FROM TEMPLES TO THAMES STREET – 2000 YEARS OF RIVERSIDE DEVELOPMENT

ARCHAEOLOGICAL EXCAVATIONS
AT THE SALVATION ARMY
INTERNATIONAL HEADQUARTERS

From Temples to Thames Street 2000 Years of Riverside Development

Archaeological Excavations at the Salvation Army International Headquarters, 99 –101 Queen Victoria Street, City of London

By Timothy Bradley and Jonathan Butler

Pre-Construct Archaeology Limited, Monograph No. 7

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Front cover: reconstruction of the final phase of the 'Period I' complex as it may have appeared from the river, by Jake Lunt

Back cover: One of the culverts in the 'Period II' complex; detail of the new Salvation Army International Headquarters building; 16th–17th-century building, at the junction of Thames Street and Lambeth Hill, destroyed in the Great Fire of London

Contents

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Figures

Tables

Summary

The archaeological excavations at the site of the Salvation Army International Headquarters gave an opportunity to revisit the scene of a previous investigation by Peter Marsden. His work at this site for the Guildhall Museum in 1961–62 was very much limited by the circumstances of the day and consisted of a number of watching brief observations made over an extended period of time. Despite his intermittent presence on site and the restricted nature of the recording he was able to produce a coherent story for the site which was represented by two periods of massive Roman monumental masonry (hereafter referred to as 'Period I' and 'Period II'), the earlier of which was effectively sealed by a substantial chalk raft foundation for the latter. However, dating the structures was problematical (Marsden 1967a).

In the 1980s two excavations by the Museum of London's Department of Urban Archaeology (DUA) to the west and south of the site at Peter's Hill and Sunlight Wharf respectively greatly furthered the understanding of this area of the City and in particular the nature of the 'Period II' building complex which was seen to extend beyond the Salvation Army site to both west and south. Tim Williams produced an excellent synthesis of the available evidence from these two sites, incorporating Marsden's work and previous observations dating to the early days of Queen Victoria's reign (Williams 1993). Dendrochronological analysis of timber piles which supported the chalk platform provided a date of AD 294 for the 'Period II' structures which were interpreted as parts of a palatial administrative complex housing the 'primary functions of the late Roman state: armoury, treasury, mint, supply base, administrative offices, residential quarters, temples and public amenities' (Williams 1993, 32). It was suggested that the 'Period I' structures formed part of a massive programme of public works in the southwest area of Londinium along the waterfront, which included the Huggin Hill bathhouse to the east and probably a temple and at least one monumental arch or entrance. The complex was suggested to have been constructed in the late 1st or early 2nd century and to have undergone a number of refurbishments or rebuilds in the 3rd century prior to the construction of the river wall in *c.* AD 270 (Williams 1993, xi), however there was still little evidence to precisely date the 'Period I' structure found by Marsden (Williams 1993, 8).

The archaeological investigations in 2001–03, although limited in scope where carried out within the footprint of the former 1960s' building, revealed that Roman masonry remains survived the 1960s' construction along the southern part of the building with even more substantial Roman, medieval and post-medieval remains present to the south, beneath Booth Lane.

Tentative evidence of 1st-century waterfront activity, associated with the timber threshold of a possible warehouse, were observed, suggesting that the port of Roman London may have extended further to the west and at an earlier date than previously supposed.

Masonry from the 'Period I' structure previously observed by Marsden was revealed with more detailed recording allowing better understanding of construction techniques, including the use of timber shuttering at foundation level. The fact that the building had been the subject of catastrophic collapse was reinforced by the extreme angle of lean to the south of the foundations and evidence of bracing provided by timber chocks suggest it may have been subject to subsidence and building weakness for some period of time. The major discovery of a western apse fronting the Thames to accompany the previously known eastern apse allows with more certainty the layout of the building and its possible function to be proposed. Crucially the dating of a timber pile from beneath the masonry foundation of the eastern apse to *c.* AD 165 is the first definite dating of the complex suggesting a later date than previously suggested for at least this part of the complex. Dating of timbers recovered from foundations at the east and an enigmatic structure to the west suggested modifications and rebuilding in the AD 230s. The western apse and the masonry to the west were part of a major rebuilding programme sometime between the AD 230s and AD 294 most likely in the AD 250s based on the interpretation of two inscribed altars found reused within the riverside wall to the west (Hassall 1980, 195–198).

