more	1	No nails	Stitch-holes made with triangular awl.
621	4078/292	412		Adult	R	2 or more	?	B	
622	4078/298	412		Small adult	R	2 or more	2	B(?)	Stamped concentric circles.
623	4078/303	412		Small adult	L	2	3	B	Urn-motif stamp.
624	4078/761	412		Adult	R	2 or more	?	B(?)	
625	4079/175	412A		Large child-adult	L	3 or more	2-4	B	Cut and expanded middle
626	4079/230	412A		Small adult	R	2 or more	3	B(?)	
627	4079/231	412A	*c.* 220	*c.* Adult 3	R	2 or more	4-5	A	Random nail-pattern. Stitch holes on either side of waist.
628	4079/239	412A	234	Adult 5	L	2 or more	4	No nails	Stamped rosettes. Marking-out line on underside of insole. Bunion-shaped toes.
629	4079/380	412A		Child	R	2 or more	3	No nails	
630	4076/126	408	*c.* 220	Adult 3	L	3 or more	3	B	
631	4076/148	408	197	Child 13	R	2	4	B	Impressed line from toe to heel. X mark. Stamped eight-spoked wheel.

Fig. 67. Billingsgate Buildings, 1974: Catalogue of sandals.

DISCUSSION

From representations on statues it is apparent that sandals shaped to the foot with a thong between the great and second toes were common throughout the classical world from at least the mid 6th century B.C. (for a clear example see Bonfante, 1975, 59). In their simplest form they were referred to by the term *solea* although there are many literary references to the *crepida*; a Greek shoe which was probably an elaborate version of the *solea*, though still retaining the toe thong (Purser, 1901, 562, and above p. 113). Although the *crepida* appears to have been quite widely worn by Romans who adopted Greek habits (Anderson, 1902, 685) it is unlikely to have been much used in the northern provinces, and as *solea* appears to have been generally applied to all types of sandal (*ibid.*) it would not be incorrect to apply this term to all the sandals described above.

Soleae were the proper footwear of women in ancient Rome (Becker, 1876, 425) although the climate of London and the northern provinces probably meant that they were only worn outdoors in the summer, as suggested by Busch (1965, 168). They were only worn by men whilst in the house, where they were the usual foot-covering, although they were put off when their owners reclined for a meal (Becker, 1876, 425). No excavated examples have been found in which the uppers have been completely preserved but Becker (*ibid.*, 426), presumably from an examination of representations on statues, says that they consist of a thong passing between the great and second toes which is thereafter fastened to another by means of a *lingula* (strap), which passes longitudinally over the upper surface of the foot, and with an ankle-thong keeps the whole secure. Although no *lingulae* have been recovered from this excavation, there is one known example of a leather *lingula* from London in the Museum of London (Acc. No. 1014; see Borrajo, 1908, 34, No. 52). In another type, according to Becker (*ibid.*), the toe-thong divides at the toe into two parts, which run along the instep and are fastened by *lingulae* to the ankle-thong. Busch (1965, 168, Abb. 4) has made a reconstruction upper for a Saalburg sandal, and suggests that the thong which enters the insole between the toes was attached in some way to the thonging which held the bottom-unit layers together in order to prevent it from pulling out (*ibid.*, 167).

Most of the uppers of the Billingsgate Buildings sandals seem likely to have been of the simple designs described here, although Nos. 618, 619 and 627 may have been more complicated (see pp. 119-120).

Sandals, like the nailed shoes and the one-piece shoes, have been widely found throughout the northern provinces; *e.g.* at Bar Hill (Keppie, 1975, 66-67), *Vindolanda* (Metcalfe and Longmore, 1975, 40-41 and Fig. 3), *Vindonissa* (Gansser-Burckhardt, 1942, 64 and Abb. 38b), Saalburg, Zugmantel and Kleiner Feldburg (Busch, 1965, 167-8), although on the evidence from Saalburg and Zugmantel (*ibid.*, 166) and from this site, they seem to be significantly less common than one-piece shoes. In comparison with nailed shoes they are very infrequent.

The stamp designs on London examples are not paralleled elsewhere and the frequent occurrence of concentric-circle stamps suggests that these sandals at least have a common source and are likely to be of local manufacture. The catalogue of shoe sizes represented by the sandals from this site (Fig. 67, column 5) confirms that in London at least, they were used principally by the women and children.

ONE-PIECE SHOES

(Figs. 68-71, Nos. 632-661)

These are shoes made of a single piece of leather, where the sole of the foot rests on the central area and the side and top-parts are shaped from the edges. They are often referred to as moccasins, although Hald (1972, 9) has criticised this on the grounds that it is incongruous to borrow an Indian term for an ancient European type of footwear. One-piece shoes form the second-largest category of shoes from the Billingsgate Buildings site with 30 examples, forming *c.* 20 per cent of the total number of groups of related shoe fragments. They vary between *c.* Child Size 3 and *c.* Adult Size 13 and were probably worn by men, women and children. As every example is different, they have all been illustrated (Figs. 68-70) with the exception of two insubstantial fragments (Nos. 655 and 657). This has been done to show the grain side, as if each were fully opened out. A complete catalogue is given in Fig. 71.

The uppers of these shoes are exceptional in that they have survived nearly as well as the soles because, unlike the other shoes, they are by definition of exactly the same type of leather. This is apparently cattle-hide, in which the grain is on the outer side in every case.

The forepart of the sole was held to the foot by thonging between a series of loops, or eyes, along the sides of the unit. Most of these were formed by cutting pieces of leather away, using a knife, a chisel-like tool, or

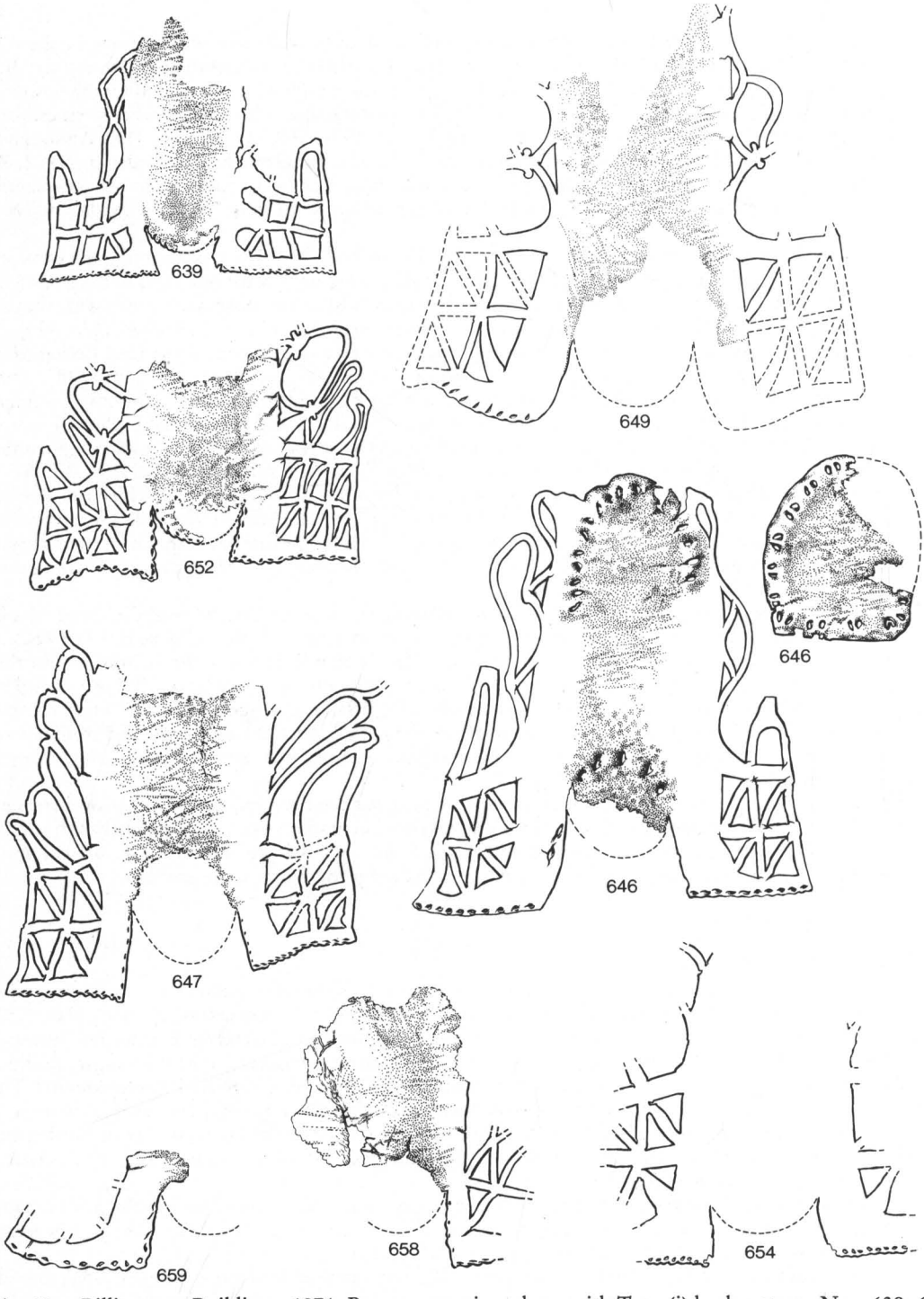


Fig. 68. Billingsgate Buildings, 1974: Roman one-piece shoes with Type (i) heel-patterns Nos. 639, 646, 647, 649, 652, 654, 658 and 659 (⅓).

perhaps a stamp, but in the foreparts of some of the shoes (*e.g.* Nos. 634, 639 and 646; illustrated, Figs. 68 and 69) they have been made by the "expanded" method (Thornton, 1975, 6); *i.e.* by wetting the leather, cutting a slit parallel to the edge and pulling the resulting strip of leather into a loop. In examples where the loops have survived on both sides (No. 644, Fig. 70; and Nos. 646, 647 and 652, Fig. 68) they are seen to be longer on one side of the instep than on the other, so that the thonging progressed up the instep towards the inner side, *i.e.* over the *first phalange* and *metatarsal* and the *internal cuneiform* and *scaphoid* bones of the foot; see also Waterer (1976, 183, Pl. 300) where a shoe which is probably an exact parallel to No. 661 from this site is described. Several one-piece shoes have small decorative protrusions at the junctions of their loops, a common feature on shoes of this sort from London, see Ross (1971, Pls. 3-7). These are Nos. 635, 641, 644, 645, 648, 649 and 652 (illustrated, Figs. 68-70).

The sides of the one-piece shoes rise at the ankle from which point a loop springs to accommodate each end of the thonging, presumably for a last time before it was tied at the top of the instep. Where both of these "top-loops" survive (Nos. 639, 646, 647 and 652, illustrated, Fig. 68) these are, like the lower loops, of unequal length, positioning the knot on the highest point of the instep (*i.e.* over the *scaphoid* bone).

Heel types

About one half of the shoes are decorated around the heel with an elaborate system of cut-out shapes or "openwork" (Hald, 1972, 49 and 55-66). The other half are plain, although these tend to have decorative features at the point where the top-loops join the heel. The openwork served no practical purpose and indeed must have weakened the shoe, although Ross (1971, I, 5) has remarked on the attractive effect of wearing this over stockings or foot-wrappings of a contrasting colour. The patterns usually consist of two or more rows of triangles (in some cases better described as rectangles with diagonals), squares, rectangles and circles, which vary in size between *c.* 4 and 20mm across. The larger shapes could have been cut with a knife whilst the smaller ones were probably stamped out. The heel-patterns fall into seven groups as follows:

i) Two or three rows of rectangles with diagonals as in Nos. 645, 646, 647, 649, 652, 654, 658 and 659 (see Fig. 68). The general style of No. 639, in particular the shape of its top-loops, suggests that this also belongs with this group even though its openwork is of squares. This is the largest group from Billingsgate Buildings and although the type is not paralleled elsewhere, at least five similar London examples are to be found in the Museum of London (Acc. Nos. 982, 994, 998, 14128 and 14143). One of these (Acc. No. 14128) has no stitch holes at the back of the heel, suggesting that is an unfinished article and hence was probably made locally. Because of this, their frequent occurrence here but not outside London and the homogeneity of the group, it is suggested that they should be regarded as a London type.

ii) Many rows of small rectangles as in No. 632 (illustrated, Fig. 69). This is comparable with a shoe in the Museum of London (Acc. No. 14130).

iii) Six to seven, or more, rows of squarish rectangles and rectangles with diagonals, reaching exceptionally high over the ankle as in No. 660 (illustrated, Fig. 70). Although this is the only example from Billingsgate Buildings, this is a common variety with eleven London examples in the Museum of London (Acc. Nos. 14127, 14140, 14141 and 29.200) and the British Museum (Acc. Nos. CRS 1006, CRS 1015, CRS 1016, CRS 1022, 1903/6-23/62, 1935/11-6/10, 1935/11-6/11). *Cf.* also one-piece shoes from Carlisle (Hogg, 1964, 28-29 and Fig. 5) and Valkenburg (Groenman-van Waateringe, 1967, Fig. 52).

iv) Plain, apart from a decorative band of openwork around the top of the heel, as in No. 643 (illustrated, Fig. 69). Three shoes also of this variety come from the Bank of England site (M.O.L. Acc. Nos. 14146, 14148 and 14149).

v) Plain, with top-loops that spring from the back of the ankle as in Nos. 633, 636, 637, 641 and 642 (illustrated, Fig. 69). Eight more examples of this variety come from other London sites and may be found in the Museum of London (Acc. Nos. 12.404, 14129, 14154 and 24.624) and the British Museum (Acc. No. 1935/11-6/17 and Ross (1971), Cat. Nos. 7, 12 and 13). *Cf.* similar examples from Bar Hill (Keppie, 1975, Fig. 20, No. 13; Fig. 21, No. 28).

vi) Plain, with a decorative cluster of cut-out triangles at the point where the top loop joins the heel, as in Nos. 638, 648, 650 and 653 (illustrated, Figs. 69 and 70). There is an exact London parallel to No. 653 in the Museum of London (Acc. No. 29.200).

vii) Plain, with a decorative feature in the lower part of the ankle-loop comprising a long, triangular cut-out shape with an internal protrusion on the short side, as in Nos. 634, 635, 651 and possibly also No. 640 (illustrated, Figs. 69-70).

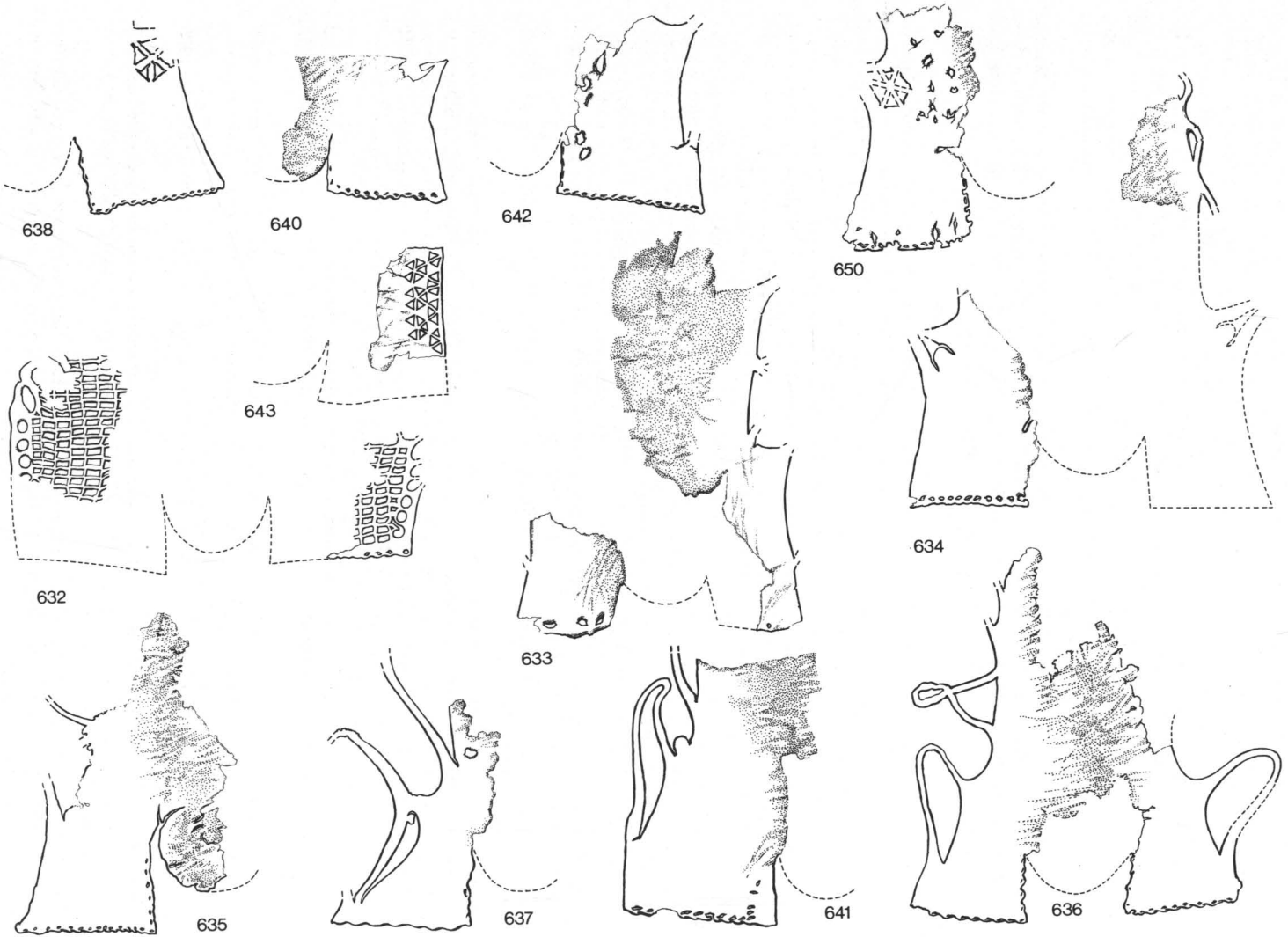


Fig. 69. Billingsgate Buildings, 1974: Roman one-piece shoes Nos. 632-638, 640-643 and 650 (⅓).

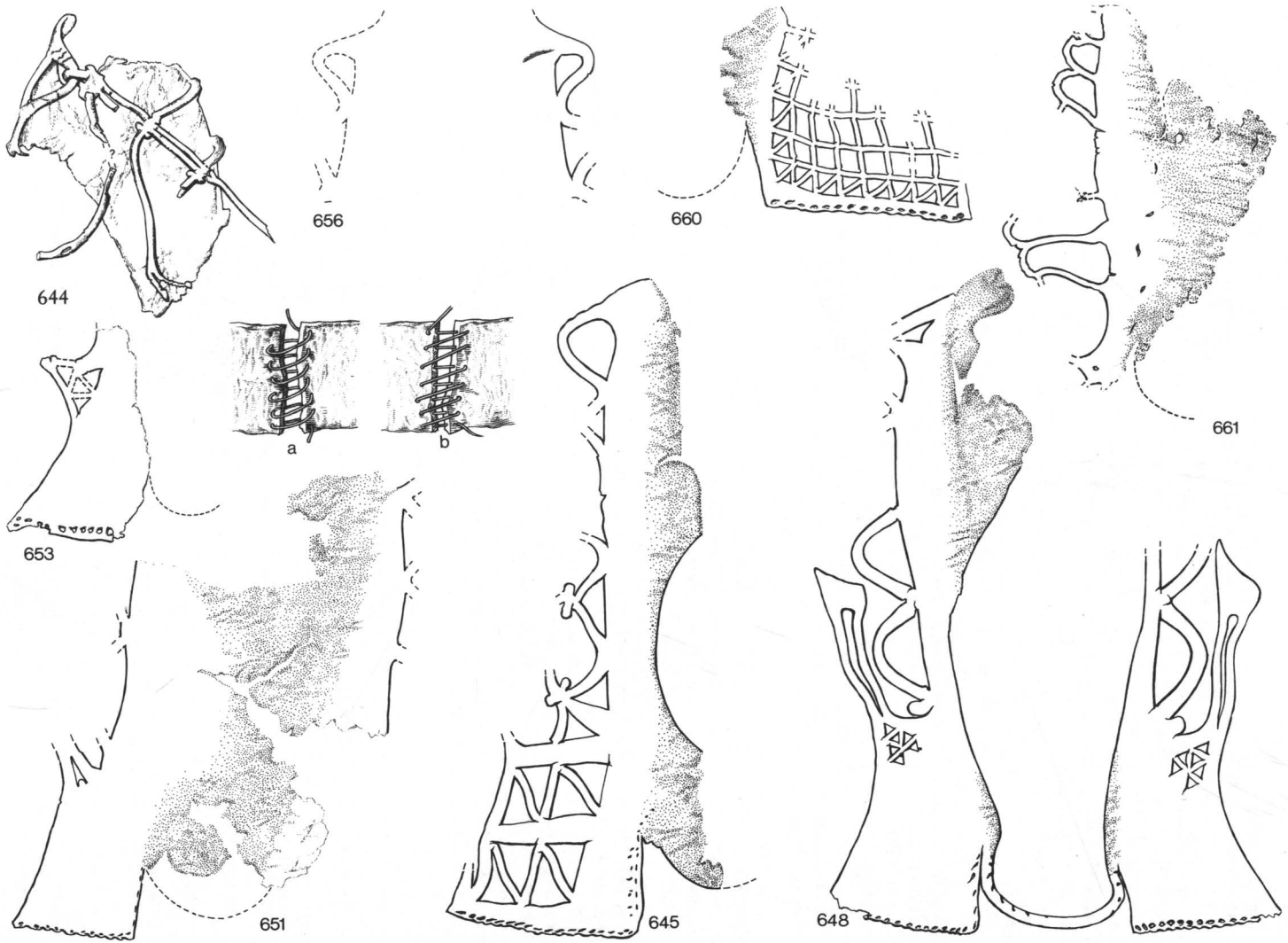


Fig. 70. Billingsgate Buildings, 1974: Roman one-piece shoes Nos. 644, 645, 648, 651, 653, 656, 660 and 661 (⅛); diagrams of one-piece shoe heel-seams as seen inside of shoe: (a) butt-seam (b) blind-seam.

Back-seams

As a general rule, one-piece shoes are seamed only around the heel and up the back. Although no thread has survived, the awl-holes and thread impressions (where these exist) show that three types of back-seam were used, but in every case the sides are abutted and do not overlap. All but three examples have "butt-seams" where the awl-holes pierce the sides from the back face to the front face in rows parallel to the join and the thread was oversewn (see Fig. 70) (a)). Two others (Nos. 637 and 655) employ "blind-seams", where the thread passes from the back face to the edge and through the opposite edge to the other back face and is thus not seen on the outside (see Fig. 70 (b)). Another (No. 642) has a more elaborate version of the "butt-seam" but the exact stitching-pattern is not clear. There is no evidence from this material for the use of blind-seams with stitches on the outside as reported by Goodfellow and Thornton (1966, 8) or for the elaborate "outer overlapping cross-stitch" suggested by Ross (1971, I, 5).

Thonging

As with all the other shoes from this site, the thongs have disappeared with the exception of No. 644 (Fig. 70). This is the fore-part of a right one-piece shoe in which the cut-out lattice-work on the right side terminates in two opposing decorative protrusions and a long, square-sectioned thong. This immediately passes through the foremost loop on the left side of the shoe and back through a hole in one of the decorative protrusions. From there it would presumably have gone back and forth across the shoe before terminating over the instep. Although it is broken just past the protrusion, its end has been recovered, and this is pierced by a *c.* 5mm long slit, *c.* 10mm from its squared-off end. This raises the intriguing possibility that it may have been fixed by a method other than knotting. A London one-piece shoe with two thong ends similar to this is in the British Museum (Ross, 1971, Cat. No. 11).

Wear and repair

Unlike the nailed shoes from this site, these shoes have clear wear patterns, although most of the shoes are too fragmentary to show any deformities. Nevertheless the wear-patterns are of considerable use in determining whether a shoe was worn on the left or the right foot. This information is recorded in Column 6 of the catalogue (Fig. 71). Most of these shoes seem to have suffered a fair degree of wear and were probably discarded because they were worn out. Five examples, however, appear to have been cut-up for re-use (Nos. 644, 645, 648, 649 and 656), indeed a complete, nailed-shoe sole-layer appears to have been removed from No. 648 (see Fig. 70).

Unlike nailed shoe-soles, one-piece soles may be readily repaired by stitching a patch on the underside of the sole using tunnel-stitches and two examples from this site show that they were repaired in this way. These are No. 646 (illustrated, Fig. 68), which was patched on the tread and the heel; the patch from the tread survives, and No. 661 (illustrated, Fig. 70) which had a repair piece over the entire sole area. Nos. 642 and 650 (illustrated, Fig. 69) have a number of irregularly-spaced awl-holes whose purpose is unclear but which may be connected with repair work.

1 No.	2 Accession No.	3 Context	4 Length in mm	5 Size	6 Foot	7 Heel type	8 Details of illustrations
632	4080/315	423		Adult	?	ii	(Fig. 69).
633	4080/320	423		Large child-small adult	R	v	(Fig. 69).
634	4082/324	430		Adult	?	vii	Forepart loops made by "expanded" method (Fig. 69).
635	4082/423	430		Large child-adult	?	vii	Decorative protrusions at loop junctions (Fig. 69).
636	4082/424	430	*c.* 150	*c.* Child 7	L	v	(Fig. 69).
637	4058/793	349A		Large child-adult	?	v	(Fig. 69).
638	4068/332	394		Large child-adult	?	vi	(Fig. 69).
639	4068/334	394	*c.* 115	*c.* Child 3	L	i(?)	Forepart loops made by "expanded" method (Fig. 68).
640	4068/792	394		Probably adult	?	vii(?)	(Fig. 69).

641	4007/179	208		Adult	?	v	Decorative protrusions at loop junctions (Fig. 69).
642	4007/291	208		Adult	?	v	(Fig. 69).
643	4007/791	208		Child	?	iv	(Fig. 69).
644	4078/160	412		Adult	R	?	Thong survives, decorative protrusions at loop junctions. Cut for re-use? (Fig. 70).
645	4078/170	412	*c.* 270	*c.* Adult 10	R(?)	i	Decorative protrusions at loop junctions, cut up for re-use (Fig. 70).
646	4078/171	412	176	Child 11	R	i	Forepart loops made by "expanded" method, and repair piece (4078/339), Fig. 68).
647	4078/185	412		Child 9-13	L	i	
648	4078/209	412	*c.* 290	*c.* Adult 13	L	vi	Decorative protrusions at loop junctions. Sole-shape cut out for re-use (Fig. 70).
649	4078/219.1	412		Small adult (?)	L(?)	i	Decorative protrusions at loop junctions, cut up for re-use (Fig. 68).
650	4078/219.2	412		Large child-small adult	?	vi	(Fig. 69).
651	4078/289	412		Large adult	L	vii	(Fig. 70).
652	4078/294	412	*c.* 135	Child 5	L	i	Decorative protrusions at loop junctions (Fig. 68).
653	4078/309	412		Child-small adult	?	vi	(Fig. 70).
654	4078/523	412		Large child-small adult	?	i	(Fig. 68).
655	4078/775	412		Large child-adult	?	?	
656	4079/381	412A		?	?	?	Cut up for re-use (Fig. 70).
657	4076/147	408		Large child-small adult	?	?	
658	4076/198	408		Child	L	i	(Fig. 68).
659	4072/177	402		Adult (?)	?	i	(Fig. 68).
660	4072/364	402		Adult	?	iii	(Fig. 70).
661	4000/36	Unstrat.		Small adult (?)	L	?	(Fig. 70).

Fig. 71. Billingsgate Buildings, 1974: Catalogue of one-piece shoes.

DISCUSSION

One-piece shoes have their origins in the prehistoric period (Busch, 1965, 166) and the Roman versions would appear to have evolved from a European iron-age type (see Hald, 1972, 46-48 and Fig. 48). Their simple mode of manufacture suggests that they would have been among the cheaper types of footwear (Busch, 1965, 166) and their relatively weak construction and emphasis on decoration at the expense of strength suggests that they were primarily intended for indoor use.

The Roman term usually associated with them is that of *carbatina*. Purser (1901, I, 361) describes this as "a piece of untanned ox-hide placed under the foot and tied up by several thongs, so as to cover the whole foot and part of the leg" and which required no skilled manufacture at all. The one-piece shoes from this site are however almost certainly of tanned hide and although Busch (1965, 166) has suggested that shoes of this sort could be cut from a template by members of the public, the majority show a high degree of manufacturing skill and are, without doubt, the work of professional shoe-makers.

A second term which has been applied to this type of shoe is *gallica*, the Gaulish slipper (*e.g.* Swan, 1975, 16, Fig. 3). There is little information about them in Roman literature (see Wayte, 1901, 900) other than that they were reckoned among the *soleae* and were, presumably, used as an alternative kind of indoor shoe. Single-soled *gallicae* for men and double-soled for farm-workers are mentioned in Diocletian's Price Edict (9.12-14) where their price was fixed at 60 to 80 *denarii* a pair. There must be some doubt about this identification.

Parallels

One-piece shoes have been widely found in the northern Roman provinces with documented finds coming from Carlisle (Hogg, 1964, 28-9, Fig. 5), *Vindolanda* (Metcalfe and Longmore, 1975, 40), Newstead (Curle, 1911, Pl.20, Nos. 1 and 3), Valkenburg (Groenman-van Waateringe, 1967, Fig. 52) and the forts at Saalburg,

Zugmantel and Kleiner Feldburg (Busch, 1965, 166). At Kleiner Feldburg, they appear to have been worn inside the fort walls (*ibid.*, 174). The shoes from the Billingsgate Buildings site appear to have been typical of London from a comparison with previously-made finds, and the recurrence of decorative features within the material suggests that a large number of them have common sources. The incomplete example of Type (i) in the Museum of London implies that this type at least was made within the city boundary.

GENERAL CONCLUSIONS

As we have seen, on grounds of construction alone, five broad categories of footwear seem to be present – namely nailed shoes of *caliga* (?) type, nailed shoes with closed uppers of *calceus* (?) type, stitched shoes, sandals and one-piece shoes. Two known types of Roman shoe which have been found elsewhere in London are not present on this site. These are broad-toed sandals (*e.g.* Thornton, 1975a, 3, Fig. 1) and the flat, wooden sandals usually associated with the Roman name *sculponeae* (see Marindin, 1902, 613-614). There are, however, only two known wooden sandals from London (Museum of London, Acc. Nos. 1033 and 21192) and Ross (1971, I, 25) has suggested that wide-toed sandals do not occur until the 3rd century, as is supported by their absence on the Billingsgate Buildings site. The only type which has been found here but has not been reported from elsewhere in London are the "stitched shoes", it is more than possible that they have been found, but have been thought to be medieval. Otherwise the material from this site would seem to be typical of the other London shoes of the 1st and 2nd centuries and are widely paralleled in the previously collected material.

This collection also appears to be typical, in the type of shoes found and in the proportion of the various types, of other collections of 1st-2nd-century date from the northern Roman provinces. The decorative features displayed by all these shoes seem, nevertheless, to be subject to local variation. This suggests, as might be expected, a regional basis for their manufacture although there is as yet insufficient evidence to make any firm conclusions. As almost all of this comparative material comes from military sites it is not possible to infer the extent to which Roman London life had a military or civilian flavour, although this material is so closely comparable with the collections from Saalburg and Zugmantel (Busch, 1965) that it would not be inconsistent with a *vicus*-like life style.

All the shoes show a high degree of manufacturing skill and must have been made by professional shoe-makers, some perhaps within the Roman city. There is firm evidence that at least one type of one-piece shoe (Type i, p. 123) was made in London and the recurring decorative features of other one-piece shoes and the sandals suggest that both these types were being manufactured locally. This is also implied by the suggestion that the sandal shapes were made with a particular wearer in mind. The literary evidence shows that Roman shoe-making and repairing were divided into a number of related specialist crafts (Forbes, 1957, 59), so that the five categories of shoe mentioned above were probably each made (and perhaps repaired) by different groups of craftsmen. It follows therefore that if makes of sandals and one-piece shoes were established in London, other types of shoe-maker are also likely to have been here. Indeed many of the pieces of cattle-leather waste from this site (see Miller and Rhodes, p. 95) are cut in curvilinear shapes, suggesting that they are discards from the manufacture of nailed-shoe soles. The sole shape cut from a one-piece shoe (No. 648, Fig. 70 and p. 126) also suggests that there was a nailed-shoe-maker or repairer in the region of this excavation. By contrast, slight evidence indicates that one or two of the nailed shoes (Nos. 527 and 533, see p. 103) may have been imported.

(n) WOOD
by Hugh Chapman

(Figs. 72-73, Nos. 662-678)

(Samples of the hard-wood objects were submitted to George Willcox and samples of the soft-wood objects to Beverley Smith, and their findings are included below. Mark Hassall examined the writing tablets to see if any writing could be deciphered, but this proved impossible.)

662. (4053/135) Fragment of a writing tablet in soft-wood; the total height survives and about two thirds of the width. The leaf, recessed to receive wax on one side only, was either the first or the last page of the document. A single hinge hole pierces the surviving vertical edge and a cut caused by the binding cord is also visible. Though traces of writing are visible, they have proved to be illegible. From Context 332 and therefore not later than *c.* A.D. 100 (illustrated).

663. (4082/369) Fragment of writing tablet in soft-wood, possibly *Abies alba* (silver fir); two edges forming a corner and part of body; both sides recessed for wax; one hinge hole. From Context 430 and therefore not later than *c.* A.D. 100 (illustrated).

664. (4083/349) Fragment of a writing tablet in soft-wood, possibly *Abies alba*; top and bottom edge and part of body survive; one side recessed for wax, thus, as above No. 662, the fragment comes from either the first or last page of a document. From Context 433 and therefore not later than *c.* A.D. 100 (illustrated).

665. (4083/372) Rectangular fragment of body of writing tablet in soft-wood; no edges survive. Date and provenance as for No. 664.

666. (4078/153) Fragment of writing tablet in soft-wood; the total height survives and about half the width. The leaf, which was recessed on both sides, has cracked across the middle on

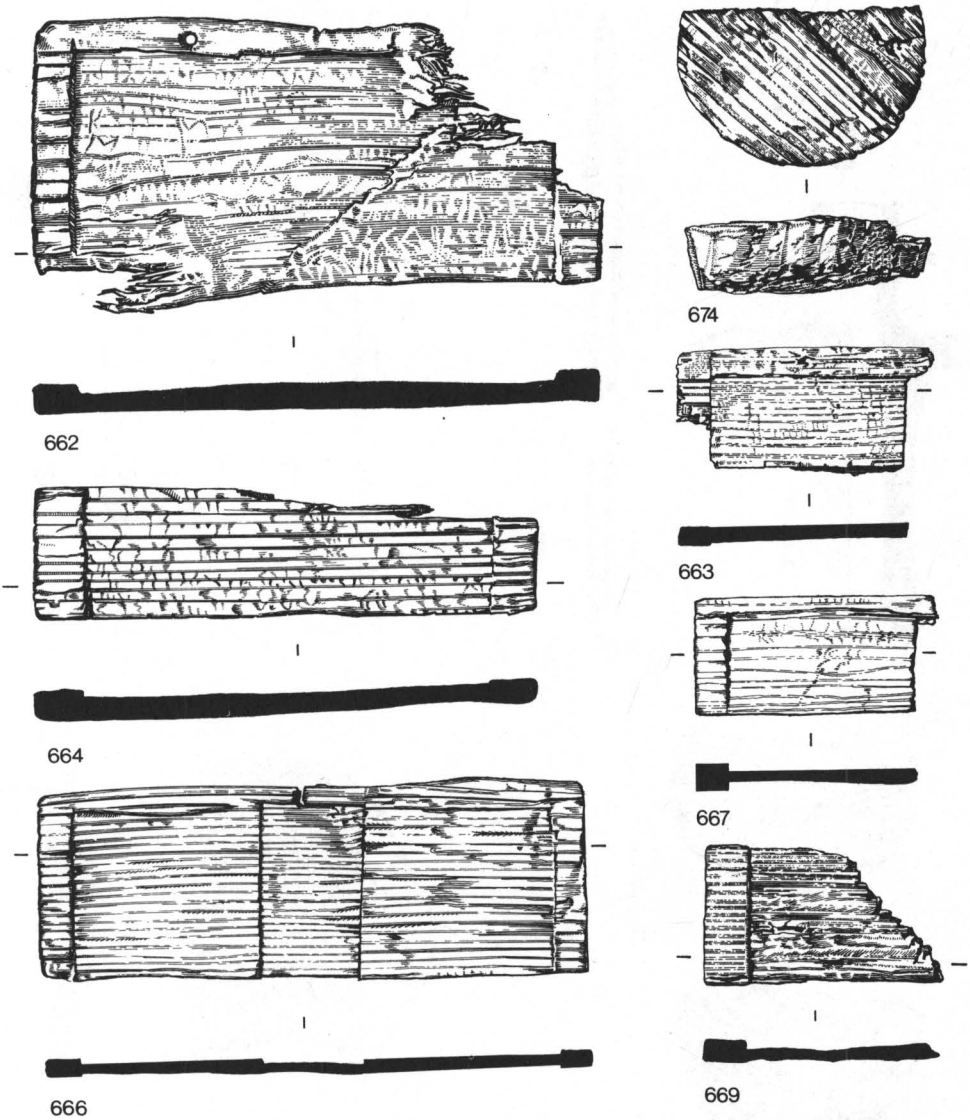


Fig. 72. Billingsgate Buildings, 1974: Roman wooden objects Nos. 662-664, 666, 667, 669 and 674 (½).

the line of one of the two cuts incised to remove a wide horizontal groove across the body of the tablet, and at the edge where the binding cord has cut into the wood. This depression received the seal impression of persons called to witness the contents of the document. For other examples from London and method of use see Chapman (1976, 66-68 and 1977, 67, No. 481). From Context 412 and therefore not later than *c.* A.D. 125 (illustrated).

667. (4078/159) Fragment of writing tablet in soft-wood; two edges forming corner and part of body; both sides recessed for wax. The sharpness of the horizontal break across the body indicates that this leaf, like No. 666 above, had a wide horizontal groove cut across it on one side and as above No. 666, formed part of a business or legal document. Date and provenance as for No. 666 (illustrated).

668. (4007/373) Rectangular fragment of body of writing tablet in *Abies alba* (silver fir); no edges survive. From Context 208 and therefore not later than *c.* A.D. 140.

669. (4035/145) Fragment of writing tablet in soft-wood, possibly *Abies alba*; edge and part of body; recessed on one side. From Context 288 and therefore not later than *c.* A.D. 200 (illustrated).

670. (4080/374) Turned object with elaborate transverse mouldings in an unidentified hard-wood. One end (the smaller) is broken and the other may be also. The piece is fragmentary and split down the middle, revealing that the

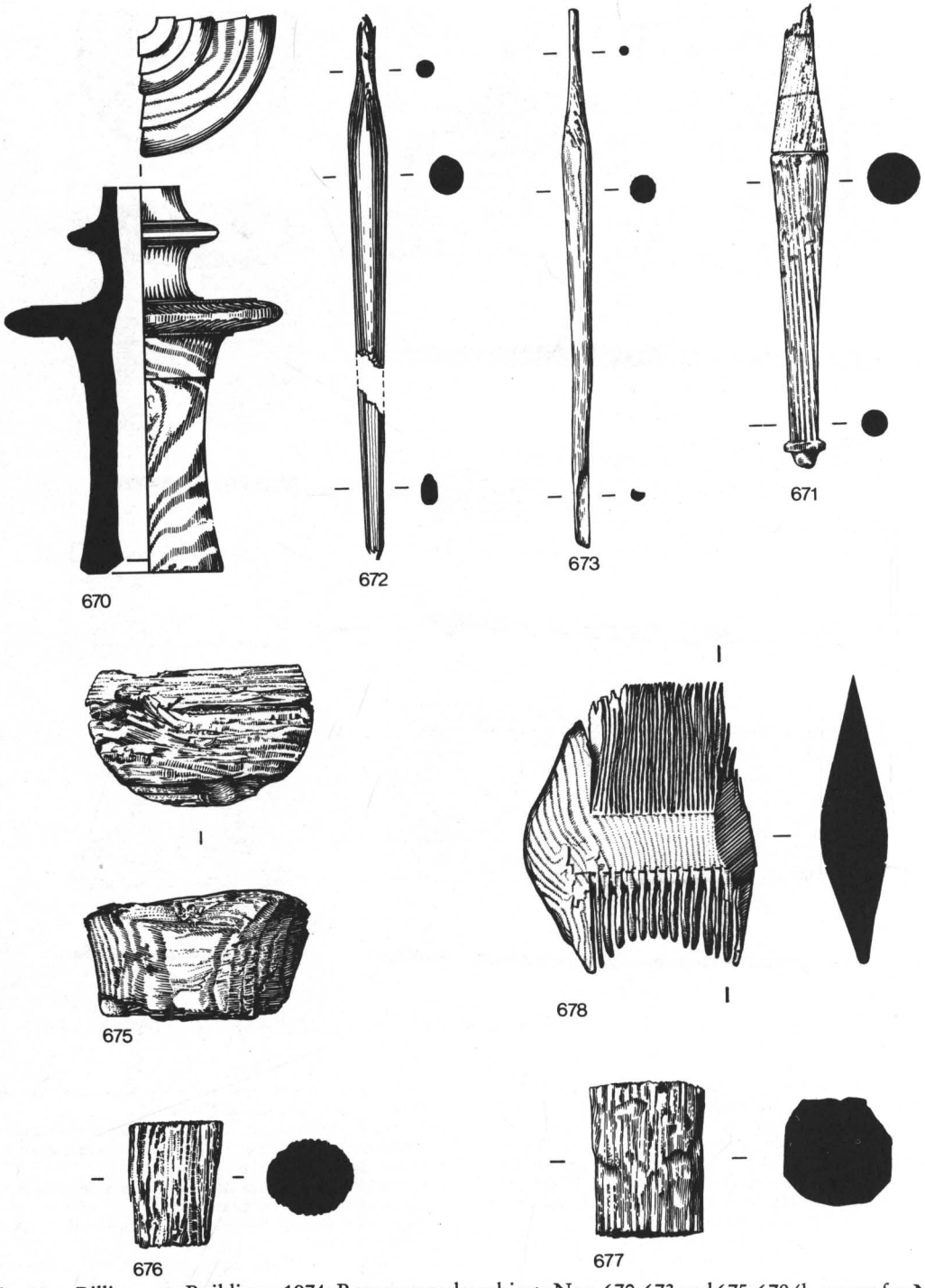


Fig. 73. Billingsgate Buildings, 1974: Roman wooden objects Nos. 670-673 and 675-678 ($\frac{1}{2}$, except for Nos. 670, 672 and 678 $\frac{3}{4}$).

main body is hollow. It is not clear whether this was deliberate, or represents the natural form of the wood. The purpose of the piece is not certain but the most likely suggestion is that it is a fragment of furniture. The insubstantial character of the piece indicates that it must have been a finial or decorative piece rather than a load bearing stool or couch leg. For a recent find from Norfolk of a group of Roman wooden furniture fragments, including a piece identified as part of a leg, see Liversidge (1977, 204, Fig. 87 Nos. 1-4). From Context 423 and therefore not later than *c.* A.D. 100 (illustrated).