The 'Period II' masonry revealed beneath Booth Lane advances the knowledge and understanding of the eastern of the two temples that were proposed by Williams to occupy the area (1993, 13–32) and shows the enormity of its masonry construction. A date for the commencement of the foundation piling was confirmed by tree-ring dating to be AD 294. The findings from the site together with those from Sunlight Wharf to the south would suggest that they are part of a massive podium for a temple, measuring *c.* 21m by 8m.

Covering the 'Period II' remains were a series of metalled surfaces, roadside ditches, structural and other occupation activity dating from the 11th to the 17th centuries on the line of Thames Street and Lambeth Hill. The latest surface showed evidence of extreme heat caused by the Great Fire of 1666, which destroyed a building on

the northwest side of the junction of the two roads that had been associated, at least later in its life, with brewing. Reconstruction after the Great Fire was provided by the foundations of a late 17th-century structure, built further to the north than previous edifices, to allow for a widened Thames Street. The latest phase of activity recorded on the site was the early Victorian sewer, originally beneath Thames Street, the construction of which first brought to light the massive Roman masonry remains surviving in the area.

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Chapter 1: Introduction

CIRCUMSTANCES OF THE FIELDWORK

A wide-ranging and detailed programme of archaeological work was undertaken by Pre-Construct Archaeology, intermittently between 2001 and 2003, in advance of the redevelopment of the Salvation Army International Headquarters, 99–101 Queen Victoria Street, City of London, London EC4 (Fig. 1). The site, centred at TQ 3210 8091, is bounded by Queen Victoria Street to the north, Lambeth Hill to the east, Castle Baynard Street to the south and City of London School for Boys to the west and (see Fig. 9). The reduction of Booth Lane, situated immediately to the south of the building, was also subject to archaeological excavation.

The Salvation Army International Headquarters, constructed in the early 1960s, was subject to archaeological observations by Peter Marsden, which revealed at least two phases of monumental Roman masonry (see Archaeological and Historical background, below). The present redevelopment scheme involved the demolition of the existing buildings (Fig. 2) (with the exception of Booth Hall beneath Peter's Hill which was to be retained for use by the Salvation Army) and the erection of two office blocks on the site.

An initial archaeological evaluation supervised by Jonathan Butler was carried out between May and July 2001 prior to the demolition of the building (Butler 2001). A series of engineering test pits and trenches, designated as Inspection Pits (IPs) or Observation Pits (OPs) were observed cut through the concrete basement slab of the standing building (OP103–106), as well as outside the footprint of the building (OP101–102, IP201–204); four boreholes (BH101–104) were also monitored. In addition three trenches were archaeologically excavated (OP201, OP202 and OP107) along the southern part of the area to determine the level of archaeological survival on the site (Fig. 3). With the exception of OP103 located at the extreme west of the site, where timber piles were revealed, no archaeological features were observed across the north or central parts of the development area due to the truncation of the natural slope caused by construction of the 1960s' Salvation Army International Headquarters Building. However, the archaeological evaluation revealed Roman structural remains surviving along the southern edge of the site (Fig. 4) both below the basement slab (OP201 and OP202) and in a test pit to the south of the footprint of the standing building (OP107). These included an east–west aligned ragstone-faced wall with tile bonding courses in OP201, which was part of the 'Period I' building phase as observed by Marsden during the construction of the building in 1961–1962. It had collapsed to the south in antiquity and the resulting void had been filled by Roman