671. (4082/375) Lathe-turned spindle in unidentified hard-wood, with both ends tapering from a wider point half way along the body; this point is also marked by an incised concentric groove, and the one surviving end has a raised transverse moulding above the domed tip. The whole object appears to have been painted red in antiquity, and traces of this still survive. Though fatter and larger than most, it is probably best interpreted as a wool spinning spindle and a surface mark running round the body on the broken arm above the middle point, perhaps indicates the position of the spindle-whorl. From Context 430 and therefore not later than *c.* A.D. 100 (illustrated).

672. (4078/161) Spindle for wool spinning, fragmentary, in unidentified hard-wood. Probably hand-cut. From Context 412 and therefore not later than *c.* A.D. 125 (illustrated).

673. (4068/131) Spindle for wool spinning; lathe turned. From Context 394 and therefore not later than *c.* A.D. 140 (illustrated).

674. (4068/133) Circular amphora stopper or bung in *Abies alba* (silver fir); part missing. Date and provenance as for No. 673 (illustrated).

675. (4068/134) As for No. 674.

676. (4000/559) Circular stopper or bung; presumably for a barrel or cask. Unstratified, but probably from a Roman layer (illustrated).

677. (4000/560) Stopper or bung; roughly circular, perhaps unfinished; presumably for a barrel or cask. Unstratified, but probably from a Roman layer (illustrated).

678. (4076/154) Comb in unidentified hard-wood; about half survives. The tips of the wider-spaced teeth have been burnt in antiquity. The type is normally thought to be a domestic toilet article, but an example from those recently excavated at Vindolanda still had animal hairs, probably cow, attached and it has been suggested that they may also have been used in a tanning process, see Birley (1977, 123-124 and Pl. 60). From Context 408 and therefore not later than *c.* A.D. 140 (illustrated).

(o) SLAG-LIKE MATERIAL

by John Evans

Two pieces of slag-like material were recovered from the Roman strata. They come from Contexts 249 and 412, both of which are rubbish-dump layers of Period II, Phase 2 and are not later than *c.* A.D. 125. The samples are both heterogeneous, have marked vesicular layers and are dark-brown to red-brown in colour. No. 679 (4015/748) from Context 249, has inclusions of metal and a layered appearance, and No. 680 (4078/747) from Context 412, shows marked vitrification. The specimens were examined by emission spectroscopy and the resulting spectra are summarised in Fig. 74. Suitable samples were also digested with mixed concentrated acids and the solutions obtained, after suitable dilution, were analysed by atomic absorption and flame photometry (for sodium and potassium). The data obtained from these analyses is shown in Fig. 75.

The results suggest the No. 679 is not a slag, but lead-waste metal containing accidental inclusions of other metallurgical or fuel-slag waste. The copper content of No. 680 suggests the possibility of bronze working in the area of the site, but the low iron content argues against the sample being a straight-forward bronze slag.

	Element																	
	Fe	Ca	Cr	Pb	Na	K	Mn	Al	Ni	Co	Ag	Zn	Ti	Cu	Au	Si	Mg	Sn
679 (4015/748)	S	P	–	S	P	P	P	P	–	–	P	–	T	T	–	S	S	–
680 (4078/747)	S	S	T	S	P	S	T	P	T	T	T	T	T	S	–	S	S	P

S lines suggest concentration greater than 1%
P lines suggest concentration less than 1%
T lines suggest concentration less than 0.1%
– indicates element absent

Fig. 74 Billingsgate Buildings, 1974: Emission Spectroscopy analysis of Roman slag-like material.

	Percentage composition*								
	Fe_2O_3	CaO	MgO	Na_2O	K_2O	CuO	PbO	Ag_2O	Al_2O_3
679 (4015/748)	1.75	0.41	1.63	0.38	0.38	0.01	66.86	1.73	1.36
680 (4078/747)†	7.98	2.08	6.93	0.69	1.04	26.01	1.73	0.06	1.36

* Remaining material insoluble silicates etc.

† SnO less than 0.5%

Fig. 75 Billingsgate Buildings, 1974: Quantitative analysis of Roman slag-like material.

(p) QUERNSTONES
by Amanda McIlwain
(Fig. 76, Nos. 681-684)

Four pieces of quernstone were recovered, all of which are of Niedermendig or Mayen lava from the great quarries at Andernach, some ten miles north-west of Koblenz, on the Rhine (identification by F. G. Dimes). This is an easily recognisable, dark blue-grey, sponge-like stone, which has been used to make querns since the iron age.

Mayen lava quernstones have not attracted much detailed study with regard to their distribution and their social and economic implications, and although this is partly due to a scarcity of clearly stratified examples, their interpretation is also hampered because they are often not adequately recorded and published. It may be seen however that they come from a remarkably wide area of the country, for example, from Pen Llystn in North Wales (Houlder, 1968, 185), from the Antonine Wall at Balmuildy (Miller, 1922, 98) and Bar Hill (Keppie, 1975, 45) and from a number of isolated sites in Dorset, for example Ham, near Poole, where the famous "donkey-mill" derivation, now in the British Museum, was found.

Although Mayen lava querns are usually interpreted as another indication of the thriving trade links between Roman Britain and the Continent, their presence on so many military sites must raise the possibility that they were brought to this country specifically for, or by, the army. The quernstone was part of the military equipment of the day (see Childe, 1943, 25, and Vegetius *De Re Militari*, 1.18 and 3.3). This might explain the large number of imported querns when there are many British stones suitable for their manufacture (*e.g.* Hertfordshire Puddingstone and Millstone Grit, which continue to be used for this purpose). Furthermore, although brittle and easily broken, Mayen lava querns are comparatively light, which would have been an important consideration for the army.

All the fragments from this site have shallow, straight, parallel and regular, tooled grooves on the upper surfaces and sides, which often show white against the rest of the surface. These are quite commonly found on lava querns and may be seen particularly clearly on a pair of quernstones now on display in the Museum of London (Acc. No. 26357). Whilst their exact purpose is not clear, they do not appear to be functional and may simply be the neatest tooled finish that could be obtained. Upper stones generally have these grooves on their upper surface whilst the lower surface is smoothed by the grinding action. On lower stones it is the upper surface which is worn smooth, and the lower surface is often left rough. The edges of both upper and lower quernstones are again often marked with grooves, this time arranged vertically.

681. (4057/394) Small fragment of the upper (?) stone of a quern, probably from near the centre hole, with parallel grooves on the upper surface and a worn lower surface. From Context 349 and therefore not later than *c.* A.D. 125 (illustrated).
682. (4049/545) Small fragment from the edge of the upper stone of a quern, with parallel grooves on the edge and upper surface and a worn lower surface. Residual in Context 320 (illustrated).
683. (4001/103) Part of the edge of a quernstone with parallel grooves on the edge and on the one surviving surface. Residual in Context 200 (illustrated).
684. (4001/104) Part of an upper quernstone, with parallel grooves on the side and upper face. The stone tapers towards the middle and there is a wide (*c.* 50 mm) raised lip around the edge on the upper surface. Residual in Context 200 (illustrated).

(q) STONE
by Michael Rhodes
(Figs. 76-77, Nos. 685-693)

685. (4080/386) Hone with rounded corners, broken off at each end. D. T. Moore identifies the rock as a quartz glauconite limestone; almost certainly Kentish Rag from the Hythe Beds of Kent. From Context 423 and therefore not later than *c.* A.D. 100 (illustrated).
686. (4051/554) Hone (?). Probably a large flake from the end of a wide hone with rounded corners. D. T. Moore is almost certain that this is also of Kentish Rag. From Context 322 and therefore not later than *c.* A.D. 125 (illustrated).
687. (4082/526) Armlet in Kimmeridge Shale (identification by F. G. Dimes). Hugh Chapman comments: "Fragment of large armlet decorated with circling grooves forming ridges between them; internally only part of the surface has been removed leaving about a third standing proud, *v.* Lawson (1975, 254, No. 40 and Fig. 5)". From Context 430 and therefore not later than *c.* A.D. 100 (illustrated).
688. (4051/561.1) Small tessera. F. G. Dimes comments: "A light grey to white-coloured compact limestone. The specimen resembles in nature some beds of the Chalk and it is to this limestone that it is assigned, although it appears to be altered in some way. The Chalk is a very widespread formation, especially in southern England, and as a result no provenance is suggested although there is some resemblance to the Chalk of East Anglia". From Context 322 and therefore not later than *c.* A.D. 125 (illustrated).
689. (4051/561.2) As for No.688.
690. (4078/259) Piece of Purbeck "marble" (identified by F. G. Dimes) face and back surfaces smoothed. Broken off at both ends. The original width of the fragment was *c.* 34 mm (smoothed edges may be seen on both sides in one place) however both edges appear to have been deliberately chipped to make it slightly narrower. Probably a piece of decorative

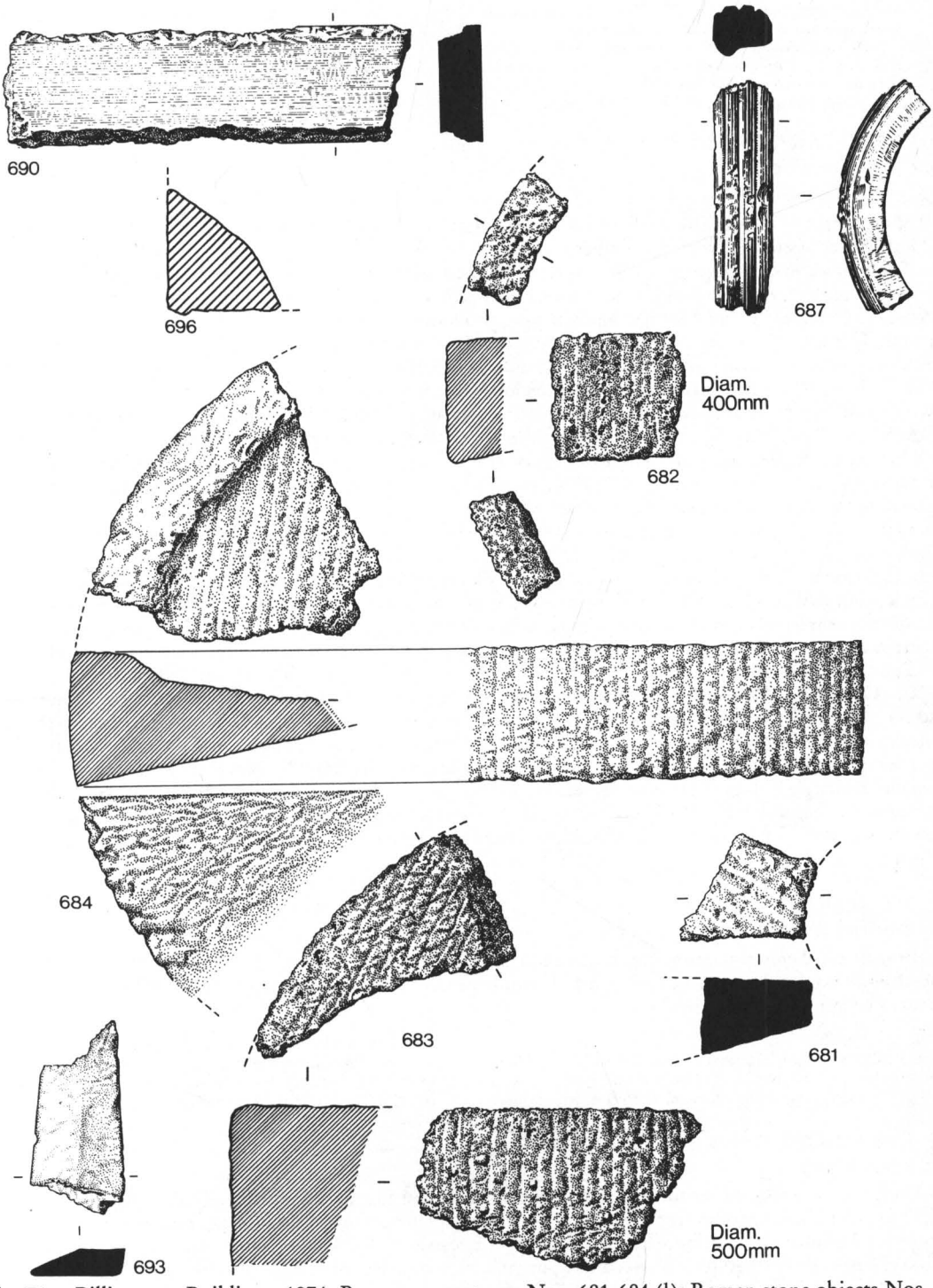


Fig. 76. Billingsgate Buildings, 1974: Roman quernstones Nos. 681-684 ($\frac{1}{4}$); Roman stone objects Nos. 687, 690 and 693 ($\frac{1}{2}$); section through *opus signinum* moulding No. 696 ($\frac{1}{4}$).

wall inlay (see Cunliffe, 1971, 30). From Context 412 and therefore not later than *c.* A.D. 125 (illustrated).

692. (4078/435) Small, abraded fragment of Purbeck "marble" wall-inlay (?). Varies between 12 and 15mm in thickness. Date and provenance as for No. 690.

693. (4042/40) Palette with an abraded, shallow bevel on one side. D. T. Moore identifies the stone as a "quartz-chlorite-ore-bearing-plagioclase rock, probably a quartz dolerite". Roman stone palettes of this sort generally have sides in the region of *c.* 60-120mm. They are thought to have been used for mixing cosmetics or medicinal ointment; see Wheeler (1930, 83). Residual in Context 309 (illustrated).

(r) WALL-PAINTING
by Joan Liversidge

(Fig. 77, Nos. 694-695)

Whilst most of the wall-plaster is residual, a small quantity was mixed with other building materials in the dump layers associated with the timber riverside revetments.

The two earliest fragments (from Contexts 433 and 249A; E.R. Nos. 403 and 4016 respectively) were buried prior to *c.* A.D. 125 and, with some of the residual red plaster, may come from a room of the late 1st century. Other early 2nd-century deposits have produced burnt material which may come from the same room. This includes a fragment with a white ground divided from light brown by a black line, 3mm wide. Another piece, originally white or light grey, may have darker grey veining (Fig. 77, No. 694, from Context 208; E.R. 4007). A fine black and a wider (6mm) white line separates this area from grass green decorated with white motifs. Across one corner is a diagonal white line, 5mm wide, edged on one side with black (see Liversidge, 1976, 282, Fig. 143). These motifs may be leaves but it seems more probable that this is part of a dado with rectangles decorated with lozenges or crosses, and filled in with large-grained imitation marbling. Four more pieces (from Context 412; E.R. 4078) are either plain pale brown or burnt with faint traces of green and a border of red/white/green/red/white lines.

Other plaster, perhaps from an adjacent room of the same building, comes from three of the mid to late 2nd-century deposits (Contexts 382, 323 and 288; E.R. Nos. 4065, 4052 and 4035 respectively). These fragments include three pieces of plain red (from Contexts 382 and 323) and at least one, perhaps two, of a black ground of good quality divided by a white line (6mm wide) and possibly a black line (4mm wide) from a bluish-green panel or pilaster strip. The most interesting piece (from Context 288) is burnt grey and shows faint traces of small white motifs and black or white stipple, again presumably imitation marbling.

The residual material comprises more reds (from Contexts 222, 231, 202, 200 and unstratified; E.R. Nos. 4008, 4011, 4003, 4001 and 4000 respectively) including dark red stippled with yellow (from Context 222), some evidence for a yellow ground (from Contexts 231 and 279; E.R. No. 4027), and pink with traces of a black and green border (from Contexts 222 and 200). The best piece surviving from the whole collection is the corner of a white rectangle with a red border at least 32mm wide (Fig. 77, No. 695, from Context 279). A smaller rectangle is outlined in black on the white, with a black bead and blob marking the corner. The white ground may be stippled in black and yellow (?), or even have more elaborate motifs of small flowers, but the condition of the plaster makes this difficult to determine. Traces of a pink line appear near the horizontal red border.

(s) OPUS SIGNINUM
by Michael Rhodes

Fragments of *opus signinum* were recovered from over half of the layers belonging to Periods I and II, but apparently not from any of the later strata. The only pieces of any size or significance which were kept by the excavator are described below.

(Fig. 76, No. 696)

696. (4007/565) Two fragments of a quarter-round moulding, presumably from the junction of a floor and wall, both *c.* 110mm long. The aggregate is abundant, angular, crushed, red tile up to 7mm and moderate rounded chalk up to 15mm. The face surfaces, which are in fresh condition, show smoothing marks made by hand or cloth. From Context 208 and therefore not later than *c.* A.D. 140 (cross-section illustrated).

(t) CERAMIC BUILDING MATERIALS
by Chris Green

Unfortunately most of the tile fragments were discarded on site. Of the small quantity remaining for study all the recognisable types are reported here, but clearly quantification cannot be attempted, and a thorough study of the fabrics has not been made at this stage. Because of the problem of residuality, the tiles have not been grouped by stratigraphic provenance, but most may be assumed to belong to the same date range as the bulk of the pottery, *i.e.* the later 1st and 2nd centuries.

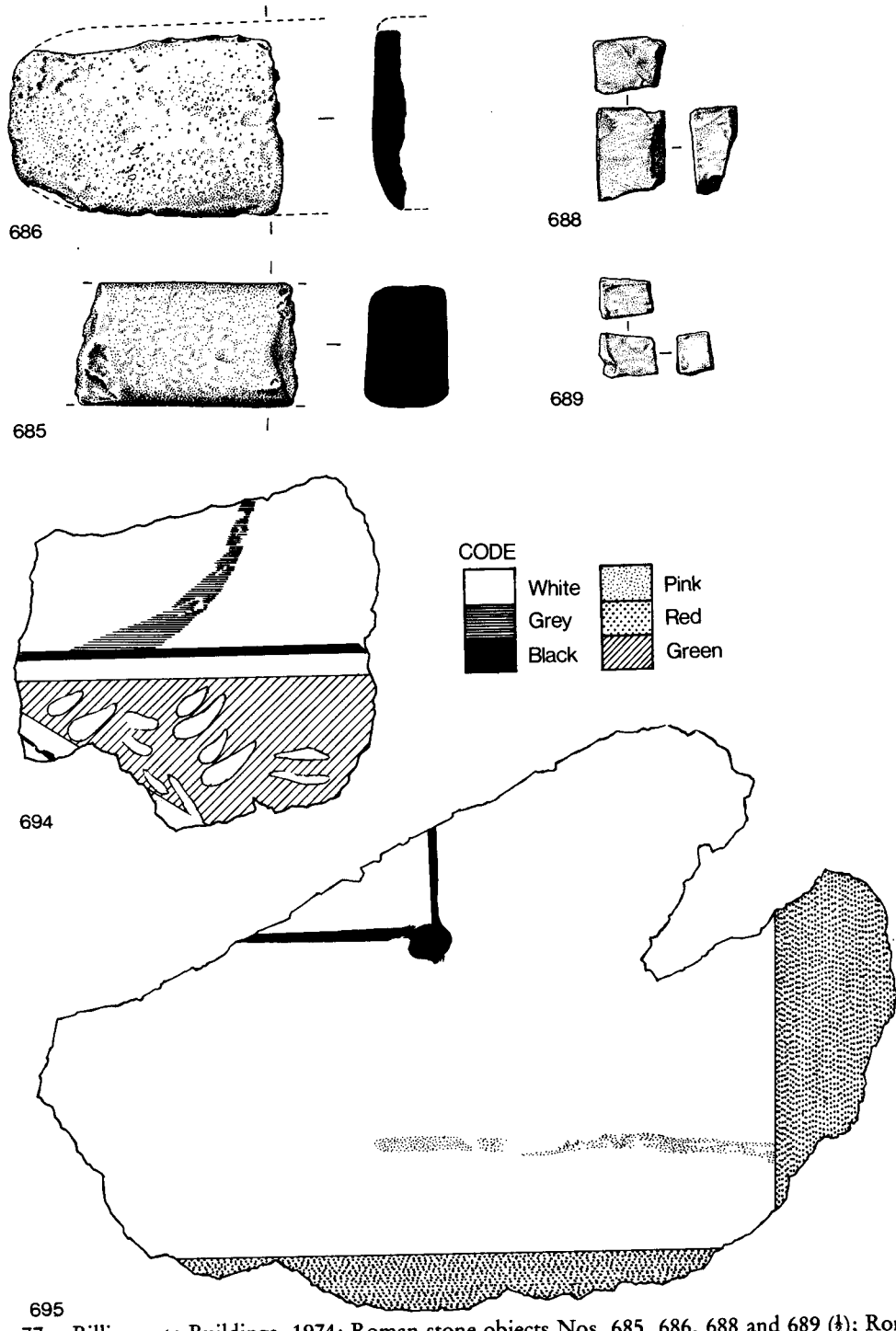


Fig. 77. Billingsgate Buildings, 1974: Roman stone objects Nos. 685, 686, 688 and 689 (½); Roman wall-painting Nos. 694 and 695 (½).

(Fig. 78, Nos. 697-708)

Roof tiles – tegulae *and* imbrices

As expected, roof tile was much the commonest type in the sample. Two main fabrics are present:

(i) Red fabrics, varying in colour from orange to a deep purplish-red with the intensity of firing, as is the case with modern red brick. In most of the specimens there are surprisingly few inclusions – mainly sub-angular quartz and rounded red-black ironstone up to 1 mm in diameter with a few plates of mica – but the matrix is obviously very silty and it is assumed at present that these tiles are local products made from the London brickearth. Grog was used in the fabric of only one example (No. 697, from Context 312; E.R. 4044, illustrated).

The upper corners of two *tegulae* survive. These are No. 697 and No. 698 (which is from Context 222; E.R. 4008, illustrated), and, although their full size is not known, it is possible to suggest how they were articulated (see reconstruction drawing, Fig. 78).

The *imbrices* are generally unremarkable except for a tile stamp, No. 699 (4078/348), on a burnt example probably of this fabric. This was submitted to Peter Marsden, who comments:

"Incomplete stamp; reads [PP] BR LO[N] (see Merrifield, 1965, 43-44). Another incomplete stamp, probably from the same die, was found in 1959 in the Thames river gravels deposited during the Roman period, on the Public Cleansing Depot site, Upper Thames Street (E.R. 546). This second stamp is on a *tegula* (?) and reads [PP B]R LON." The Billingsgate Buildings stamp comes from Context 412 and is therefore Hadrianic or earlier (illustrated).

(ii) White fabrics. Yellowish-white *tegulae* and *imbrices*, whose colour and inclusion type and size closely resemble that of the main pottery output of the Brockley Hill-Verulamium region (see p. 49 above), although the tile fabric appears to be more highly fired than the pottery, and inclusions are relatively sparse. White tiles appear to be considerably outnumbered by red tiles in this sample, as is the case in deposits of comparable date from Cannon Street (Green, 1979). However, in the present sample *imbrex* fragments are conspicuously commoner than *tegula* sherds which suggests that there may have been a building (or buildings) in the area decoratively roofed with red *tegulae* and contrasting verticals of white *imbrices*. Two surviving corners of white *tegulae* (No. 700, from Context 382; E.R. 4065, and No. 701 from Context 289; E.R. 4036, not illustrated) show very fragmentary evidence of articulation: 700 is probably from the upper edge of the tile, and shows the use of a cut-out in the mould to give a more complex form than 281-2, but 285, the lower corner of another tile, shows an arrangement as suggested in the reconstruction. Again the *imbrices* are unremarkable.

Building bricks

Two fragments of thick, red tile (fabric as roof tiles, above) seem likely to have belonged to bonding courses. They are parts of plain, rectangular slabs with maximum *surviving* dimensions of 200 mm (from Context 208; E.R. 4007) and 130 mm (from Context 222; E.R. 4008); 32 and 38 mm thick respectively.

Roller-stamped box-flue tiles

See Lowther (1948) for this type of tile and references in this section. Six fragments remain, all in red fabrics (as for roof tiles, above).

(i) Five sherds of tiles in Lowther's "plain chevron" group 5. Where enough of the pattern survives, it appears possible that a single die is involved, but whether it corresponds exactly to one of Lowther's dies is impossible to say without close comparison. Nos. 702 and 703 (both illustrated) come from Context 412 (E.R. 4078) and Context 208 (E.R. 4007) respectively. The others come from Context 208 and Context 222; E.R. 4008.

(ii) No. 704; a sherd belonging to Lowther's "W-chevron" group 1, closest to his Die 4. Mortar adheres to its patterned surface. From Context 222; E.R. 4008 (illustrated).

Box-flue tiles with freehand decoration

705. Red fabric, possibly as above, with combed, diagonal decoration. From Context 222; E.R. 4008 (illustrated).

706. White fabric, probably as above, with combed, wavy decoration. From Context 382; E.R. 4065 (illustrated).

Other types of brick

707. Part of a *terra mammata* brick used in a heating system. The applied dot of clay acted as a spacer. The fabric is comparable to that of the red roof tiles (above), but is rather lightly fired and contains abundant quartz inclusions. *Terrae mammatae* are not very common in Britain, but tend to have a south-eastern distribution (pers comm. G. Brodribb). From Context 200; E.R. 4001 (illustrated).

708. A sherd of ill-wedged, lightly-baked micaceous silt, 170 x 130 mm, varying in thickness from 32 to 40 mm. The colour is blue-grey with beige margins and surfaces. Coarse inclusions are very sparse, and consist of organics, rather rounded quartz (< 0.6 mm) and a little ironstone. The fabric is strongly reminiscent of river mud. Use unknown; possibly a type of mud brick for building, or for use in an industrial process. From Context 430; E.R. 4082 and therefore not later than *c.* A.D. 100.

(u) GRAFFITI AND INSCRIPTIONS
by Mark Hassall

(Fig. 79, Nos. 709-712)

For the critical conventions used here see Collingwood and Wright (1965, xxxiv).

709. (4057/555) *Graffito* on the sherd of a burnished, sandy, fine grey-ware vessel of unknown source (information from Chris Green). Reads]P[, *p(ondo), i.e.* ". . . in weight". From Context 349 and therefore not later than *c.* A.D. 125 (illustrated).

710. (4068/262) *Graffito* on a sherd from a hand-made jar of Patchgrove Ware (see pp. 62-5). Reads . .]Ḥ XIIII, *i.e.* ". . . 14". From Context 394 and therefore not later than *c.* A.D. 160 (illustrated).

711. (4027/99) *Graffito* cut, after firing, along the handle of a Dressel 20 *amphora*. Reads VII III: *m(ensura(?))* VII III/Ṃ *(M(ensura) (?)), i.e.* "by measure (?) 7 and 3 parts". The reading of the M is uncertain; the strokes possibly being intended for XX. The numeral 7 with or without a fraction occurs fairly commonly as an indication of capacity on *amphorae* found in Britain, but the unit of measurement is uncertain.
Dressel 20 *amphorae* were imported to Britain in the 1st to 3rd centuries; see pp. 40-2. From Context 279 (illustrated).

712. (4001/558) *Graffito* on a sherd from a burnished, sandy, fine grey ware jar, of unknown source (information from Chris Green). Reads PII = –, *(P)ondo) II (librae) 3 unciae, i.e.* "2 pounds, 3 ounces in weight." Residual in Context 200 (illustrated).

For inscriptions see No. 37 (p. 45), Nos. 466, 488 and 490, No. 619 (p. 120) and No. 699 (above).

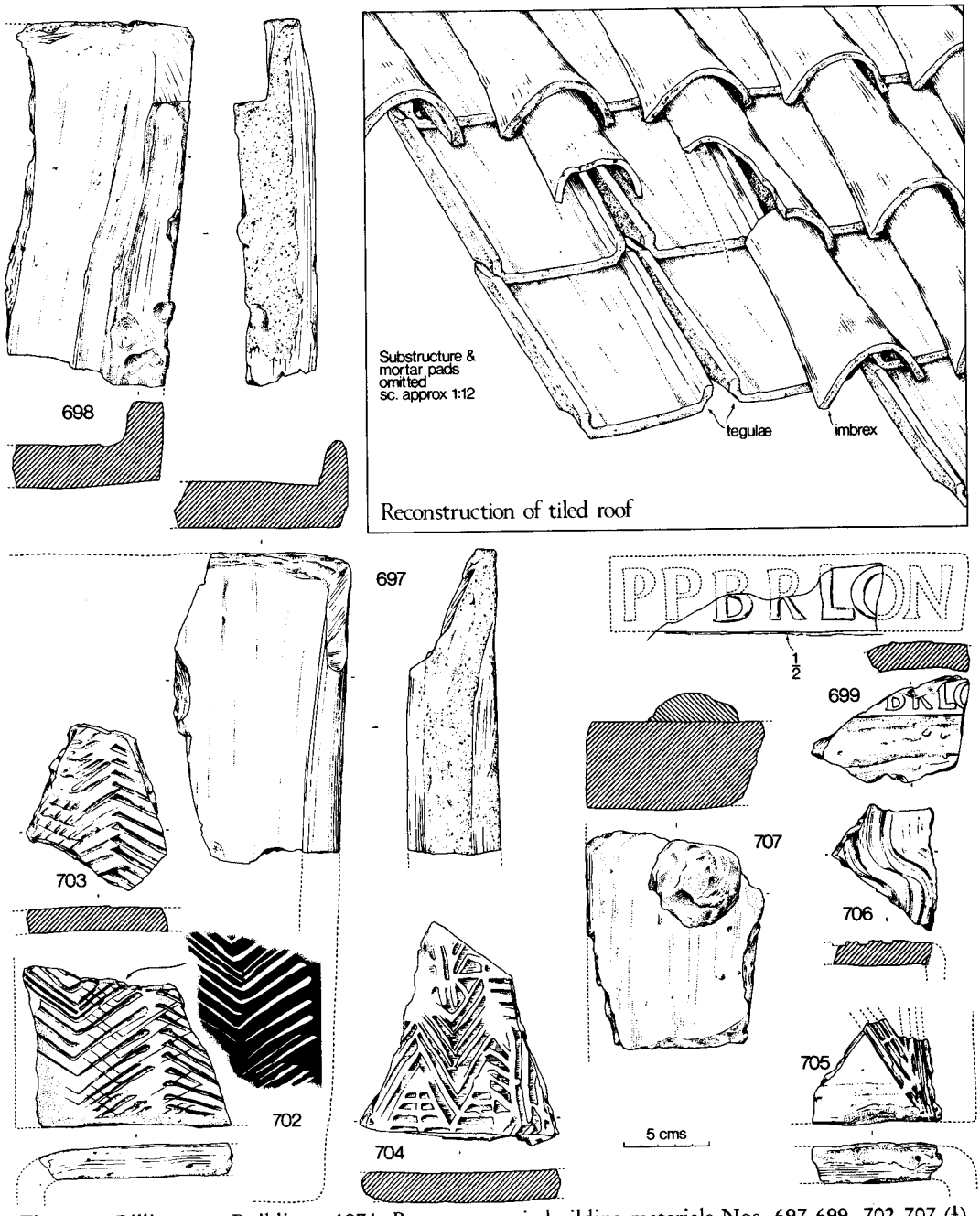


Fig. 78. Billingsgate Buildings, 1974: Roman ceramic building materials Nos. 697-699, 702-707 (¼).

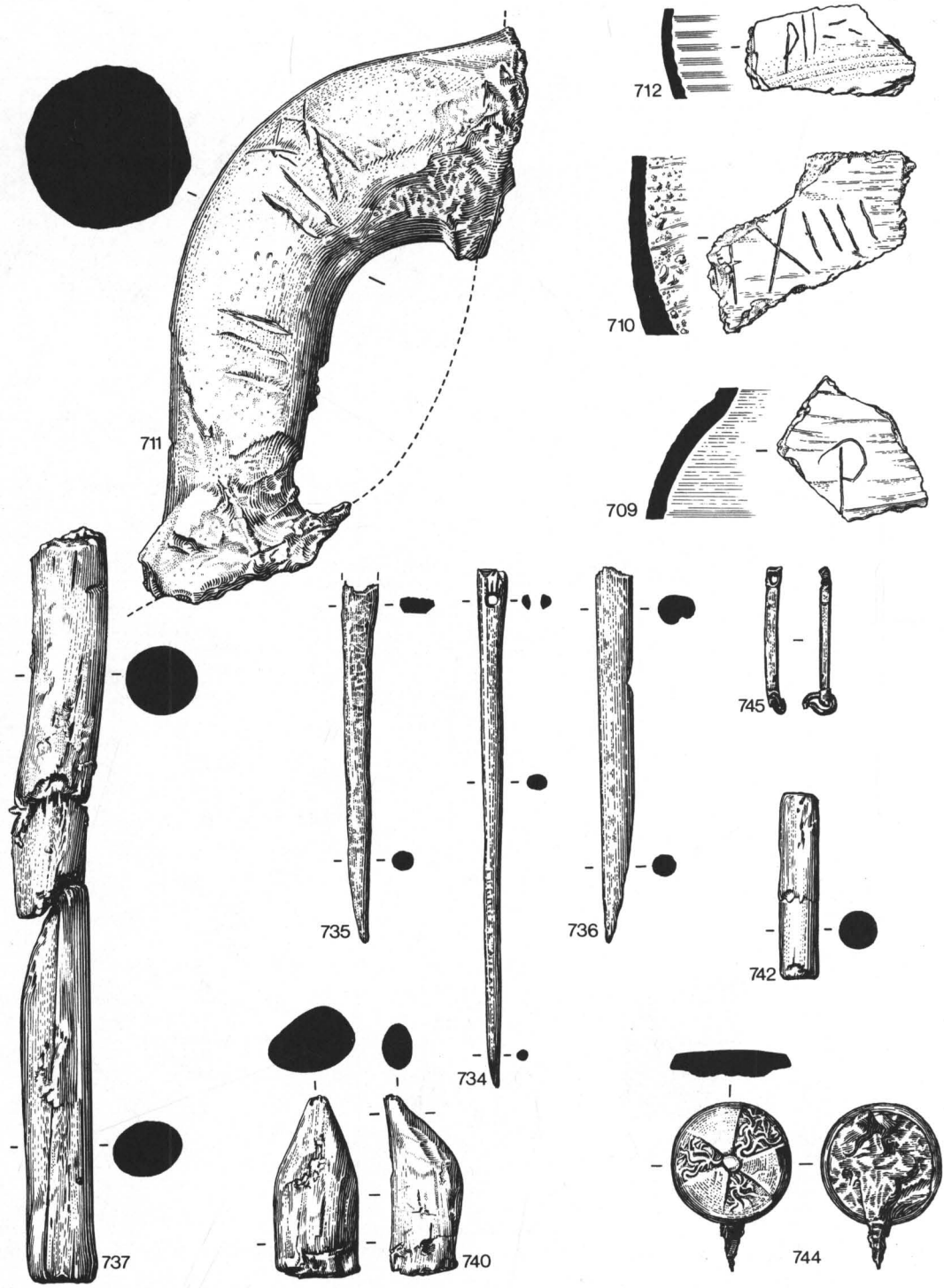


Fig. 79. Billingsgate Buildings, 1974: Roman *graffiti* Nos. 709-712 (½); Saxo-Norman bone bodkins Nos. 734-736 (½); Saxo-Norman wooden objects Nos. 737, 740 and 742 (½); Post-medieval metal objects Nos. 744 (2/1) and 745 (1/1).

(2) SAXON

(a) POTTERY

by Michael Rhodes

(Fig. 80, Nos. 713-720)

Thirteen sherds of pottery are thought to be of Saxon origin, although of these, only five are properly stratified. There are two particular problems associated with this material; the first concerns the general difficulty of recognising and dating Saxon pottery from London; the second concerns the dating and interpretation of the layers which have produced the stratified sherds.

It is at present not possible to be in any way certain about the dating of Saxon and early medieval pottery prior to the introduction of glazed jugs in the 12th century. There are three main reasons for this. Firstly there is a lack of structures and features of Saxon date by which the pottery may be dated by association. This is partly because, until recent years, most of our archaeological records have resulted from salvage work on building sites under conditions inappropriate to the discovery and identification of the characteristically elusive Saxon strata, although a lack of independent dating evidence (other than pottery) may mean that some late Saxon structures have been labelled as medieval. Furthermore, even where Saxon features have been found, they have generally not been recovered in a useful stratigraphic sequence, thus making it difficult to establish any kind of seriation for the pottery.

Another problem arises from residual material. The frequent occurrence of Saxon pottery in medieval contexts has clearly led to a tendency to date it too late and, conversely, sherds in layers containing a large quantity of Roman pottery have tended to be missed. This problem is made more acute because pottery seems to have played a much less important role in the material culture of the Saxons in comparison with the Romano-British or medieval peoples and, as a result, it is the rule rather than the exception for Saxon sherds to be out-numbered by residual Roman sherds in London excavations (see Clark, 1973 and Rhodes, 1975).

Finally, there is so far no evidence of any substantial kind of pottery industry in London prior to the 9th century, and whilst many known Saxon sherds have features in common, they do not seem to fall into closely-definable fabric groupings in the same way as, for example, does medieval pottery: presumably because of a more casual mode of production. This, in conjunction with the general lack of material, makes it very difficult to cite useful parallels and hence to show that any given sherd is definitely Saxon.

The Billingsgate Buildings site is a typical case, as only one of the sherds (No. 720) is closely paralleled elsewhere. With the stratified sherds, however, the lack of close parallels in itself supports the suggestion that they are pre-Conquest, since if the layers from which they come were later than Saxon, they would be expected to have produced some of the common "early medieval" types (which do, indeed, come in at a later point in the stratigraphic sequence). All the sherds do, however, have many general features consistent with known pre-Conquest types (*i.e.* shell inclusions, hand-made construction, sagging bases, wiped surfaces, low firing temperatures) and No. 714 in particular is quite unlike a Roman or medieval vessel in form or size.

If we accept that the stratified sherds described below are indeed Saxon, we must then briefly examine the problem of dating and interpreting the layers from which they originate. These are Contexts 222, 292, 203 and 202, all of which belong to Periods IV and V. In addition to the five probable Saxon sherds, these phases have, however, produced 830 pieces of Roman pottery. In view of this low proportion of Saxon to Roman sherds (*c.* 0.6%) it cannot be argued that they prove these phases to be of the Saxon period. It seems unlikely, however, that such uncommon sherds of pottery would have been accidentally introduced into these layers in recent times, particularly as none of the plentiful medieval and post-medieval types has been found. We must therefore conclude that if they were not introduced into these layers when they were formed, they probably represent a minor disturbance of the strata in Saxon times, and either way, that they constitute yet another piece of evidence of Saxon activity in this region of the City (Biddle, Hudson and Heighway, 1973, Map 3; Miller, 1977; Hobley and Schofield, 1977, 37).

As already mentioned, one of the sherds can be paralleled elsewhere. This is No. 720 which is of a type of pottery termed Saxon Shelly 1. The principal groups containing this ware come from the New Fresh Wharf excavations of 1974-75, in association with a series of pointed stakes which are possibly part of an Alfredian river-defence system (see Miller, 1977, 48; Hobley and Schofield, 1977, 37 and Pl. Vb), dated by C14 analysis to A.D. 870±60 (uncalibrated). The main forms are jars and cooking pots (of which this vessel is fairly typical) which appear to be constructed by the coil-and-throw technique. Vessels of this sort have now been recognised in a considerable number of contexts of possible Saxon date (notably in the fill of a sunken hut

discovered during the Department's 1976-77 excavation of a site at Milk Street (*London Archaeologist*, 1977, 140) and seem to represent a fully-developed pottery industry of the 9th century.

All of the Saxon sherds have inclusions of shell, a very common feature in London pottery prior to the introduction of Surrey ware. It is highly likely that this shell occurred naturally in the clays used and as such a high proportion of the fabrics have this characteristic, it seems reasonable to infer that such clays were especially sought out, perhaps because the pottery they made shrank less before and during firing.

Two of the sherds (Nos. 713 and 715) have abundant sand inclusions, probably added as a filler. The finds from New Fresh Wharf suggest this was a common practice as early as the 9th century and there is as yet no evidence to show that it represents a clearly defined technological innovation useful for dating purposes.

Taking the available evidence into account it seems likely that all these sherds are of middle, or late, Saxon date.

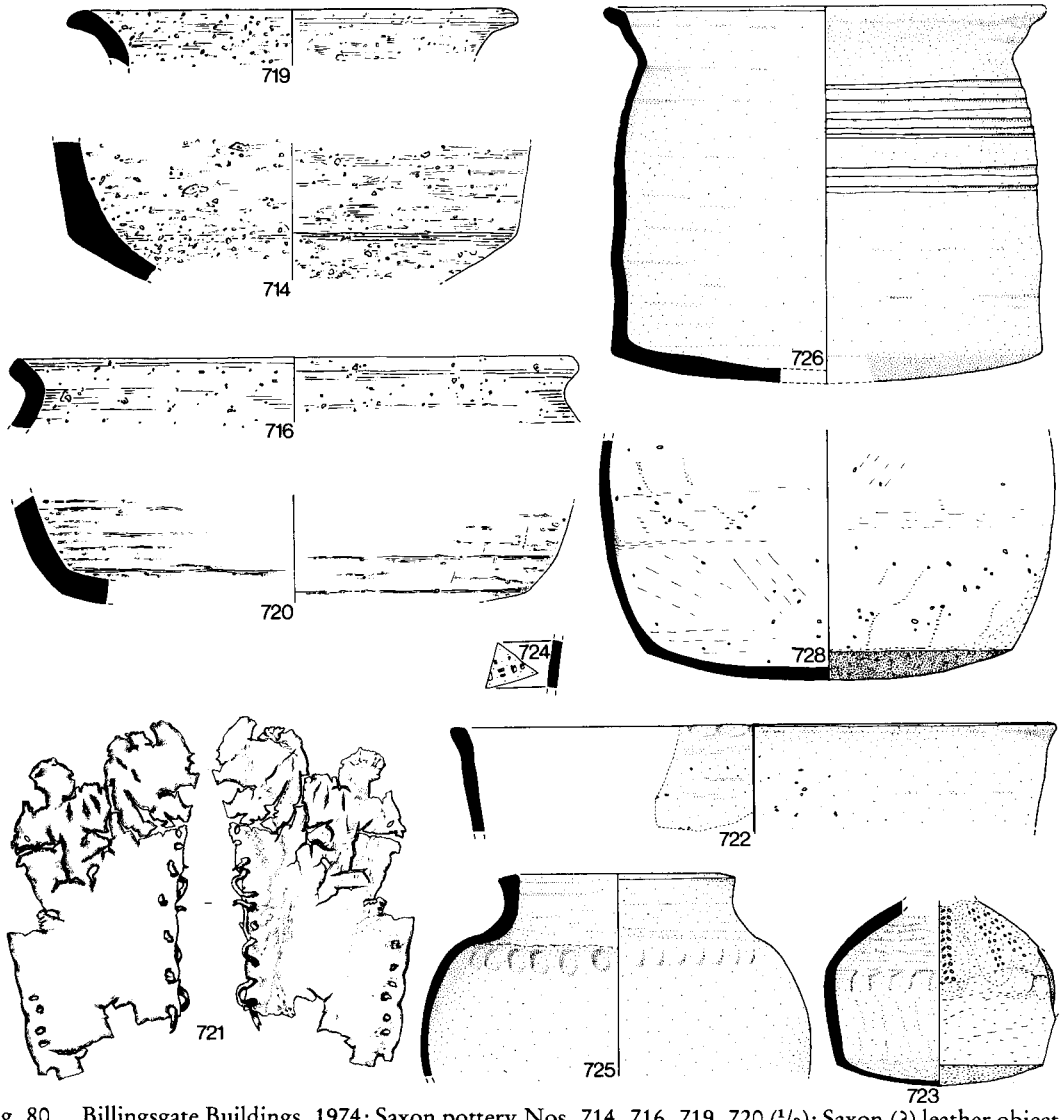


Fig. 80. Billingsgate Buildings, 1974: Saxon pottery Nos. 714, 716, 719, 720 (1/3); Saxon (?) leather object No. 721 (1/4); Saxo-Norman and early medieval pottery Nos. 722-726, 728 (1/4).