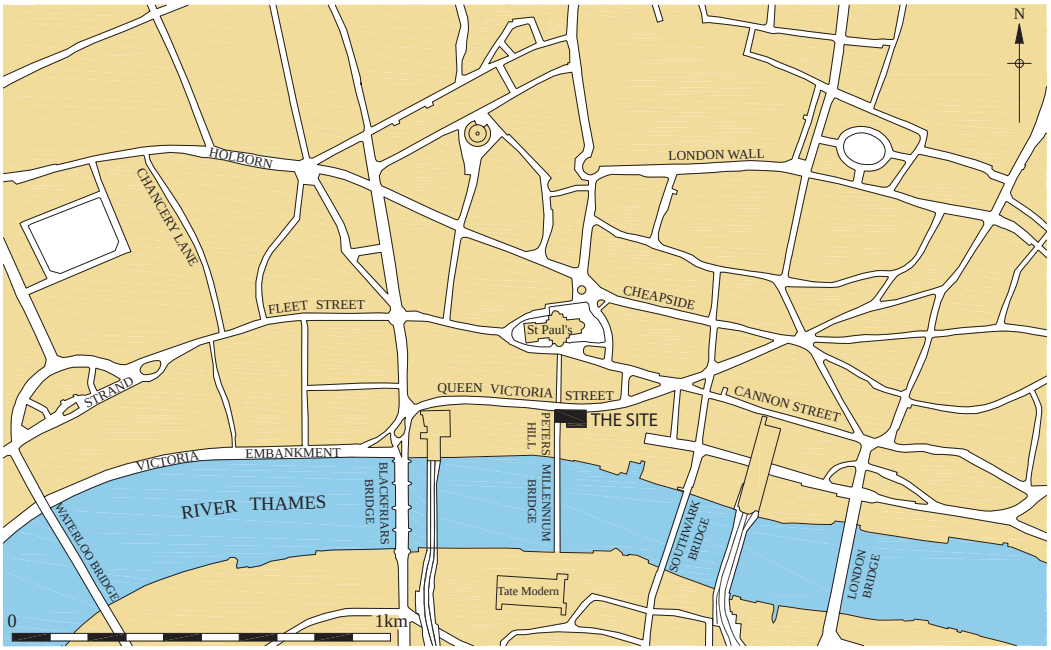


Fig. 1 The site location (scale: 1:20,000)

Fig. 2 The site during excavation, with St. Paul's in the background

building debris, which was then piled with large timber posts, which were part of the 'Period II' building activity. Further 'Period II' timber piles were revealed in OP202, which suggested that they survived across the southern third of the site. An archaeological trench (OP107) situated to the south of the building in Booth Lane revealed that where the post-Roman stratigraphy had not been truncated by basementing, the remains of medieval and post-medieval buildings overlay Roman masonry structures.

As a result of this evaluation, an archaeological mitigation strategy was prepared. In the face of the proposed development scheme a phased approach to the fieldwork was devised, which was carried out between November 2002 and May 2003. This work was supervised initially by Lorraine Darton, and thereafter by Tim Bradley. Initially, an archaeological watching brief was conducted during the breaking out of the basement slab, ground reduction in the northern part of the site and piling in Booth Hall (Pile locations P19–P34) to the west of the development area. Secondly, localised archaeological excavation and monitoring of works were carried out in the southern, more archaeologically sensitive part of the site where there was ground reduction, piling, construction of pile caps, and the forming of sumps and service runs. Most archaeological excavation was confined in this phase to eight pile locations (P1–P2 and P5–P10). Finally, an open area excavation was necessitated by the reduction in the level of Booth Lane (Fig. 5). This Area of Excavation measured 12.5m north–south by 30m east–west (see Fig. 3). In conjunction with the redevelopment there was also a positive design process and implementation relating to *in situ* preservation of archaeological artefacts, structures, soils and ecological materials. As such, existing pile and pad foundation locations were, where possible, reused which avoided the need for archaeological intervention in many locations. P1 was relocated in order to avoid impacting on Roman walls identified during the evaluation, and a short length of metal casing was inserted to further protect the walls during the insertion of this pile. P8 was also rotated through 45° from its original alignment, in order to protect the substantial Roman masonry of the 'Period I' western apse (Fig. 6).

ORGANISATION OF THE REPORT

Based on the archaeological findings from the recent redevelopment of the Salvation Army International Headquarters (hereafter referred to Salvation Army Headquarters), this volume aims to expand our understanding of both the major public works undertaken in the southwest quarter of Roman London in the 2nd and 3rd centuries AD, and also the development of the area in the medieval and post-medieval periods. The following section summarises the geological, topographical, archaeological and historical background to the area. Chapter 2 describes, illustrates and discusses the stratigraphic data relating to the Roman sequence on site. Specialist finds reports, which focus on certain, more important, aspects of the Roman finds assemblages, follow the stratigraphic description in Chapter 3. Chapter 4 aims to draw together the various elements of the site (including the observations of Marsden in 1961–1962) and incorporate the evidence from other sites in the immediate vicinity in order to provide a broad interpretive discussion of the development of the area throughout the Roman period. Chapter 5 describes, illustrates and discusses the medieval and post-medieval development of the site, and is followed by specialist reports in Chapter 6. The medieval and post-medieval periods are then discussed together with the significant finds and environmental evidence as well as documentary research to correlate with the archaeological sequence in Chapter 7. The importance of the site as a whole, and the contribution of this study to furthering our understanding of the development of this area of London, is discussed in the conclusions, in Chapter 8.