713. Body sherd from cooking pot. The fabric is smooth and very hard with irregular fractures. The inclusions are abundant, well-sorted, medium to coarse, sub-angular, clear and grey quartz; moderate, very coarse (< 4 mm), irregular chalk and/or soft fossil shell; moderate, coarse, irregular, black ironstone; sparse, coarse, irregular grog and sparse, very fine, white mica. The colour is very dark grey (N3) with a yellowish brown (2.5YR 5/6) external margin and greyish brown (2.5YR 5/2) external surface. The surfaces were wiped smooth prior to firing and the vessel is hand-made at least in part. From Context 222; E.R. 4008.

714. Sherd from the basal angle of a sagging-base cooking pot. The fabric is soft, the feel is smooth and powdery, and the fracture is irregular. The inclusions are abundant very fine to very coarse (< 3 mm) soft white and hard grey irregular limestone or fossil shell; moderate, coarse, sub-angular clear quartz; moderate, medium to coarse, irregular black ironstone and sparse, very fine, white and yellow mica. The colour is dark grey (5YR 4/1) with a very pale brown (10YR 7/4) internal margin and surface and a grey to light grey (10YR 6/1) external surface. The vessel is hand-made and the external surface shows wipe-marks. From Context 222; E.R. 4008 (illustrated).

715. Sherd from the basal angle of a cooking pot with sagging base. The fabric is fairly hard with an irregular fracture and is rough to the touch. The inclusions are abundant, ill-sorted, fine to coarse, sub-angular clear and light brown quartz; abundant, irregular, very fine to very coarse (< 2 mm) shell; sparse to moderate, medium to very coarse, irregular and rounded black ironstone and sparse, very fine, white mica. The colour is dark reddish brown (5YR 3/2) with a very dark grey (10YR 3/1) external surface and a light brownish grey (10YR 6/2) internal surface. The vessel is hand-made and the external surface is smoothed. From Context 292; E.R. 4038.

716. Simple, everted rim of a small cooking pot. The fabric is soft and rough with an irregular fracture. The inclusions are coarse to very coarse (< 4 mm) shell; moderate, medium, sub-angular red and grey quartz; moderate, fine irregular ironstone; moderate, very fine, white, yellow and green mica, and sparse, very coarse (< 2 mm) flecks of charcoal. The colour is very pale brown (10YR 7/4) and the vessel was finished on a turntable. This may be a variant of Saxon Shelly 1 (see discussion above). From Context 203; E.R. 4004 (illustrated).

717. Base sherd from a sagging-base cooking pot. The fabric is fairly hard, the "feel" is soapy and the fracture irregular, perhaps hackly. The inclusions are abundant, very coarse shell; moderate, fine to very coarse (< 4 mm) charcoal and sparse, very fine yellow mica. The colour is dark grey (5Y 4/1) with a greyish brown (2.5Y 5/2) external surface and a light yellowish brown (10YR 6/4) internal surface. There are smoothing marks on the outside and finger-marks on the inside. From Context 202; E.R. 4003.

718. Small sherd from the everted rim of a cooking pot. The fabric is fairly hard, the "feel" is smooth to rough and the fracture is irregular. The inclusions are abundant coarse to very coarse (< 3 mm) shell; moderate, medium, sub-angular, clear and light brown quartz; sparse to moderate, very coarse (· 2 mm), rounded black ironstone; sparse to moderate, very coarse (< 2 mm) flecks of charcoal and sparse, very fine, white mica. The colour is dark grey (5YR 4/1) and the sherd is clearly from a hand-made vessel. There are finger-marks on both surfaces. Unstratified; E.R. 4000.

719. One rim sherd and two body sherds from a cooking pot. The fabric is fairly hard and smooth to rough, perhaps slightly soapy, with irregular fractures. The inclusions are abundant fine to very coarse (< 2 mm) shell; moderate, coarse flecks of charcoal and sparse, very fine, yellow and white mica. The colour is dark grey with light yellowish brown (10YR 6/4) surfaces. The vessel was probably hand-made although marks on the rim suggest it may have been finished on a turntable. There are no exact form parallels although rather similar forms have been recovered in Saxon deposits on the New Fresh Wharf site. Unstratified; E.R. 4000 (illustrated).

720. Sherd from the basal angle of a cooking pot (illustrated) and three more body sherds. The fabric is fairly hard and powdery, with irregular fractures. The inclusions are abundant, very fine to very coarse (< 2 mm) shell; moderate, medium to very coarse (< 1.5 mm) grey limestone; moderate, very fine mica; moderate, coarse to very coarse (< 2 mm) charcoal and moderate, fine to medium, rounded ironstone. The colour is grey (10YR 5/1) with a light yellowish brown (10YR 6/4) internal margin and surface. The exterior is dark grey (N4). These sherds fall into the category Saxon Shelly 1 (see above, and for a detailed description of the type see Rhodes, forthcoming). Probably 9th century. Unstratified; E.R. 4000 (illustrated).

(b) LEATHER

by Michael Rhodes

(Fig. 80, No. 721)

721. (4008/60) Part of a cattle-leather article in poor condition; both ends lost through deterioration. The grain surface is worn although the flesh surface shows little sign of wear. A series of 3-4 mm wide awl holes run in a line 2-7 mm from the surviving edges. These are for the running-stitches of a leather thong, parts of which survive *in situ*. The awl holes, which are set at an angle, were made from the flesh side in closely-spaced pairs, converging towards the grain surface so that only short lengths of thonging were exposed to wear.

This seems to be the sole or sole-repair piece of an item of footwear, and, whilst its dating must remain uncertain, it displays one or two features which suggest it is not of Roman origin. Firstly, practically no leather thonging has survived on any of the Roman leather objects from this site, as it has on this object (see pp. 95-110). Secondly, without exception, all the Roman leather shoes and repair pieces known to the writer employ tunnel-stitching not exposed on the underside of the sole to avoid wear; no parallels are known to the sort of running-stitches used here.

As this find comes from Context 222, which although of indeterminate date has produced two sherds of middle to late Saxon pottery, it is tempting to suggest that it is of Saxon manufacture, and may perhaps be the surviving sole-piece of a woollen or linen breeches or leggings which did not withstand burial (illustrated).

(c) DAUB

by Michael Rhodes

Two small fragments of daub were recovered from Contexts 251 (E.R. 4018) and 200 (E.R. 4001). Since no daub was recovered from the Roman strata, they may well be Saxon.

Both are soft-baked and of a sandy, slightly micaceous clay, probably the local brickearth, which was clearly mixed with straw, grass or dung before use.

(3) SAXO-NORMAN

(a) SAXO-NORMAN AND EARLY MEDIEVAL POTTERY

by Clive Orton

The term Saxo-Norman is used here for distinctive pottery of late Saxon and/or early medieval date, *e.g.* wares in the Stamford/Winchester/Andenne and blue-grey (Paffrath) traditions. The "early medieval" pottery is so-called because it can be paralleled by fabrics of the "early medieval" group from the New Fresh Wharf excavations of 1974-5 (Orton and Miller, forthcoming). There the Saxon/Norman division is placed at an apparently suitable point in the long stratigraphic sequence: "early medieval" fabrics appear to start at or just above this division, and some can be paralleled in general terms with "early medieval ware" from Northolt (Hurst, 1961, 259).

(Fig. 80, Nos. 722-728)

Contexts 270A and 270B amalgamated; E.R. 4023. Probably 11th century.

722. Rim-sherd of bowl with flat-topped, slightly everted rim, finger-tip impressions on inner edge. The fabric is fairly hard with finely irregular fracture and slightly harsh feel. The main inclusions are abundant, fine to moderate, grey, brown and clear rounded quartz and moderate shell – mostly medium or coarse but some very coarse. Also sparse red and black ironstone. The core is dark grey (N4) with light brown (10YR 6/3) exterior margin and variable greyish brown (c. 2.5Y 5/2) surfaces. Smoothing marks on exterior; interior worn. Probably hand-built. The fabric belongs to the "sandy plus shell 2" group of "early medieval ware" as defined at New Fresh Wharf (Orton and Miller, forthcoming), and as such is likely to have an 11th-century date. The form is not familiar and bowls are in any case notoriously difficult to date (illustrated).

Also three sherds of "early medieval ware" and one of "shell/sandy ware" (see Orton and Miller, forthcoming).

Context 321; E.R. 4050. Probably 11th century.

Two sherds as No. 722, one similar sherd but without margin ("sandy plus shell 1"), one sherd of "early medieval chalky ware" and one of "shell/sandy ware 1" (see Orton and Miller, forthcoming).

Context 275; E.R. 4024. 11th or 12th century.

723. Most of base and body of small squat jug. Hard fabric with finely irregular fracture and fairly smooth feel. Abundant, very fine, clear and greyish, angular quartz inclusions with sparse black ironstone. Light grey (N7) fabric with grey (N5 to 6) interior surface and areas and patches of pitted light green glaze on the exterior. The body is thick and shows extensive signs of fingering on the interior, while the base is thin and well-shaped, possibly moulded. There is a handle scar but no evidence for the shape of the handle. The upper part is decorated with lines of double impressions radiating down from the neck: the glaze is darker and thicker around them. A small blow-hole in the base makes this vessel a waster, but since the hole is hardly visible from the outside it may nevertheless have been sold.

No parallels for this vessel have been found. It appears to belong to the Stamford/Winchester tradition of early medieval glazed wares, but does not match the products of either. A Continental origin is unlikely (J. Verhaeghe and H. Janssen, *pers. comm.*). Since it is (just) a waster, a local origin is suggested. On technical grounds, an 11th or early 12th-century date seems most likely (illustrated).

724. Small body sherd of hollow form, possibly a pitcher. Very hard fabric with smooth to laminar fracture and fairly smooth feel. White (N8) fabric with glossy, light yellow glaze on exterior. Wheel-thrown. Rouletted decoration. Possibly from Andenne or region (J. Verhaeghe, *pers. comm.*), (illustrated).

Context 306; E.R. 4041. 11th or 12th century.

725. About half of a rim, with body sherds, of a globular vessel with relatively narrow neck. Possibly a ladle (Dunning, 1959, 56-60) although there is no trace of a handle; or else a cooking pot. The fabric is very hard, approaching stoneware, with a laminar fracture (smooth between inclusions) and a fairly rough feel. There are abundant inclusions of medium, clear, angular and sub-angular quartz, and sparse, fine white mica. The fabric is pale yellow (5Y 8/4)/light grey (about N7) with grey (N5 to 6) exterior and light grey (N7) interior surfaces. The body is thin, hand-built with signs of fingering, especially at the shoulder, while the rim is thicker and wheel-thrown. Burnt.

This is an example of "blue-grey ware" (*ibid.*, 76) similar to those found at Dowgate. An 11th-12th-century date is suggested (illustrated).

726. About one-quarter of complete profile of cooking pot. Everted rim with slight flange, body tapering outwards from neck to sagging base. The fabric is very hard with a hackly fracture and rough feel. There are abundant inclusions of medium and coarse, colourless, sub-angular or rounded quartz, and of a black, non-magnetic material, with sparse inclusions of white mica. Fabric colour ranges from light grey (N7) to light yellow (2.5Y 8/4), and the surfaces are a variable grey. Wheel-thrown, with grooving on upper part of body. Burnt.

Of the fabrics noted at New Fresh Wharf, "early medieval coarse-sandy ware" comes closest to this example. The form, however, is unfamiliar, and could even be Saxon in origin. Only a very general date of 10th-12th century can be given (illustrated).

Also one sherd each of "early medieval chalky ware" and "early medieval sandy plus shell ware 1".

Context 320; E.R. 4049. 11th or 12th century.

One sherd as No. 725.

Contexts 224A and 224B amalgamated; E.R. 4009. 12th or 13th century.

727. Body sherd, probably from pitcher. Hard fabric with smooth fracture (but many small voids) and feel. Abundant fine, clear, angular quartz inclusions, with moderate, fine and medium, greyish and whitish sub-angular quartz and sparse red ironstone. Very pale brown (10YR 8/4) core with white (N8) exterior margin and light grey (2.5Y 7/2) interior surface. Crazed glossy "brown" glaze on exterior, which has part of an applied thumbed strip. Wheel-thrown. Probably from Andenne.

Also sherds in medieval fabrics, 11th and 12th to 13th centuries.

Residual

728. Large part of base and body of cooking pot. Hard fabric with hackly fracture and smooth feel. Abundant shell

inclusions, up to 3mm in size, with moderate very fine mica and sparse colourless quartz. The core is dark grey (N4) and the surfaces pale brown (10YR 6/3) with greyer and redder patches. Probably hand-built. This vessel belongs to the group classified as "medieval shelly ware 1" at New Fresh Wharf and an 11th-century date seems most likely. Residual in Context 201; E.R. 4002 (illustrated).

(b) LEAD OR LEAD-ALLOY

by Michael Rhodes

(Fig. 83, No. 729)

729. (4024/556) Shoe(?)-buckle in lead or lead-alloy, still attached to a leather thong. Bent. Casting seams on the edges. Part of a highly corroded iron pin remains. From Context 275 and therefore of Saxo-Norman date (illustrated).

(c) SLAG

by John Evans

Four pieces of slag come from four layers all associated with the Saxo-Norman timber-lined well. No. 730 (4050/745) comes from Context 321; a layer of silt deposited at the bottom of the well during its period of use, and Nos. 731 (4024/743), 732 (4041/744) and 733 (4049/746) come from Contexts 275, 306 and 320 respectively; layers which filled the well after its disuse.

All the samples are heterogeneous and have marked vesicular areas. Nos. 730 and 733 have a very similar off-white appearance and the other two are mainly dark brown to red-brown. All four specimens were examined by emission spectroscopy and the resulting spectra are summarised in Fig. 81. Suitable samples were also digested with mixed concentrated acids and the solutions obtained, after suitable dilution, were analysed by atomic absorption and flame photometry (for sodium and potassium). The data obtained from these analyses are shown in Fig. 82.

The marked similarity, both in appearance and content, of Nos. 730 and 733 suggests that they are from the same source and that they are most likely to be fuel ash slags. No. 732 contains sufficient iron to suggest a slag from a manufacturing process. No. 731, however, although having a significant iron content, is more likely to be a "contaminated" fuel ash slag.

		Element																	
		Fe	Ca	Cr	Pb	Na	K	Mn	Al	Ni	Co	Ag	Zn	Ti	Cu	Au	Si	Mg	Sn
730.	(4050/745)	P	P	T	–	P	P	P	P	T	–	T	–	T	T	–	S	S	T
731.	(4024/743)	S	S	–	–	S	S	P	P	–	–	–	–	T	T	–	S	S	–
732.	(4041/744)	S	S	–	–	S	S	–	P	–	–	–	–	T	T	–	S	S	–
733.	(4049/746)	P	P	–	–	P	P	–	P	–	–	–	–	T	T	–	S	S	–

S lines suggest concentration greater than 1%
P lines suggest concentration less than 1%
T lines suggest concentration less than 0.1%
– indicates element absent

Fig. 81 Billingsgate Buildings, 1974: Emission Spectroscopy analysis of Saxo-Norman slags.

		Percentage composition*								
		Fe_2O_3	CaO	MgO	Na_2O	K_2O	CuO	PbO	Ag_2O	Al_2O_3
730.	(4050/745)	0.85	0.36	4.86	0.70	0.60	0.01	–	–	1.87
731.	(4024/743)	7.38	9.50	4.13	2.88	1.13	0.01	–	–	2.51
732.	(4041/744)	51.38	11.99	28.25	4.28	2.57	0.01	–	–	3.06
733.	(4049/746)	0.55	0.41	2.47	0.69	0.50	0.01	–	–	1.55

* Remaining material insoluble silicates etc.

Fig. 82. Billingsgate Buildings, 1974: Quantitative analysis of Saxo-Norman slags.

(d) BONE
by Michael Rhodes
(Fig. 79, Nos. 734-6)

(All three objects were submitted to Dr Philip Armitage for bone identification, and his findings are included below).

734. (4041/351) Bodkin fashioned from a sliver of long bone; perhaps a cattle metapodial bone. From Context 306 and therefore of Saxo-Norman date (illustrated).
735. (4041/353) Bodkin; broken off at eye. Date and provenance as for No. 734 (illustrated).
736. (4041/352 Bodkin (?); end broken. Date and provenance as for No. 734 (illustrated).

(e) WOOD AND WOODY TISSUE
by Michael Rhodes
(Figs. 79, 83 and 84, Nos. 737-742)

(These articles were submitted to George Willcox for wood identification, and his findings are included below).

737. (4050/62) Fragmented object in an unidentified hardwood. Smoothed surfaces. The lower end appears to be original but the top end is broken off. Perhaps the handle of a tool such as a small hammer. From Context 321 and therefore of Saxo-Norman date (illustrated).
738. (4049/1) Bucket; nearly complete; slightly narrower at the top than the bottom; recovered from Context 320, the fill of a Saxo-Norman well (see pp. 14-16).

The base consists of two semi-circular oak plates (dia. *c.* 355mm) held together by two circular oak dowels (dia. *c.* 10mm) set 70 and 55mm in from the rim (Fig. 84 (d)). The sides are represented by 13 wedge-shaped oak staves, sawn across the medullary rays, with square rebates on the inside *c.* 28mm from the bottom to accommodate the base, and chamfered on the top inside edges. Nine of these are *c.* 95mm wide and the other four about half this width. Most are *c.* 285mm long, but one is *c.* 352mm in length and has a circular hole near the top, presumably for a rope handle. A whole segment of the vessel on either side of this long stave was recovered intact (see Fig. 84(a)).

The construction is entirely without metal. The staves were held together by three one-piece hoops which are now very fragmentary. The top two are of ash and the lower, wider band of birch (?). The ends of the two upper bands and perhaps also of the lower were held together by at least two and perhaps three trenails (Fig. 84(e) and (f)) although the exact positions of the joins with respect to the long staves cannot be ascertained. The wedge shape of the staves presumably helped to prevent the longer load-bearing stave(s) from being pulled free. No traces of caulking were found, although the inside was lined with pitch, still clearly visible, which must have improved the durability of the vessel as well as making it watertight. It could have held up to about 20 litres of water.

A comparison of the circumference of the base plates with the sum of the stave widths, measured across the rebate, indicates that at least one wide stave is missing. Because the bucket is incomplete in this way there are two possible reconstructions. If the missing stave was as short as most of the others and there was only one long stave, so that the rope was attached on one side alone, this might have had advantages in filling the bucket. On the other hand it would not allow a very large amount of water to be drawn at once, and the uneven strain involved in lifting the bucket from one side only would surely weaken the whole construction. It is, therefore, thought to be more likely that the missing stave was a counterpart to the long stave, on the opposite side of the vessel (see reconstruction, Fig. 84(c)). It is tempting to suggest that this was lost when the bucket handle broke on one side whilst drawing water, thus jerking the missing stave, still attached to the rope, away from the body of the bucket.

Very few buckets of medieval date seem to have been discovered so far, although a close parallel has been found in Seaford, Sussex (Church Street Excavations 1976, Feature 12; see Freke, 1978, 211-2 and Fig. 13). Here nine staves of an oak bucket were recovered from a well which is dated to *c.* 14th century. Although somewhat smaller than the London vessel it is the same overall shape with inward-sloping sides and has one surviving long stave with a handle (?) hole near the top. Again the staves have a chime inside the upper edge and a square rebate for the base which again consists of two pegged semi-circular sections. Bearing in mind these two vessels are at least three centuries apart in date their similarity is quite remarkable, and it seems reasonable to infer that both are products of a fully-developed tradition of manufacture which lasted right throughout the early medieval era. A well-made Saxon cask of stave construction with wood-binding has been recovered from Hamwih (see Holdsworth, 1976, 43-45) and there is therefore no reason to doubt the early date of the London example. From Context 320 and therefore of Saxo-Norman date (illustrated).
739. (4049/795.1) Part of a bucket stave in alder or possibly hazel (identification by Annie Slack and Jane Squirrell); broken off at top and bottom; *c.* 95mm wide and slightly wedge-shaped as are the wide staves of No. 738, but since this is a different species of wood it is not likely to be the missing stave from that bucket. The inside of this specimen is blackened, showing that the bucket was lined with pitch. Date and provenance as for No. 738.
740. (4049/38) Oak object; ovoid in section. One end is sharpened to a point on one side; the other is cut off or broken. Perhaps a bung. Date and provenance as for No. 738 (illustrated).
741. (4049/63) Short length of three-stranded, "plain-lay" rope (see Hodges, 1964, 130) in which the yarn has an S-twist and the strands a Z-twist. The yarn is a bast fibre, but the species is not now identifiable (information from Noel Sayers and Philip Porter). Date and provenance as for No. 738 (illustrated).
742. (4049/87) Piece of circular dowel in hazel. The upper end is probably original, but the lower may be broken. Date and provenance as for No. 738 (illustrated).

(f) QUERNSTONE
by Michael Rhodes
(Fig. 83, No. 743)

743. (4049/538) Half of an upper quernstone of Niedermendig or Mayen lava (identification by F. G. Dimes); both sides more or less flat, apart from a small ridge around the centre-hole on the upper side. The top surface is marked by whitish tool-marks which seem to have been made by a rather blunt, pointed instrument, struck in an anti-clockwise direction with respect to the outside edge. It also has two smooth-sided depressions which, from left to right, are 16 and 22mm deep (indicated on the illustration by arrows). Their exact function is not clear, but they are probably to do with the means of rotating the stone on its axis.