During the post-excavation analysis the stratigraphic information was organised into chronological periods (phases) based on stratigraphic and dating evidence. The terms 'Period I' and 'Period II', which had been used in previous investigations, have been retained as far as possible in this report. Phase 5 related to the preparation for the 'Period I' complex whilst Phase 6 as a whole equated with the 'Period I' structures. However, as the chronology of the structures was found to be more complex than previously thought this was broken down into three distinct sub-phases: Phases 6A, 6B and 6C. As the 'Period II' complex was securely and tightly dated these structures

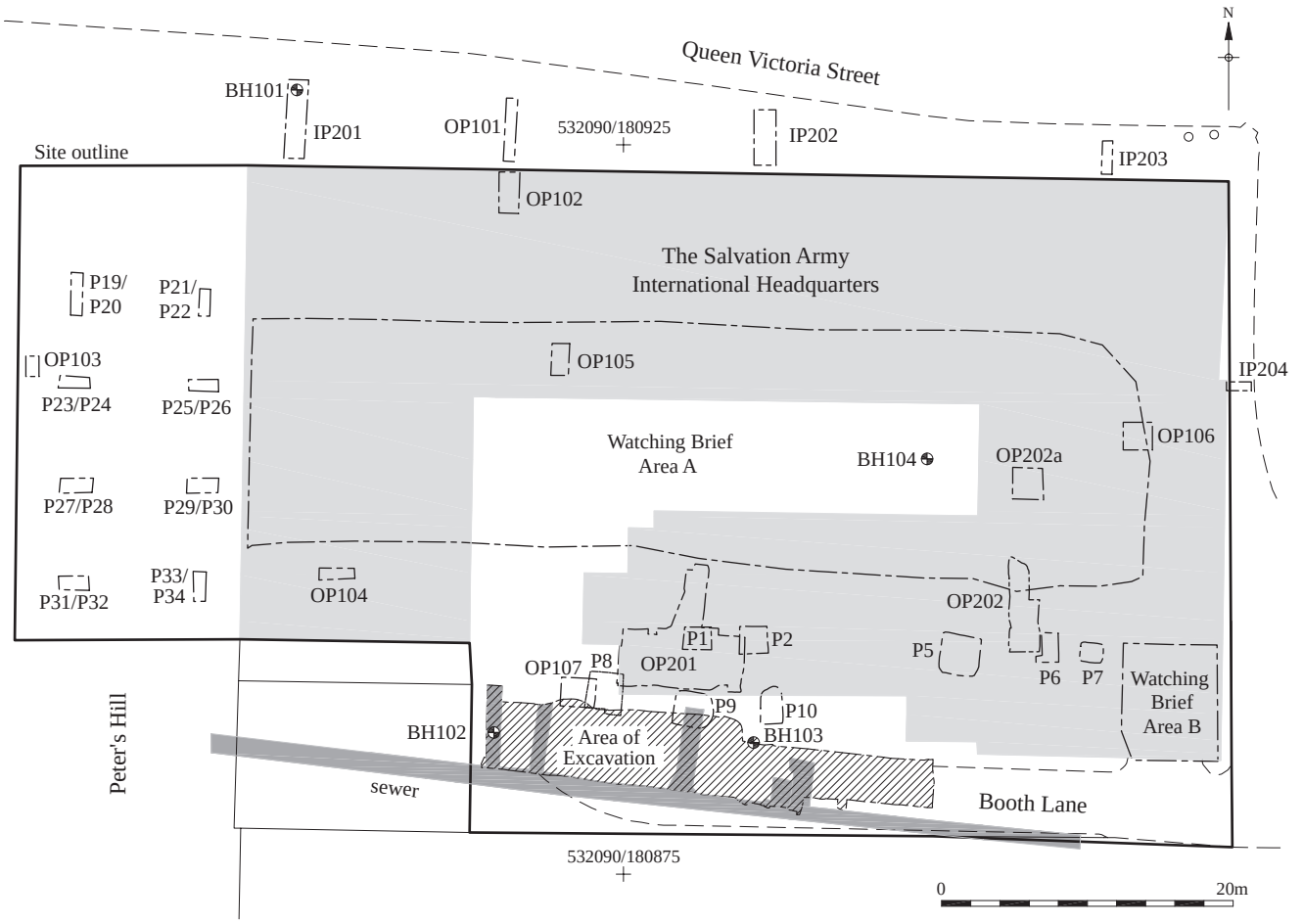


Fig. 3 Areas of archaeological interventions in relation to the 1960s' Salvation Army International Headquarters building (scale: 1:500)

Fig. 4 Recording Roman masonry during the evaluation

were given one phase number: Phase 8. Throughout this publication individual context/feature numbers appear in square brackets (e.g. [704]), registered finds (small finds) and samples are identified by <> (e.g. <12>) and 'feature' numbers used by Marsden by {} (e.g.{16}).

THE ARCHIVE

Of necessity, for reasons of brevity and to maintain a coherent report, the publication of this site does not include a description of all contextual information or full catalogues of all finds. An assessment of the site including a full context index and detailed finds reports has been produced (Bradley 2004). This document with a phased matrix and full finds reports and catalogues will be deposited together with all the finds recovered from the site at The London Archaeological Archive and Research Centre (LAARC) at Eagle Wharf Road under the site code QUV 01, where the material will be available for study on application.

GEOLOGY AND TOPOGRAPHY

The site lies on the south side of Queen Victoria Street, *c.* 200m south of St. Paul's Cathedral and *c.* 75m north of the present line of the River Thames (see Fig. 1, 9). It lies within the London (or Thames) basin, which consists of a bed of chalk covered by marine sands, gravels, and clays (i.e. Thanet Sands and Woolwich and Reading Beds), over which greyish brown to grey London Clay has formed. In many places the upper part of the London Clay has been weathered to a mottled orange brown in colour. The drift geology of the site itself is shown on the British Geological Survey of North London map as Floodplain River Terrace gravels overlying London Clay. This is covered in much of the City by brickearth. Due to the fluvial erosion of the

Fig. 5 The Area of Excavation beneath Booth Lane, showing post-medieval walls, looking east

Fig. 6 Pile 8 during excavation, showing external face of the 'Period I' western apse, looking south

area, these deposits are exposed in sequence on the slope of the hillside moving away from the river.

The topography of the area has been subject to significant modification throughout the historic period, perhaps most significantly during the 19th-century industrialisation and associated redevelopment of London. Prior to this the ground fell away gently, from where St. Paul's Cathedral stands for approximately 80m to the south, then the slope broke more steeply towards the River Thames (Williams 1993, 6).

Previous boreholes in the vicinity have provided some evidence for the levels of the London Clay down the slope from St. Paul's. A borehole immediately to the west of the northern part of the site encountered London Clay at a level of 4.75m OD. Two boreholes located to the south of the site in the northern carriageway of Upper Thames Street revealed levels of –2.03m OD to the west and –5.28m OD to the east (Paterson 1998). Grimes, during an archaeological investigation on Site 32 to the east of Lambeth Hill, found evidence of the natural slope of the London Clay down towards the Thames, showing it to have a gradient of *c.* 1 in 2.5. Natural terrace gravel was observed immediately to the north of that site but no attempt was made to find the junction between the gravel and the clay below (Grimes 1968, 57–59; Shepherd 1998b, 62).

During the recent archaeological investigations on the site (the natural geological deposits of which were assigned to Phase 1), the underlying natural topography was found to vary greatly. Towards the north the London Clay had been truncated most significantly by the construction of the 1960s' Salvation Army Headquarters building, with the basement being cut into the natural slope down to the Thames. Here, it was recorded at a broadly uniform height of approximately 3.00m OD. Further to the south, however, the natural topography, and possible Roman modifications to it, remained intact.

Towards the west of the site London Clay was recorded in P27/28 and P29/30 at heights of 2.63m OD and 2.86m OD respectively. This dropped to heights of between 0.62m OD and 0.10m OD in P31/32 and P33/34 situated approximately 5m to the south. These results suggested the natural slope in this area of the site was approximately 1 in 2. However, just to the east, in a section along the western edge of the main watching brief area (Area A), the natural slope of the London Clay was found to be steeper, dropping from 2.50m OD to 0.62m OD over 1.90m at a gradient of 1 in 1 (Fig. 7).