This is a typical late-Saxon quern (information from John Parkhouse). For a similar London parallel see Wheeler (1930, 109 and Pl. 51A, left) which, despite its Roman attribution, is not a standard product of the Roman quern industry (Hugh Chapman, pers comm.) and could also be Saxon. From Context 320 and therefore of Saxo-Norman date (illustrated).

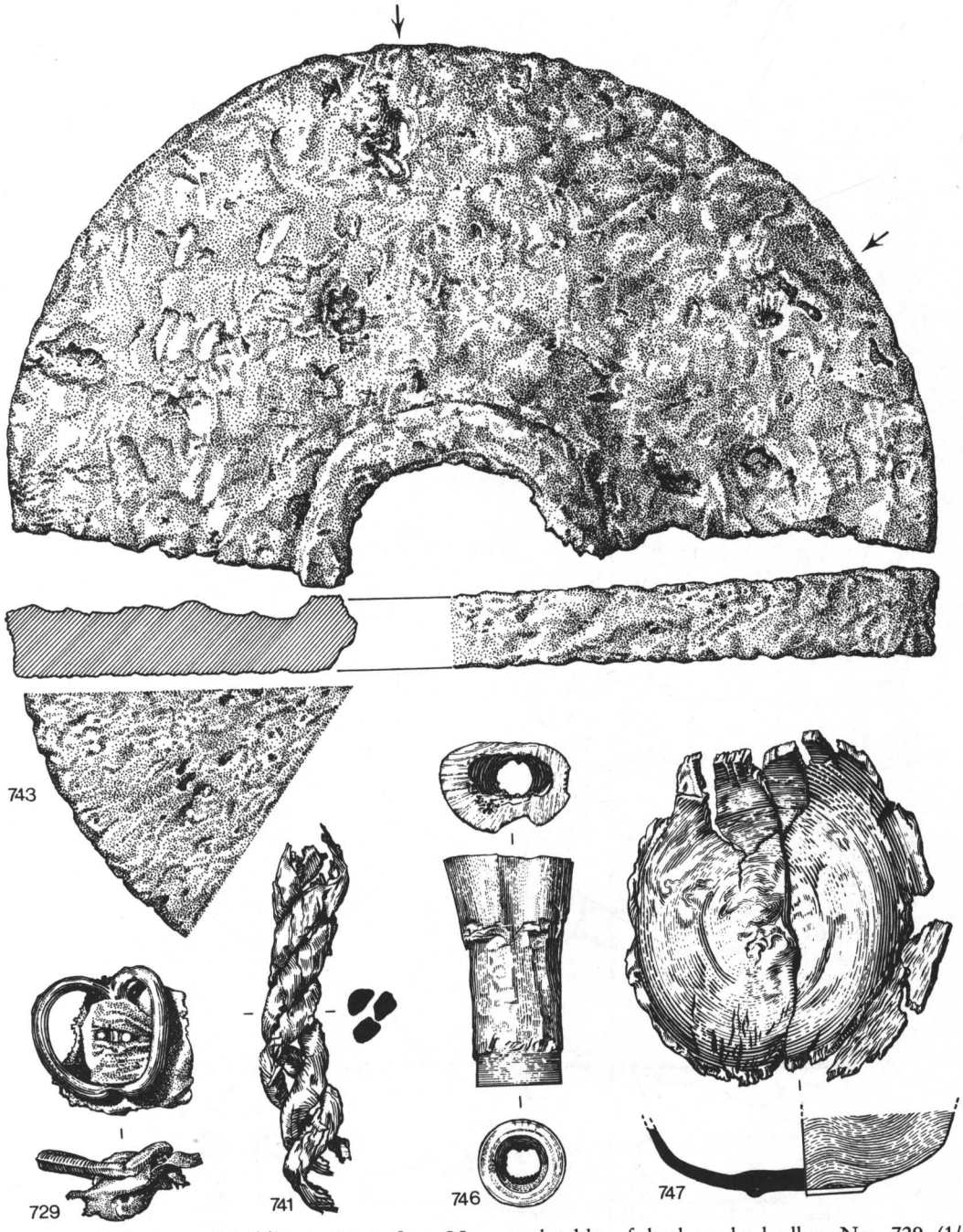


Fig. 83. Billingsgate Buildings, 1974: Saxo-Norman buckle of lead or lead alloy No. 729 (1/1); Saxo-Norman rope No. 741 (½); Saxo-Norman quernstone No. 743 (¼); Post-Roman bone object No. 746 (½); Medieval (?) wooden bowl No. 747 (1/3).

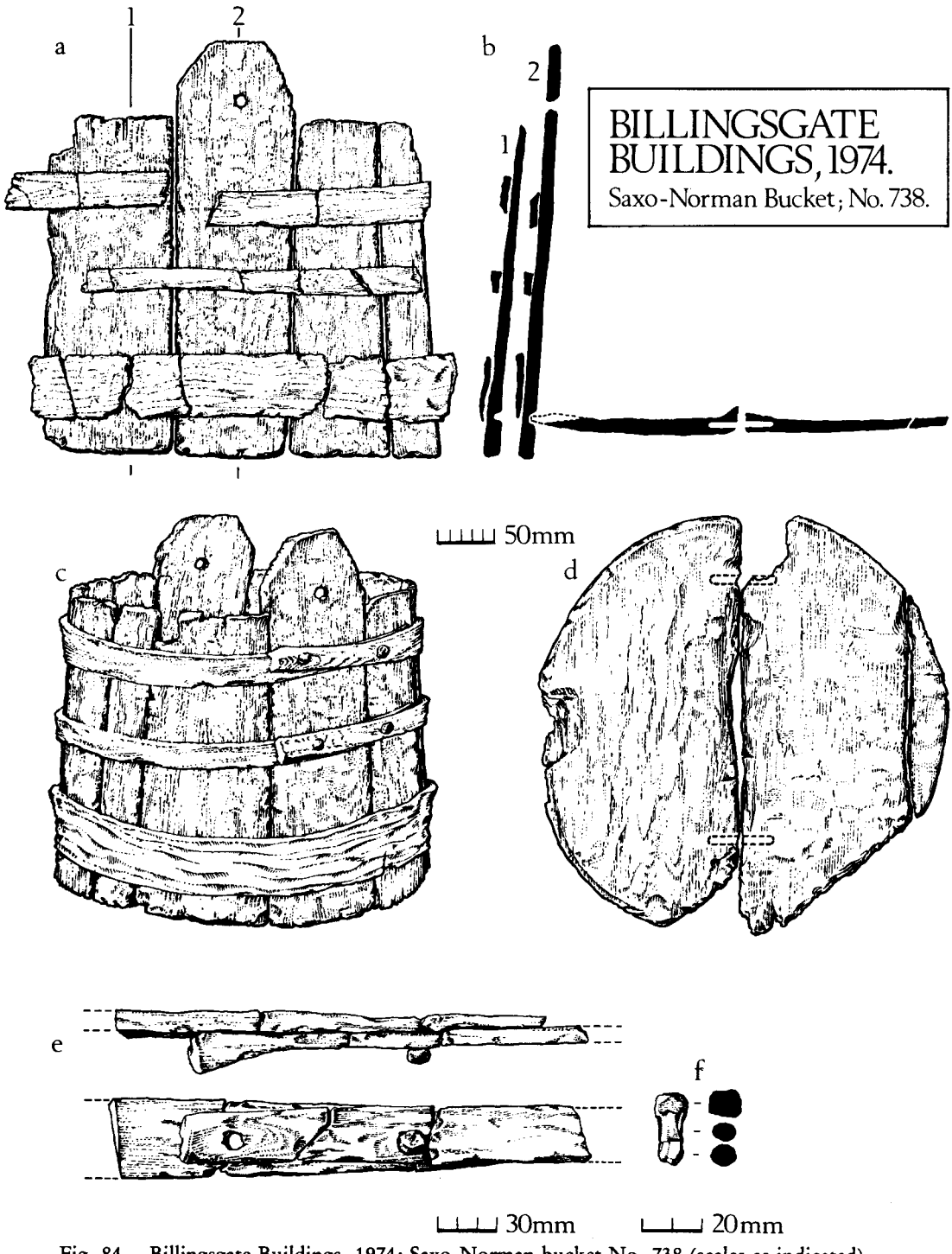


Fig. 84. Billingsgate Buildings, 1974: Saxo-Norman bucket No. 738 (scales as indicated).

(g) OYSTER SHELLS

by John Llewellyn-Jones and Celia Pain

The shell remains of over 235 Common British Oysters (*Ostrea edulis*) were recovered from Context 320, a layer of fill of the Saxo-Norman well. They include *c.* 235 upper valves, although this report is concerned only with the lower valves. These fall into two distinct groups which are described separately.

The larger group comprises 250 examples (of which 226 are complete enough to be measured) which are extremely well preserved; retaining traces of the periostracum, the aragonite of the muscle scar and the delicate shelly frills around the ventral margins. These frills are, however, very fragile, and because of this a large number are chipped. Many shells are also broken along the ventral margin and both these factors must affect the accuracy of the measurements given below. The shells are thin (0.35 g/mm length of shell), large and nearly circular (mean length 82 mm by width 80 mm; ratio 1: 0.97). The frequency distribution of their lengths is given in Fig. 85, and shows a strong central peak; 88 per cent lying between 70 and 100 mm. Distributions for individual year classes based on major growth rings are not given because it is known that under favourable conditions, oysters may produce more than one growth ring per year (D. Keys, *pers. comm.*).

Nine sets of oysters were cemented in pairs during growth. In some examples both oysters were obviously alive contemporaneously as both valves are clean and in a fresh condition. In others only one of the pair was alive at the time of collection as the other shells are discoloured and have spat (very young oysters) and barnacles in them. One of the single valves has similar characteristics (see Pl. 3, bottom left).

Examples of these shells have been submitted to D. Keys of the laboratory of the Ministry of Agriculture, Fisheries and Food at Burnham-on-Crouch. He comments that these oysters clearly grew fast as evidenced by their large size, thin shells and large growth stages. Oysters grow best in clean, well-aerated water, with an abundance of planktonic food. These conditions are often found in estuaries, which may yield large crops of oysters, although over-crowding can cause distortion of the shells and reduced growth. Very few shells in this group are distorted, and despite the few pairs which became cemented together through growth in close proximity, the majority evidently lived in very favourable conditions for shell growth. Mr Keys adds that similar shells are collected today from the Solent.

Three-fifths of the shells have marks on the inside. These range from slight scratches (Pl. 3, top) to deep gouges (Pl. 3, right), running from near or on the adductor muscle scar to the ventral margin, and in some cases the frills of the ventral margin are also broken off (Pl. 3, right). All these marks and breaks probably came about when the shells were opened.

An oyster is usually opened by holding it in the palm of the left hand, hinge to the left and flat valve uppermost, and forcing a knife between the valves. This is then moved backwards and forwards until the adductor muscle, which holds the valves shut, is cut. Saxo-Norman knives are triangular in section (Ward-Perkins, 1940, 51) and the marks and grooves in question were probably made with the back of such a knife. The extent of the damage to some of the oysters either indicates that they were fresh when opened (the fresher they are, the tighter they shut) or that the persons enjoying this food were not very proficient in the art of opening oysters.

This first group of oysters appears to be so homogenous that the shells could well have been collected from the same habitat and at the same time. Their large size (as large as the "choice" class sold today) and small size-range suggests that they may have been specially selected; perhaps the remains of one meal for a number of people.

The small group of oysters comprises only 12 examples. These are thick (0.55 g/mm length of shell), more elongated (mean length 80 mm, by width 70 mm; ratio 1: 0.87) and have lost the frills on their body and on their ventral edges. It is also likely that they were gathered many years prior to their burial with the first group because the leaching of the muscle scar has progressed much further. (The oyster muscle scar is composed of aragonite which is more translucent, often a different colour and has a brighter, glistening lustre than the surrounding shell calcite. It is also prone to selective leaching in dead or fossil oysters because aragonite is a less stable form of calcium carbonate than the calcite which forms the rest of the shell; see Stenzel, 1971, N981). These shells may well be residual, Roman shells.

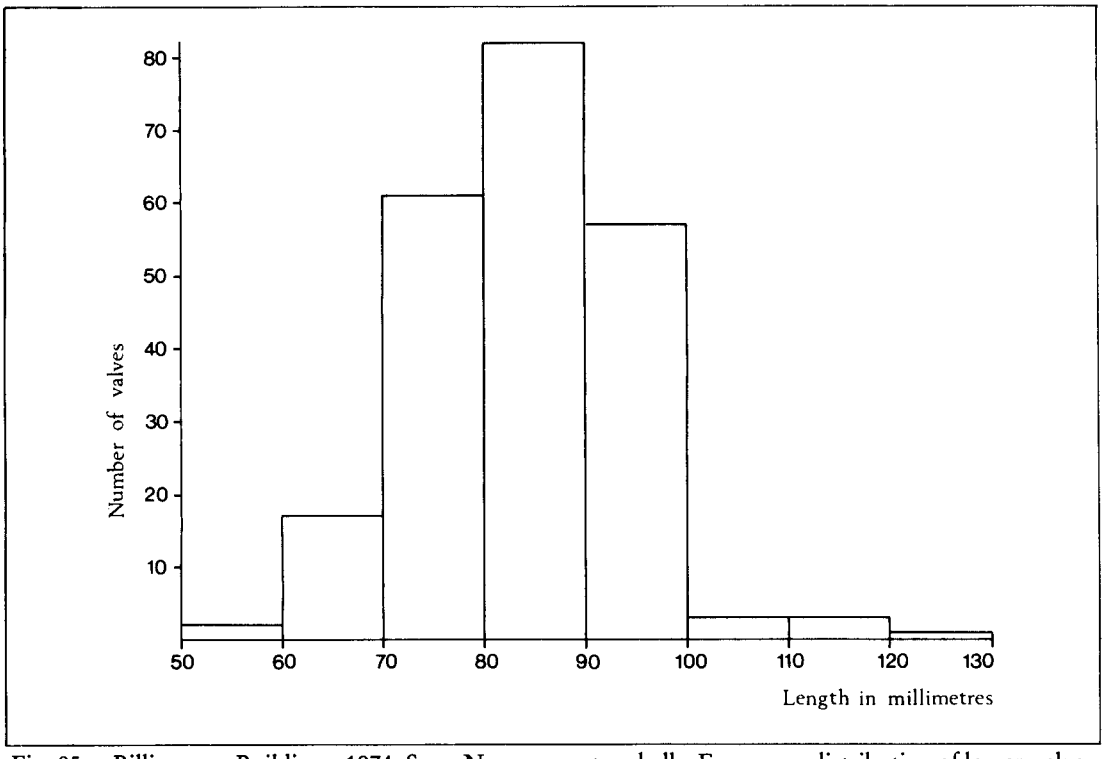


Fig. 85. Billingsgate Buildings, 1974: Saxo-Norman oyster-shells. Frequency distribution of lower-valve lengths.

(4) LATER MEDIEVAL AND POST-MEDIEVAL

(a) MISCELLANEOUS SMALL-FINDS

by Michael Rhodes

(Fig. 79, Nos. 744-745)

744. (4001/32) Stud (?) with machine-stamped, brass face and much-corroded iron back-parts. Function uncertain, but may have been used for upholstery. Buttons constructed in the same manner have been dated between A.D. 1837 and 1865 (Noël-Hume, 1969, 90-91, Type 25). From Context 200 (illustrated).

745. (4001/54) Copper-alloy strip with a drilled hole at both ends, one of which accommodates a small circular link of iron wire. Probably from a chain consisting of alternate links of copper-alloy and iron. Perhaps 17th or 18th century. From Context 200 (illustrated).

(Fig. 83, Nos. 746-747)

746. (4000/390 Unfinished (?) article, fashioned from a cattle metatarsal bone (identification by Philip Armitage). The distal end of the bone has been sawn off. The other has been whittled with a knife and then lathe-turned, making smooth surfaces on the outside, inside and end. Date unknown, but its colour and condition are much fresher than that of the skeletal material and bone artefacts from the Roman and early medieval strata. Unstratified (illustrated).

747. (4020/9) Lower part of a turned bowl in an unidentified hard-wood. Probably medieval, although recovered from Context 259 (illustrated).

(b) FLOOR TILES

from comments by Elisabeth Eames

Five plain floor tiles were recovered from Context 200; E.R. 4001. Clive Orton describes their fabric as "hard, with a sub-conchoidal fracture and a 'compact' appearance to the matrix. The fabric colour is yellowish red (5YR 7/10). There are moderate inclusions of very fine to fine, angular, colourless and greyish quartz with sparse mica. One tile has a worn, very dark green glaze on the upper surface and over the edges. The others have only spots of glaze (if any) on the upper surface, but traces on the edges suggest that the tiles were all originally glazed, but have been heavily worn" (for details of the descriptive terminology used here, see Orton, pp. 37-8). All the tiles are roughly square (111-117 mm across), and are between 23 and 28 mm thick.

A nail-hole at each corner of their up-sides and another at each centre-point indicates that they were probably made in the Netherlands. It is thought that tiles of this sort were brought to this country as ships' ballast, later to be sold. This explains why such easily-manufactured products were exported, and why they are so common in the principal ports such as London and Southampton.

They are of 14th, 15th or even 16th-century date, and are therefore residual in Context 200.

(5) APPENDICES

I. MAMMALIAN REMAINS

by Philip L. Armitage

Introduction

The mammalian remains from the Roman (late 1st-mid 2nd century) and Saxo-Norman (10th-11th century) contexts are described separately in systematic order under species. There are other groups of bone from the layers of Phases IV and V, but these are of mixed origin and include some residual Roman material. An examination of these groups has failed to distinguish between Roman and Saxon bone elements; they have therefore been omitted from this report.

A detailed list of all the specimens is available on request in the form of an indexed computer print-out from the British Museum (Natural History), or the Department of Urban Archaeology. Under the computer-based catalogue scheme of the BM(NH), the specimens have been assigned the following registration numbers: ARC 1977.R5005 to ARC 1977.R5195.

Measurements (in mm) were taken from the specimens using dial calipers (Mitutoyo No. 505-635, range 300 mm with dial graduations of 0.05 mm), the points of measurement following those described by von den Driesch (1976). For linear measurments over 300 mm and for measuring the horn cores of cattle and sheep, a flexible tape was employed. All measurements of long bones were maximum dimensions taken from bone elements with fused epiphyses. Copies of the complete series of tables prepared from the measurements taken from each of the species identified are available on request from the D.U.A.

ROMAN

Excavation of the Roman levels was carried out by pickaxe, spade and trowel, all bone uncovered during this operation being collected for subsequent analysis. Preservation of the skeletal material was good, and many of the bones are sufficiently intact to allow measurement. 3715 bones (83%) are identified to species and part of skeleton, and 742 (17%) classified as unidentified bone fragments. Of the total 3715 identified bone elements, only 32 (0.9%) are from wild species, compared with 3683 (99.1%) from domestic animals.

Number of mammal bones recovered from Roman layers:

I.	Identified bone:		
I.1	*All elements* except *vertebra and rib*		
	horse, pony & mule	24	
	ox	1272	
	sheep/goat	316	
	pig	636	
	dog	39	
	cat	1	
	Red deer	8	
	Roe deer	14	
	hare	9	
I.2	*Vertebra*		
	ox, sheep/goat & pig	457+	
	pony	2	
	Red deer	1	
I.3	*Rib*		
	ox, sheep/goat & pig	936+	
II.	Unidentified bone fragments	742+	

Weight (gm) of mammal bones from Roman layers:

I.	Identified bone:		
I.1	*All elements* except *vertebra and rib*		
	horse, pony & mule	3626	
	ox	75201	
	sheep/goat	5207	
	pig	17384	
	dog	799	
	cat	8	
	Red deer	558	
	Roe deer	276	
	hare	39	
I.2	*Vertebra*		
	ox, sheep/goat & pig	15981+	
	pony	180	
	Red deer	63	
I.3	*Rib*		
	ox, sheep/goat & pig	22789+	
II.	Unidentified bone fragments	9985	

Domestic horse and pony

Remains of horse were recovered from eight Roman contexts, as listed below. The bone from Context 412; E.R. 4078, also includes three elements of pony.

Context	*E.R. No.*	*Date*	*Description*
423	4080	not later than *c.* A.D. 100	1 fragment of mandibular ramus 1 fragment of scapula 1 fragment of innominate
430	4082	not later than *c.* A.D. 100	1 mandibular ramus, anterior fragment of male or castrate horse aged approx. 12+ years. 1 fragment of mandibular ramus
433	4083	not later than *c.* A.D. 100	1 lateral small metacarpal bone
349	4057	not later than *c.* A.D. 125	1 fragment of scapula
412	4078	not later than *c.* A.D. 125	1 complete jaw (right & left mandible) of male or castrate horse aged approx. 11+ years. 1 left metacarpus II, complete } one animal 1 left metacarpus III, complete } 1 right metatarsus II, complete } one animal 1 right metatarsus III, complete } 1 right metatarsus IV, complete } 1 atlas } size of all these bones compares well with New Forest pony 1 cervical vertebra } 1 hoof core }
412A	4079	not later than *c.* A.D. 125	2 fragments of premaxilla 1 fragment of maxilla 2 cheek teeth
208	4007	not later than *c.* A.D. 160	1 fragment of horizontal mandibular ramus of small horse 1 fragment of ascending mandibular ramus
408	4076	not later than *c.* A.D. 160	1 tooth

The height at the withers of the two horses from Context 412 is estimated (after the method of Kiesewalter, 1888) at 1.33 m (approx. 13 hands) for the complete metacarpal bone III, and 1.39 m (approx. 13½ hands) for the complete metatarsal bone III.

The ischial arch of the innominate bone from Context 423 is splintered as a result of having been gnawed by a dog.

Possible domestic mule

One right mandibular ramus from an equid was found in Context 208 (not later than *c.* A.D. 160). Comparison with mandibles of horse from other Romano-British sites in Britain (Fig. 91) shows the exceptionally large size of this particular specimen. The enamel pattern of the cheek teeth is also distinctive, especially the deep, penetrating "V" shaped internal sinus of the molar teeth (Fig. 86(a) arrowed). In Roman as well as modern horse, this sinus is generally seen to be "U" shaped (molar teeth only).