Further to the southeast in P8 a shallower gradient of 2 in 1 was recorded. The slope was recorded in P1 and P2 at a top height of approximately 2.10m OD, dropping gradually to a height of approximately 1.30m OD at the

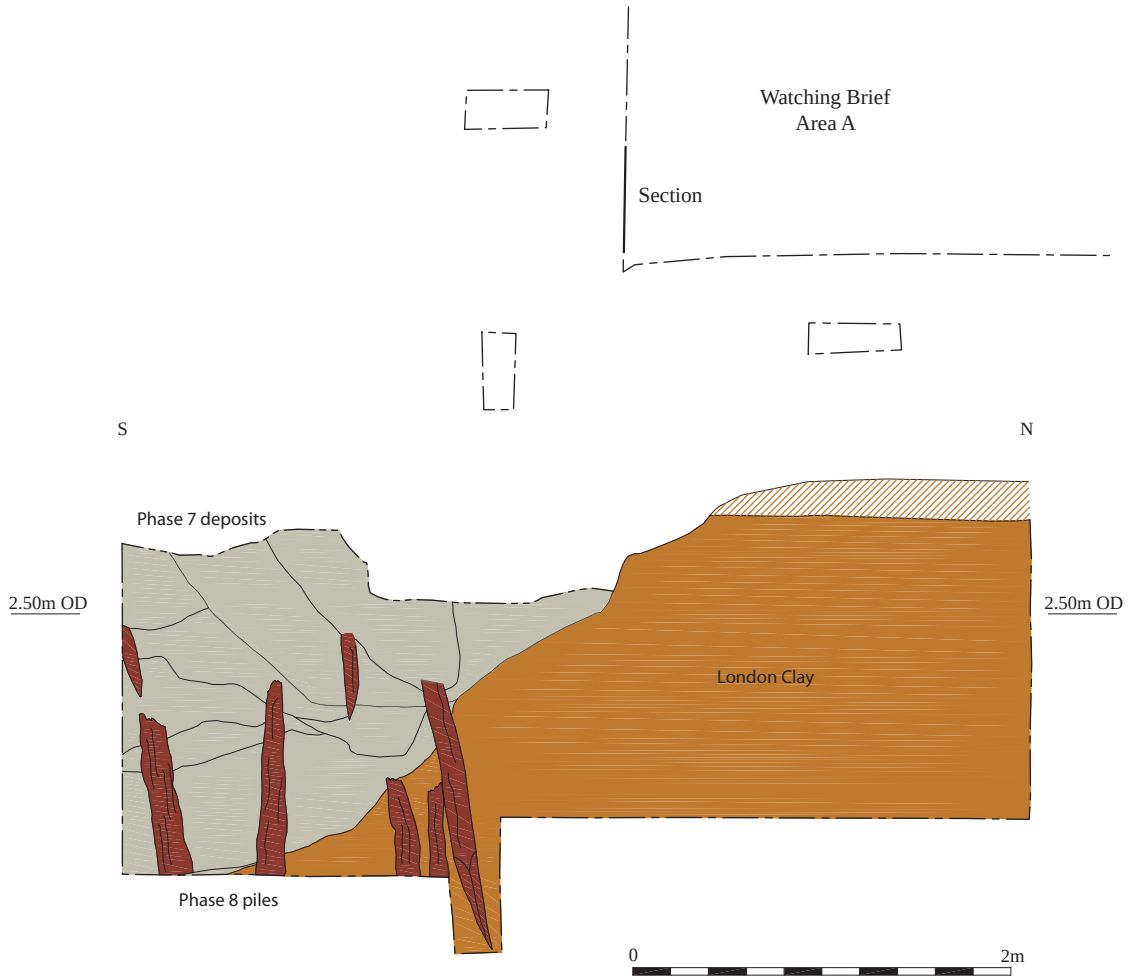


Fig. 7 Section showing the slope of London Clay with Phase 8 timber piles in foreground (scale 1:40)

northern end of P9 and P10, 4m to the south. Within these pile locations, however, the gradient became much steeper, and was recorded at a maximum depth of –0.38m OD in P9 and –0.10m OD in P10; this translated as a gradient of approximately 1 in 1. This steep break of slope might indicate the presence of a steep cliff in this area of the site. Alternatively the slope may have been man-made. A timber identified at a depth of –1.95m OD in BH 102, situated *c.* 7m to the southwest of P8, may provide putative evidence of a dock or waterfront immediately to the south, which would explain the precipitous slope in this area of the site. Augering of the deposits within OP201 revealed streaks and mottling within the top of the London Clay, which might suggest that it had been subject to river action and erosion.

Little to no evidence of natural River Terrace gravel was revealed on the site during the recent investigations. A deposit of mid orange brown sandy gravel was recorded in plan on top of the London Clay in the northern part of OP201. This may represent River Terrace gravel, which had been washed down the slope or the beginning of foreshore deposits. The north of the site had been truncated to the depth of London Clay by the 1960s' building, whilst it is probable that all gravel was washed away by river erosion along the south of the site. A similar observation was revealed at Baynard's Castle to the east where only pockets of gravel survived the river erosion (Hill *et al* 1980, 13). The observations of Grimes to the east would, however, suggest that the gravel originally survived in the northern part of the site prior to extensive Roman terracing (Grimes 1968, 57–59) and Marsden observed the presence of gravel at the Salvation Army Headquarters site in the 1960s in the northern part of the area, where he recorded the junction of the London Clay and the gravel at 6.27m OD (20.57ft OD) and the 'river gravel scarp' extending further to the south at the eastern end of the site, where it had a retaining wall, than it had at the west (Marsden 1967a, 153–154).

During the evaluation in OP202 to the east of the site, a linear feature was recorded, apparently aligned east–west and filled with sandy gravel. To the west the western side of an apparent north–south orientated channel was recorded along the eastern side of P2 filled with sandy gravel. The fills of these features contained similar sand and gravel layers, which are likely to have been washed down from the substantial deposits of River Terrace gravel situated further up the slope. These stream channels are likely to have represented minor watercourses draining the hillside into the Thames in the pre-Roman period. It is likely that numerous similar watercourses would have drained the surrounding hillside into the Thames, and also into the Walbrook to the east and Fleet to the west. Indeed evidence of such streams, also filled with loose natural gravels, was found to the west of the site at Baynard's Castle (Hill

et al 1980, 13, fig. 3; Bentley 1987, 332–333). These watercourses appear to have been artificially modified in the Roman and later periods in order to control the run-off, which may have been considerable, at least on a seasonal basis. The issue of water management would have been compounded by a natural spring line between the London Clay and the overlying terrace gravel (Williams 1993, 6). The considerable amount of water discharged both through watercourses and the spring line would have to have been considered during any significant construction work on the lower slopes of the hillside in the area of the site. This aspect of the topographical location of the site was noted in the construction of both the 'Period I' and 'Period II' Roman foundations recorded during the fieldwork. Culverts were recorded which were presumably designed to channel the large quantities of water through the foundations and into the Thames. Moreover, it may be that the topographical location of the structures in an area prone to significant water run-off may help to explain not only the construction techniques employed, but also the appearance and function of the buildings themselves.

In the piles excavated towards the very south of the site (P8, P9, P10, P31/32, P33/34) the London Clay was overlain by a fine-grained mineral deposit of greenish grey sandy silt recorded at heights of between 0.50 and 1.20m OD. Further to the north a similar deposit was recorded in OP201 to the north of the collapsed wall at a top height of 1.73m OD. This is likely to represent the level of the foreshore immediately prior to the large-scale modifications made to the area in the Roman period. Unfortunately this deposit was almost entirely devoid of cultural material, and thus accurate dating was not possible. However, a solitary fragment of pottery dating to the second half of the 1st century AD was recovered from the deposit in OP201 and a single fragment of tile recovered from this layer in P9 has been dated to the 1st century AD, both of which would suggest a very tentative second half of the 1st century date for the foreshore.

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Roman

The site lay within the southwest corner of the Roman City (Fig. 8). This area of the City has been the subject of several archaeological investigations and observations over the last two centuries. A series of large monumental Roman masonry walls have been encountered in the immediate vicinity, interpreted as forming part of a series of public buildings with at least two periods of construction.