If, as seems likely, this mandible is of mule it is an interesting find as it represents the earliest record of this equid in Britain. A mandible with similar enamel pattern was found at Dangstetten, West Germany during excavations of the Roman military camp constructed by the XIX Legion, 15 to 9 B.C. This jawbone has been identified as a possible mule by Dr Hans-Peter Uerpmann (pers. comm).

The specimen from the Billingsgate Buildings site was the subject of special study, the results of which are published separately elsewhere (Armitage and Chapman, 1979).

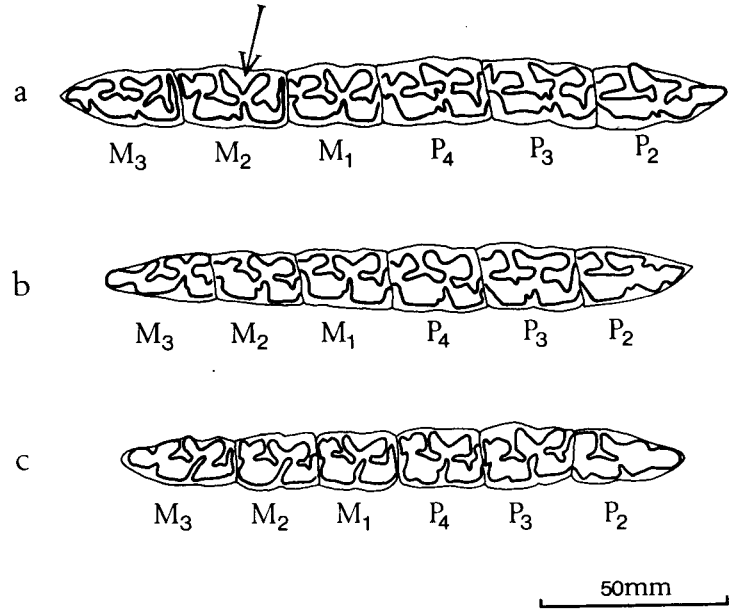


Fig. 86. Billingsgate Buildings, 1974: Equid: Mandibular ramus. Enamel patterns of cheek teeth (a) Large equid from Billingsgate Buildings Context 208 (not later than *c.* A.D. 160), (b) Horse from Billingsgate Buildings, Context 412 (not later than *c.* A.D. 125), (c) Horse from Newstead (1st-2nd centuries A.D.) B.M. (N.H.) Reg. No. H32.

Domestic ox

For all contexts, the skeletal remains of ox predominate over those of other species of livestock. A summary of the identified bones (but excluding rib & vertebra) from the combined Roman contexts is given in Fig. 90.

Fifty horn-cores were recovered, 43 of adult and sub-adult animals (with compact or slightly porous bone) and 7 of juveniles (very porous, spongy bone). Twenty five cores from the adult and sub-adult group are sufficiently complete to allow measurement of the length of the posterior-dorsal (outer) curve; these range from 73 mm to 213 mm. The cores can be classified (after the system of Armitage & Clutton-Brock, 1976) as follows:

Group	*Length of outer curve*	*No. specimens*
small horned	under 96 mm	1
short horned	96-150 mm	18
medium horned	150-200 mm	6 (includes one at 213)

The long horned group, with cores of length of outer curve well over 200 mm, is not represented.

The presence of marks made by a cleaver or chopper when the bony core with its sheath were removed from the skull show that the horn cores are the discarded waste from horn workers' shops. Unlike horn cores from the medieval refuse dumps, Baynard's Castle, London, which are believed to have been removed by a blow delivered from behind the head (see Armitage, 1977), those from the Roman levels on the Billingsgate Buildings site appear to have been chopped across from in front of the skull. A special investigation into the techniques associated with horn-working industries is currently in progress, and evidence from other sites in the City of London is being collated in order to determine possible differences in the methods employed by horn workers of the Roman, medieval and post-medieval periods.

From the length of each of the five complete metapodial bones, the height at the withers is estimated (after the method of Fock) as follows:

1.14m metacarpal bone

1.08 (two specimens) & 1.11m (two specimens) metatarsal bone

These values compare well with the size range 1.07 to 1.13 m established for the specimens of Chillingham cattle held by the BM(NH).

Fig. 90 shows that, compared to the large number of metapodial bones (141), there are relatively few humeri (10), radii (8), femora (11) and tibiae (11). This apparent lack of identified elements from the upper section of the fore and hind limbs of ox is explained by the splitting and smashing of these bones in order to obtain the marrow; the debris from this practice being represented by 366 pieces of long bone with either straight edged breaks or evidence of spiral fracturing.

Four articulated thoracic vertebrae from Context 394; E.R. 4068 have the transverse process chopped through and the rib removed (Pl. 4). This form of butchery is also known from the medieval level (High Street B, feature 110), Southampton, where the discovery of the complete thoracic portion of the vertebral column of an ox has been recorded (Platt & Coleman-Smith, 1975, Vol. 1, Plate 33).

Evidence of the use of bone in the manufacture of artefacts is provided by three scapulae which are sawn through. One piece comprises a blade which has had the neck and spine removed. Writing, in cursive script, is seen on the lateral side (No. 490, see pp. 93-5 and Fig. 54). The neat appearance and polished surface of this specimen indicate that it is a finished artefact, but the exact function is unclear. A second specimen (from Context 349; E.R. 4057), identified also as part of the blade of an ox scapula, is similar in shape to bone No. 490 but is broken and therefore is probably an unfinished (reject) artefact. The last specimen (from Context 382; E.R. 4065), a sawn section of the neck of a scapula, represents the discarded off-cut (waste) probably from the same type of bone-working industry as produced the previous items.

Two bones show evidence of severe deformity, a hoof-core (from Context 208; E.R. 4007) and a calcaneum (from Context 412A; E.R. 4079), both these elements exhibiting gross exostosis around the articular surface.

Domestic sheep and goat

Apart from three horn-cores (from Context 288; E.R. 4035, and Context 412; E.R. 4078) and the one metatarsal bone described below identified as certainly goat, most of the caprine material is ascribed to sheep. It is, however, difficult to distinguish between the jaws of sheep and goat, particularly if they are broken and incomplete; all the mandibles are therefore classified as sheep/goat.

The method of Klein & Reichstein (1977) was applied in order to separate the metapodial bones of sheep and goat. With this method, separation is based on difference in size; the metapodial bone of goat being shorter and stouter compared to that of sheep. From the diagrams prepared, all the metacarpi are identified as sheep, but out of the ten complete metatarsal bones from the Roman layers one is most certainly goat (Fig. 87).

Soay sheep found feral on the island of St. Kilda, Outer Hebrides, are the most primitive breed of domestic sheep existing in Europe today, and their skeletons are often used as the basis for comparison with the remains of sheep recovered from archaeological sites (Jewell, 1975; Jewell & Alderson, 1977). Measurements taken from Soay sheep (from St. Kilda, collection of Professor Jewell) are included in Fig. 87, where it is clearly demonstrated that the Roman sheep from the Billingsgate Buildings site are of greater stature and build. Comparison was also made between the skulls of Soay sheep and those from the Billingsgate Buildings site. The large sized horn-cores of the intact cranium from Context 427 (E.R. 4081) closely resemble those of an adult Soay ram, while the almost goat-like core on the skull fragment from Context 423 (E.R. 4080) matches that of a Soay ewe. As well as horned sheep, a polled (hornless) animal is represented by a piece of cranium from Context 412A (E.R. 4079).

The kill-off pattern (i.e. the relative number of animals killed at each age) for the sheep/goat mandibles is presented below, and is based on the method of Payne (1973). Although there is no clearly discernible peak of slaughtering, the data does show that 80% of the animals had not reached full maturity (i.e. were under three years of age) at the time of death. Sheep in the Roman period were valued not only as producers of wool and meat but also for their milk, used in cheese making, and as sacrificial animals. As the kill-off pattern is based on a small sample, it is not possible to determine which of these is represented, and it may be that the sheep from the Billingsgate Buildings site were used for all these purposes.

Sheep/goat mandibles. Kill-off pattern.

Tooth wear stage	*Age*	*No. specimens*	%/Total
A	0- 2 months	0	0%
B	2- 6 months	11	20%
C	6-12 months	9	17%
D	1- 2 years	9	17%
E	2- 3 years	14	26%
F	3- 4 years	4	7%
G	4- 6 years	7	13%
H	6- 8 years	0	0%
I	8-10 years	0	0%

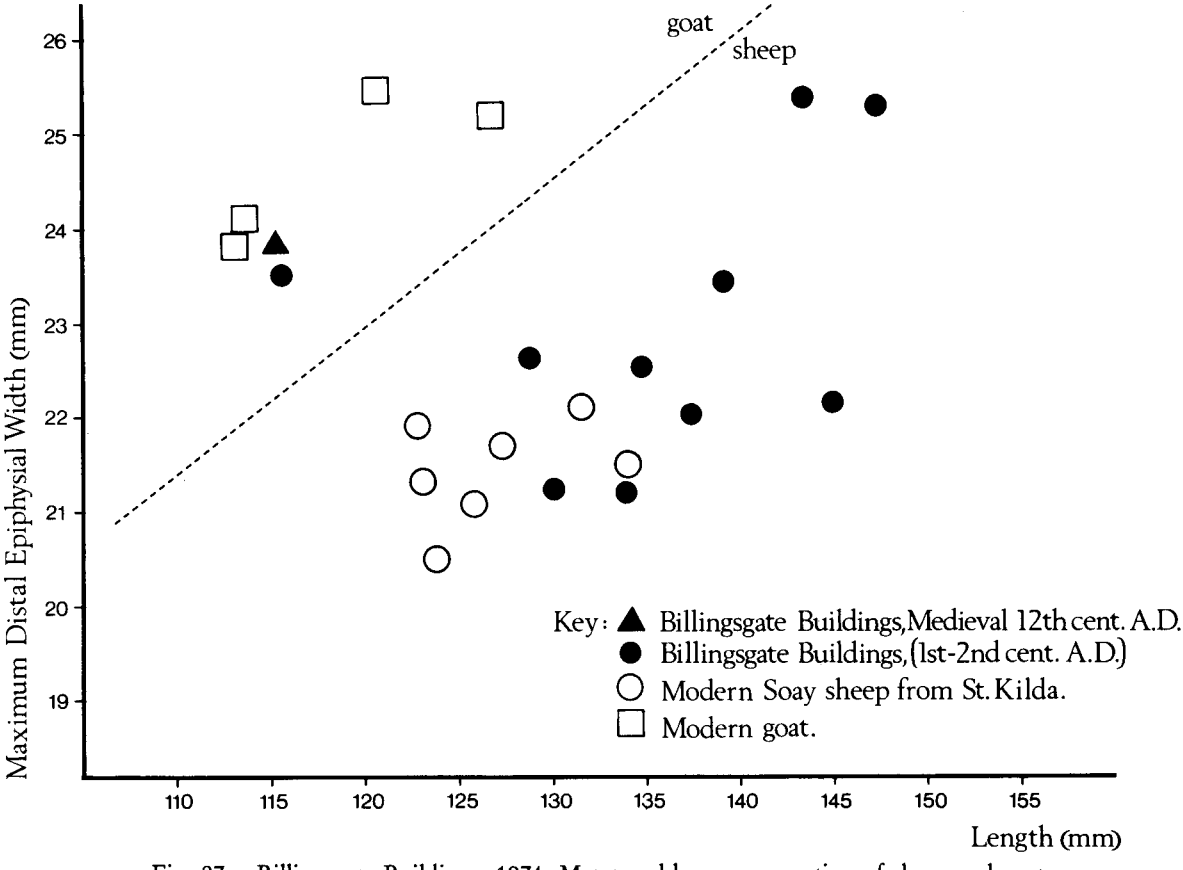


Fig. 87. Billingsgate Buildings, 1974: Metatarsal bone – separation of sheep and goat.

Domestic and wild pig

A total of 636 bones of pigs are identified, just over twice the number recorded for sheep and goat (see Fig. 90). It is interesting to note that this dominance of the remains of pig over those of sheep and goat is reversed in the material from the Saxo-Norman contexts described below.

Both domestic and wild pig are represented, as shown by the presence of a very large metacarpal bone III from Context 208; E.R. 4007 (not later than *c.* A.D. 160) identified as *Sus scrofa*. All other skeletal elements examined are ascribed to domestic pig.

The relative numbers of animals killed at each age (i.e. the kill-off pattern) was established using information on eruption of the teeth in the mandibles, the age at which each tooth erupts being based on data for pigs of the late 18th century A.D. (Silver, 1971, Table G, pp. 298-299):

Pig mandibles. Kill-off pattern.

Age at slaughter (years)	*No. mandibles*	*Cumulative frequency*
less than 1	7	0%
1-2	5	13%
2-3	28	21%
3 and over	16	71%

Over two thirds of the mandibles come from animals aged under three years. Very few of the pigs (only 29%) had, therefore, reached maturity at time of death, and 13% of the sample had been killed-off at a very early age as sucking or very young pigs (under one year old). From the kill-off pattern, the favoured time for slaughter appears to have been when the pig was between two to three years of age.

A mandibular ramus (from Context 208; E.R. 4007) has a large crater-like lesion on the lateral surface, and the structure of the bone surrounding the hole is disorganised. The animal was afflicted by a suppurating abscess on the jaw bone, with associated localised inflammation (osteomyelitis), at time of death.

Domestic dog

The following elements of dog are identified:

Context	*E.R. No.*	*Date*	*Description*
439A	4084	*c.* A.D. 60-70	2 innominate bone
423	4080	not later than *c.* A.D. 100	1 mandibular ramus
			1 humerus
			1 radius
			1 ulna
			1 femur
			1 extremity bone
430	4082	not later than *c.* A.D. 100	1 complete jaw (right and left mandible), adult dog
			1 mandibular ramus of young dog
			1 scapula
			2 humerus
			1 radius
			2 ulna
			1 innominate bone
			1 tibia
			2 extremity bone
433	4083	not later than *c.* A.D. 100	1 tibia of young dog
412	4078	not later than *c.* A.D. 125	1 mandibular ramus of small lap dog
			1 scapula
			1 radius
			1 innominate bone
			2 femur
			2 tibia
			2 extremity bone
412A	4079	not later than *c.* A.D. 125	1 humerus
208	4007	not later than *c.* A.D. 140	2 mandibular ramus
			1 scapula
			1 femur
			1 metapodial bone
408	4076	not later than *c.* A.D. 140	1 fragment of maxilla from newborn puppy

A complete tibia from Context 430 comes from a dog with a height at the shoulders of 420mm (value calculated after the method of Harcourt, 1974), the size of a modern terrier. The complete humerus from this same context is of another, larger dog with a calculated shoulder height of 610mm, while the complete tibia from Context 412 is from a dog with a shoulder height of 560mm.

Many of the bones from the species of domestic livestock (ox, sheep/goat and pig) have splintered ends and the surface pitted with perforation marks made by the teeth of dogs whilst gnawing and crunching the bone. These bones were either fed to the dogs or scavenged by them from refuse dumps.

Domestic cat

The domestic cat is represented by a left mandibular ramus from Context 412; E.R. 4078 (not later than *c.* A.D. 125). Compared with the small sized mandibles from the late medieval and early Tudor deposits, Baynard's Castle (Armitage, 1977), the jaw bone from the Billingsgate Buildings site is robust, and is from an animal of similar size to the average, modern domestic cat (Fig. 88). Cats were commonly kept in households in the Roman period, and this animal forms the subject of a number of mosaics and sculptures. From these iconographic sources and from contemporary literature it would appear that the cat was valued chiefly as a destroyer of vermin, although in the larger and wealthier households some of them may have been retained primarily as pets (Toynbee 1973, 87-90).

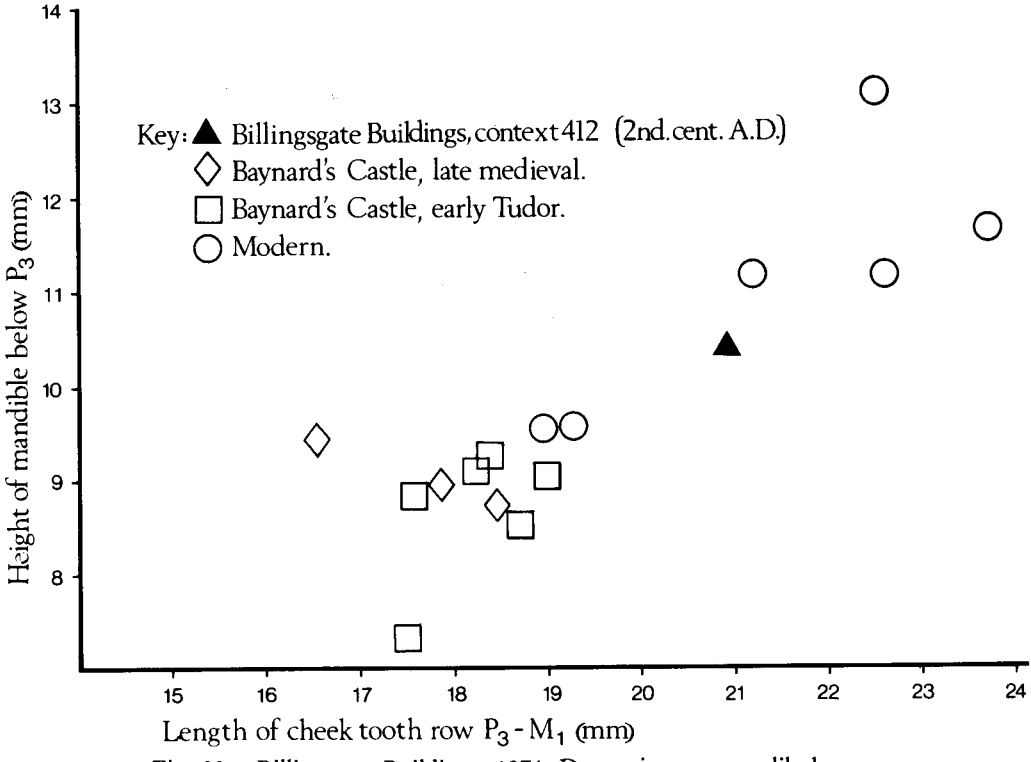


Fig. 88. Billingsgate Buildings, 1974: Domestic cat – mandibular ramus.

Red deer

The remains of Red deer are identified as follows:

Context	*E.R. No.*	*Date*	*Description*
423	4080	not later than *c.* A.D. 100	1 humerus. distal end and part of shaft
430	4082	not later than *c.* A.D. 100	1 fragment of antler tine 1 skull fragment

412	4078	not later than c. A.D. 125	1 left mandibular ramus, M_3 erupted and last cusp in wear. Aged approx. 6-7 years (after method decribed in de Nahlik, 1974, 57)
			1 metacarpus, proximal end and part of shaft
			1 axis
208	4007	not later than c. A.D. 140	1 phalanx 1, complete
			1 phalanx 2, complete
382	4065	not later than c. A.D. 160	1 fragment of antler tine

The axis from Context 412 is chopped through at an oblique angle across the posterior end, showing the position of the chop made when the head was severed from the rest of the body.

Roe deer

The Roe deer is represented by the following 14 elements:

Context	*E.R. No.*	*Date*	*Description*
439A	4084	c. A.D. 60-70	1 antler, broken stump
			1 skull, fragment of occipital region
423	4080	not later than c. A.D. 100	1 metacarpal bone, proximal end and part of shaft
412	4078	not later than c. A.D. 125	1 antler, fragment
			1 radius, broken
			1 innominate bone, female
			1 metacarpal bone, complete
412A	4079	not later than c. A.D. 125	1 femur, distal end and part of shaft
208	4007	not later than c. A.D. 140	2 mandibular ramus, two animals
			1 tibia, fragment
			1 metatarsal bone, shaft only
394	4068	not later than c. A.D. 140	1 mandibular ramus
408	4076	not later than c. A.D. 140	1 metatarsal bone, fragment of shaft only

Information on tooth eruption and degree of wear was used to establish the approximate age of the three mandibles (after the method of Aitken, 1975). The specimens are from animals aged less than one year (Context 394), two to three years and three to four years (Context 208). This last mandible shows evidence of periodontal disease; also, the third cusp of M_3 has not developed.

Both of the antlers (from Contexts 412 and 439A) are still attached to a portion of frontal bone, showing that the Roe bucks had been hunted between April and late October; the time between hardening of the newly grown antler and its shedding (see Prior, 1968, 107).

The antler from Context 439A is broken off just above the coronet, with the blunt end rounded-off. Lines etched into the end surface may have arisen from use of the bone as a tool, but if this is an implement its purpose is not clear.

Hare

Nine bones of hare are identified:

Context	*E.R. No.*	*Date*	*Description*
423	4080	not later than c. A.D. 100	1 tibia
412	4078	not later than c. A.D. 125	1 scapula
			1 humerus
			1 innominate bone
			1 femur
208	4007	not later than c. A.D. 140	1 ulna
394	4068	not later than c. A.D. 140	1 tibia
288	4038	not later than c. A.D. 200	1 scapula
			1 tibia

These bones could represent the remains of hunted animals whose meat was used to supplement the diet or, alternatively, they may be from animals raised in *leporia* or hare gardens (see Wilson, 1976, 67).

SAXO-NORMAN AND LATER MEDIEVAL

Number of mammal bones recovered from Saxo-Norman and later medieval layers:

I. Identified bone:	
I.1 *All elements* except *vertebra and rib*	
horse	0
ox	84
sheep/goat	102
pig	28
dog	0
cat	1
Red deer	0
Roe deer	0
hare	1
House mouse	1
I.2 *Vertebra*	
ox, sheep/goat & pig	65
I.3 *Rib*	
ox, sheep/goat & pig	138
II. Unidentified bone fragments	106

Weight (gm) of mammal bones from Saxo-Norman and later medieval layers:

I. Identified bone:	
I.1 *All elements* except *vertebra and rib*	
horse	0
ox	4436
sheep/goat	1642
pig	535
dog	0
cat	<1
Red deer	0
Roe deer	0
hare	1
House mouse	<0.5
I.2 *Vertebra*	
ox, sheep/goat & pig	757
I.3 *Rib*	
ox, sheep/goat & pig	800
II. Unidentified bone fragments	514

FILL OF SAXO-NORMAN WELL

The infill of the Saxo-Norman well (Context Nos. 291, 306, 320 and 321, see pp. 14-16) which represents refuse thrown into the well after it had fallen into disuse, was sieved using a 1 mm mesh sieve.

A total of 343 bones was recovered, 275 (80%) are identified to species and part of skeleton, and 68 (20%) classified as unidentified bone fragments. Of the total 275 identified elements, only 2 (1%) are from wild species, compared with 273 (99%) from domestic animals. Unlike the bones from the waterlogged Roman dumps of rubbish, which are stained dark brown, those from the Saxo-Norman well are of a pale yellowish brown colour, probably due to the enclosing matrix of sand and clay.

The species identified are as follows:

Domestic ox

A summary of the identified bones (but excluding rib & vertebra) is given in Fig. 90. Three articulated elements, comprising a left tibia, calcaneum and talus, from the hindquarters of an ox aged less than 2½ years were found in Context 320; E.R. 4049. Together, these bones represent the discarded remnants of a joint of meat which corresponds to the 'leg of beef' seen in butchers' shops today (see Rixson, 1976, 20).

Domestic sheep and goat

All specimens are ascribed to sheep and, as far as I am able to ascertain, there are no bones of goat present. Details of the identified bones are given in Fig. 90. The two mandibles from Context 291 (E.R. 4037) were aged using the method of Payne (1973), both specimens come from sheep aged two to three years. Evidence for the slaughter of lambs is provided by one femur from Context 320. Measurements taken from the complete, adult specimens show that sheep of the Saxo-Norman period are no different in stature and build from those of the Romano-British period.

Domestic pig

There are relatively few elements of pig compared with the larger quantity of sheep bone (see Fig. 90); this is the opposite situation to that recorded for the Roman contexts. Too much must not, however, be made of this observation as we are dealing here with only a small amount of skeletal material recovered from one Saxo-Norman dump of refuse, but it will be interesting to see if this picture is confirmed when further mammalian remains from other Saxon and Roman sites in the City of London are examined.

Domestic cat

The cat is represented by a detached proximal epiphysis from a humerus from Context 320 (E.R. 4049).

Hare

The hare is represented by a fragment of scapula from Context 320 (E.R. 4049).

House mouse

An innominate bone of House mouse, *Mus musculus*, was recovered by sieving from Context 320 (E.R. 4049). Using the criteria described by Lawrence & Brown (1973, 196-198) and by comparison with the pelves of known sex at the BM (NH), the bone is identified as that of a female.

MEDIEVAL PIT

The skeletal remains of domestic ox, sheep, goat and pig were recovered from a small pit (Contexts 224A and 224B; E.R. 4009), dated on pottery evidence to the 12th century A.D. A summary of the identified bone is given in Fig. 90.

Selected specimens of special interest are described as follows:

Species	*Bone*	*Description*
ox	horn core	Complete, right horn core of sub-adult. Length of outer curve 166mm (measurement assigns the core to the medium horned group)
goat	metatarsal bone	Specimen identified as goat from the relatively short length and broad shaft (Fig. 87), also by the presence of synovial pits on the proximal articular surface (see Boessneck, 1971, 354)
sheep/goat	mandible	Three specimens aged: 2-3 years (1 specimen) 3-4 years (2 specimens)
pig	mandible	Left mandibular ramus from individual aged approx. 2-3 years

DISCUSSION

The collection of skeletal remains from the Roman levels as a whole, represents the discarded debris from slaughteryard, household and workshop. During the building of revetments, quays and dock basins along the northern bank of the River Thames, this refuse was usefully employed as 'backfill' in the open areas behind the newly constructed waterfront structures. Fortunately for the modern archaeozoologist, conditions for the preservation of organic material in these same areas were good, due to the waterlogging of the dumps which, by creating an anaerobic environment, largely prevented the natural processes of decomposition.

Apart from the horn-cores of ox and sheep (from Contexts 224 A and B amalgamated; E.R. 4009), which may be from a horn-worker's shop, the group of bones from the medieval contexts (i.e. the Saxo-Norman well and medieval pit) represents the discarded refuse from domestic kitchens. Like the bone elements found in the Roman contexts, those recovered from the medieval deposits are in a good state of preservation.

An assessment of the relative importance of each species to the diet in the Roman and medieval periods has been made (Fig. 89 (a)) and is based on the numbers of identified bones (but *excluding* rib and vertebra) of the domestic and wild animals. Kubasiewicz (1956) has demonstrated that the weight of bone provides a more accurate indication of the contribution a species makes to the diet, where weight of bone is directly proportional to meat yield. The method has been applied to the bone from the Billingsgate Buildings site and the results are shown in Fig. 89 (b). The value of this method is best illustrated by reference to the data on Red and Roe deer from the Roman contexts. If interpretation is based on the number of identified bones, Roe deer is apparently more important in the diet than Red deer (Fig. 89 (a)), but the weight of the meat provided by the few Red deer hunted is greater than that from Roe (Fig. 89 (b)). From Fig. 89 it is seen that the bulk of the meat in the diet of the Roman period appears to have come from cattle and pig, whilst in the medieval period the meat yield is mostly from cattle and sheep. In both periods, the contribution from wild species is very small; meat from game animals was apparently not an important feature in the diet, but only supplemented it. These observations refer only to the evidence provided by this one site, and before any firm conclusions can be reached regarding diet in the Roman and medieval periods it will be necessary to carry out further work on bone assemblages from other sites in the City of London.

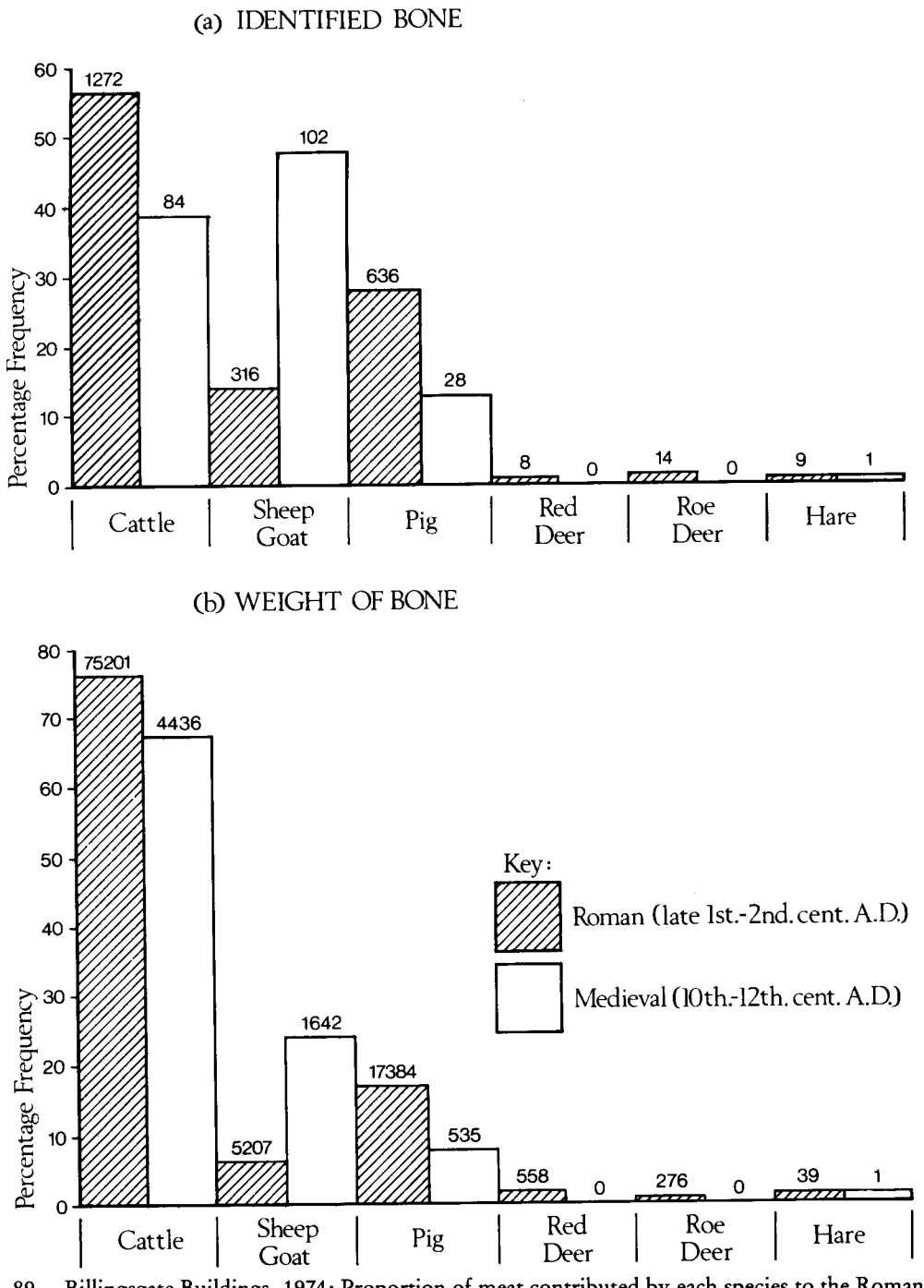


Fig. 89. Billingsgate Buildings, 1974: Proportion of meat contributed by each species to the Roman and medieval diet. Values based on (a) Number of identified elements, excluding rib and vertebra (b) Weight of bone, excluding rib and vertebra.

	HEAD						BODY			FORE & HIND LIMBS											EXTREMITY					TOTAL NO. BONES
	horn-core	skull	hyoid	maxilla	mandible	tooth	vertebra	rib	sternum	scapula	humerus	radius	ulna	innominate	femur	patella	tibia	fibula	cleaved & smashed long bone	calcaneum	talus	metapodial bone	phalanx 1	phalanx 2	hoof-core	carpal/tarsal	
ROMAN (late 1st-mid 2nd century A.D.)																										
cattle	50	118	12	50	137	42	++	++	1	138	10	8	14	103	11	1	11	–	366	12	2	141	27	8	10	–	1272
sheep & goat	5	11	–	3	61	3	++	++	–	21	22	35	9	13	5	–	43	–	–	–	–	85	–	–	–	–	316
pig	–	28	–	19	110	43	++	++	–	60	33	43	27	48	51	–	50	21	15	11	–	73	3	1	–	–	636
SAXO-NORMAN (10th -11th century A.D.)																										
cattle	–	–	–	–	–	4	++	++	–	4	1	5	2	5	8	–	3	–	9	3	1	4	2	1	1	2	55
sheep & goat	–	3	–	–	2	1	++	++	–	10	12	6	3	3	7	–	9	–	–	1	1	5	–	–	–	1	64
pig	–	–	–	1	1	–	++	++	–	1	2	2	–	–	1	–	1	–	–	1	–	3	1	–	–	–	14
MEDIEVAL (12th century A.D.)																										
cattle	1	1	–	–	5	–	++	++	–	1	3	2	2	3	–	–	3	–	2	–	2	2	–	–	1	1	29
sheep & goat	1	1	–	–	4	–	++	++	–	5	1	3	4	1	2	–	8	–	–	1	–	7	–	–	–	–	38
pig	–	–	–	–	1	1	++	++	–	–	2	2	–	1	–	–	2	1	–	–	–	4	–	–	–	–	14

++ bones present

Fig. 90. Billingsgate Buildings, 1974: Numbers of identified cattle, sheep, goat and pig remains from Roman and medieval layers.

Measurement [a] (mm)	Possible Mule	Romano-British Horse				
	BIL.B. Context 208	BIL.B. Context 412	BIL.B. Context 208	AC	GD	NF
(1)	–	355.0	–	385.5	–	395.0
(3)	141.1	98.5	–	119.3	153.5	124.5
(6)	184.6	170.5	161.7	169.4	161.0	163.0
(6a)	174.8	159.6	156.4	165.9	–	152.4
(7)	90.9	83.0	83.0	83.7	82.0	82.0
(8)	94.6	89.2	81.0	86.3	80.3	82.6
(19)	269.7	186.2	–	218.5	254.7	225.1
(20)	247.9	179.0	–	201.5	231.3	210.8
(22a)	115.8	84.2	82.8	94.8	99.7	93.2
(22b)	79.7	61.8	56.6	70.7	71.7	74.6

Key: *a.* Measurement: Points of measurement follow those of von den Driesch (1976, 52, Fig. 19a):

(1) Length of mandible
(3) Length: Gonion caudale – aboral border of M_3 alveolus
(6) Length of cheek tooth row
(6a) Length of cheek tooth row, measured near biting surface
(7) Length of molar row
(8) Length of premolar row
(19) Aboral height of vertical ramus
(20) Middle height of vertical ramus
(22a) Height of mandible behind M_3
(22b) Height of mandible in front of M_1

Sites:

BIL.B. Billingsgate Buildings, 1974. London
AC Angel Court, 1974, London BM(NH) 76.5015
GD Godmanchester, Huntingdonshire. BM(NH) 74.5107
NF Newstead Fort, Melrose. BM(NH) H.32

Fig. 91 Billingsgate Buildings, 1974: Equid. Mandibular ramus

II. FISH REMAINS

by Alwyne Wheeler

A considerable number of fish bones and other remains have been available for examination. As is usual with remains of fishes, most of it consists of fin spines, ribs, and pterygiophores (slender bones which support the fin bases internally), all of which lack features sufficient for identification. The identifiable bones represent a list of species of some interest which is presented in tabular form (see Fig. 92).

In addition to the identified material a fragmentary ctenoid scale comes from Roman Context 208 (E.R. 4007), but its species is not identifiable. It could have come from one of a number of fishes such as bass, perch or sea-bream. Other unidentifiable fish remains come from Roman Contexts 430, 349, 208 and 394 (E.R. Nos. 4082, 4057, 4007 and 4068 respectively).

The species represented in the Roman refuse are all basically sea fish, although both the bass, *Dicentrarchus labrax*, and the sprat, *Sprattus sprattus*, are common in estuarine, low-salinity areas. These two species, and the cod, *Gadus morhua*, could possibly have been captured in the mouth of the Thames, but the black sea-bream, *Spondyliosoma cantharus*, is only a rare visitor to this region. This last species is common today in the eastern English Channel and it is tempting to suggest that its occurrence might represent evidence for the transporting of food fish from south coast fishing ports to Roman London. The cod and bass could also have originated from the eastern English Channel.

All three species could be captured by means of hook and line fishing methods, although the bass, and possibly the cod in winter, would be susceptible to long-shore kiddle fisheries (which are known to have existed in medieval times along the Thames estuary). The sprat, however, could not be captured on hook and line, and is almost certainly evidence of a fishery using fine-meshed nets, possibly a seine net worked from the shore, or a stow-net hung overboard from an anchored boat. Because of the perishable nature of the sprat it is most likely to have been caught in the lower tidal Thames, although preservation by salting or smoking is also a possibility.

The species represented in the Saxo-Norman well are of some interest in that both freshwater and marine fish of several species have been identified. The roach, *Rutilus rutilus*, a member of the carp family, Cyprinidae, is represented by two pairs of pharyngeal bones with teeth attached which are easily identifiable. The numerous cyprinid vertebral centra in the same layer (Context 320; E.R. 4049) are not certainly identifiable but by association with the pharyngeal bones are tentatively assigned to this species. The roach is common in the freshwater reaches of the tidal Thames and other rivers in the London area, and it is probable that these fish were caught by local net-fisheries.

With the possible exception of the bass none of the other fishes are likely to have been caught close to London. The bass, thornback ray, *Raja clavata*, plaice, *Pleuronectes platessa*, whiting, *Merlangius merlangus*, and in winter the cod, could all be caught in shore-line kiddles towards the mouth of the river, and all, with the possible exception of the plaice, would also take a baited hook. The mackerel, *Scomber scombrus*, however, is a surface-living schooling fish which is by no means common in the mouth of the Thames today or in the North Sea, although a small fishery for it on the Dutch coast is of considerable antiquity. Likewise the haddock, *Melanogrammus aeglefinus*, is now uncommon in the southern North Sea, although there is literary evidence that it was formerly caught in some numbers there in the open sea. The occurrence of both species in these medieval contexts suggests that considerable "distant water" fishing in the North Sea was undertaken to supply London. Such fishing, employing hooks and lines, would result in the capture of thornback ray, whiting, and cod, in addition to haddock and mackerel. It is interesting confirmation of the extent of this fishery to find that the fish remains from recent excavations at Westminster Abbey in the period A.D. 1100-1240 also include thornback ray, whiting, cod, haddock, mackerel and plaice, as well as bass (A. G. K. Jones – pers. comm.). It is to be hoped that further fish remains from medieval sites in London will produce more evidence of the extent of the fishery and will permit estimation of the sizes of the fish caught, because so far the available material has been too fragmentary for detailed analysis.

	Context No.	E.R. No.	Species	Bone(s) represented	Minimum No. of fish	Estimated size in M
Roman						
	288	4035	Bass	Caudal vertebral centrum	1	1.0
	349	4057	Sprat	Otic bullae (auditory capsules)	2	–
	412	4078	Black sea-bream	Caudal centrum	1	0.4
			Cod family	Ceratohyal (fragment)	1	–
	423	4080	Cod	Preoperculum Rt (fragment)	1	1.0
Fill of Saxo-Norman Well						
	306	4041	Haddock	Cleithrum	1	0.7
			Plaice	Preoperculum Rt (fragment) Abdominal vertebral centrum Caudal centrum	1	0.45
			Bass	Cleithrum Rt (fragment)	1	0.45
	320	4049	Roach	Pharyngeal bones (2 pairs)	2	0.3
			Roach (?)	Vertebral centra (53)		
			Whiting	Dentary Rt	1	0.35
			Cod	Cleithrum Rt	1	1.0
				Abdominal vertebral centra (3) Caudal vertebral centra (3)	2	–
			Cod family	Centrum (fragment)		
			Mackerel	Caudal vertebral centra (9)	1	0.4
			Plaice	First interhaemal spine	1	–
				Parasphenoid & basioccipital	1	
				Caudal vertebral centra (13)	3	
				Abdominal vertebral centra (7)	2	
	321	4050	Thornback ray	Dermal spine (buckler)	1	–
			Carp family	Caudal vertebral centra (2)	1	–
			Mackerel	Caudal vertebral centrum	1	–
			Plaice	First interhaemal spine	1	0.3
				Caudal vertebral centra (3)	1	–
Medieval (12th-13th century)						
	224 A+B amalgamated	4009	Cod	Cleithrum Lt (fragment)	1	1.0
			Flat fish family	First interhaemal spine (fragment)	1	–

Fig. 92. Billingsgate Buildings, 1974: Details of identifiable fish bones.

III. BIRD BONES

by G. Cowles

The bones of nine bird species have been recovered from the Billingsgate Buildings site and the minimum number of individuals of each species from each context (along with other details) is given in Fig. 93.

		Roman															?	Saxo-Norman			
Context No.	439 A, B + C amalgamated	423	427	433	430	349	412	412A	208	394	402	408	382	323	288	231	321	291	306	320
E.R. No.	4084	4080	4081	4083	4082	4057	4078	4079	4007	4068	4072	4076	4065	4052	4035	4011	4050	4037	4041	4049
Domestic goose *Anser anser* (domestic)		1			1	1		1	1						1		1	1		
Greylag goose size *Anser anser* (wild)									1											
Mute swan *Cygnus olor*							1													
Mallard *Anas platyrhynchos*			+			1	1	1	1	1	1									
White-tailed eagle *Haliaeetus albicilla*																1				
Domestic fowl *Gallus gallus* (domestic)	2	4*	1	1	3	2	7	2	6	1	1	2	2	1	2	2		1	1	1
Golden plover *Pluvialis apricaria*									1											
? Woodcock *Scolopax rusticola*						1														
Rock dove *Columba livia*										1										

* Some bones deformed pathologically

\+ One bone from a duck smaller than a Mallard, larger than Teal

Fig. 93. Billingsgate Buildings, 1974: Details of bird bones.

IV. HUMAN BONE

by Merrill Morgan

Eight fragments of human bone which represent at least three individuals, were recovered. They come from six separate deposits, all of redeposited earth dated *c.*A.D. 80-130, with the exception of Context 231, which is either a late Roman or a Saxon layer containing a high proportion of Roman material. The origin and date of the bones is discussed elsewhere (Rhodes, p. 35).

Context 423: E.R. 4080 c.A.D. 80-100

Shaft of a right humerus, 217mm long, with slight periostial grooving along the medial side. Its slender character and the periostitis indicate an adult male.

Context 430: E.R. 4082 c.A.D. 98-117

Shaft of right ulna, 210mm long, well-developed. Probably from an adult male.

Context 349: E.R. 4057 c.A.D. 98-117

Shaft of left ulna, 179mm long, with well-developed interosseous crest. Probably male. Adult.

Shaft of right ulna, 170mm long. Much slighter than the other ulna from this layer. Possibly female. Adult.

Left humerus shaft, 252mm long. Possibly female. Adult.

Context 412: E.R. 4078 c.A.D. 115-130

Left clavicle 141mm long with lateral end broken. The medial end is fused and the muscle attachment areas quite well developed. This indicates an adult male.

Context 208: E.R. 4007 c.A.D. 98-117

Fragment of left tibia shaft, 137mm long, with slight periostitis on the medial surface. Sex indeterminable. Adult.

Context 231: E.R. 4011 later Roman or Saxon

Fragment of left humerus 175mm long. A fairly well-developed bone, probably from an adult male.

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