The first recorded observations were made in 1841 by Charles Roach Smith, who was monitoring the excavation of a new sewer along Thames Street (Fig. 9.1). At Lambeth Hill (now relocated see Fig 11f, 11g) he found:

> 'a wall of extraordinary strength, which formed an angle with the hill and Thames Street [extending] as far as I have means of observing, from Lambeth Hill to Queenhithe, with occasional breaks; in thickness it measured from 8 to 10ft (2.44–3.05m)... The foundation was made in the following manner: oaken piles were first used; upon these was laid a stratum of chalk and stones and then a course of hewn sandstones, from 3 to 4ft (0.92–1.22m) by 2 and 2½ft (0.61–0.76m), firmly cemented with the well known compound of quicklime, sand and pounded tile. Upon this solid substructure was built the wall composed of rag and flint with layers of red and yellow, plain and curve-edged tiles... Many of the large stones are sculptured and ornamented with mouldings, which denote their prior use in a frieze or entablature of an edifice, the magnitude of which may be conceived from the fact of the stones weighing in many instances, upwards of half a ton ... I observed also fragments of sculptured marble had been worked into the wall, and also a stone carved with an elegant ornament of the trellis-work pattern, the compartments

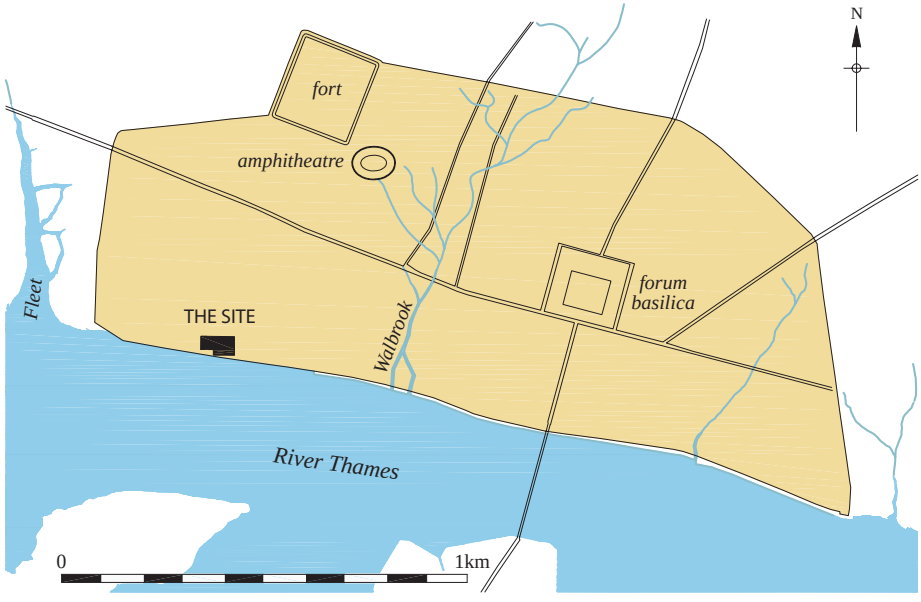


Fig. 8 Location of the site in relation to the Roman City (scale: 1:20,000)

being filled alternately with leaves and fruit' (RCHME 1928, 92–93).

The location of the walls is depicted on Sewer Plans 378 and 315 of the City of London Commissioners of Sewers, which are reproduced both by Marsden and Williams (Marsden 1967a, 151 fig. 2; Williams 1993, 72 fig. 55), and would locate the walls in the southern part of the site, at the junction of Thames Street and Lambeth Hill, in the area occupied by Booth Lane (see below). Sewer Plan 315 suggests that the wall was only observed up to Brook's Yard, which also lay within the southeastern part of the development area.

Further masonry remains were found on the site in 1924 during excavations for a new sewer under Brook's Yard from Upper Thames Street when workmen found, to the east of Lambeth Hill, two Roman walls running east–west (Fig. 9.2). The southern wall was about 8ft (2.44m) thick and constructed from ragstone and rubble concrete with its foundations laid between two rows of contiguous piles. The second wall was about 15ft (4.57m) to the north and was 5ft (1.52m) thick and also had its foundations laid between two rows of piles, but these were not contiguous. On the south face of the wall was a mass of puddled clay (RCHME 1928, 93; Merrifield 1965, 222–223). It was felt at the time that the southern of the two walls was the same as that observed by Roach Smith in 1841 (RCHME 1928, 93), however, this has been disputed by Marsden who felt that it lay too far to the north (Marsden 1967a, 153).

In 1961 and 1962 Peter Marsden conducted a watching brief on the development of the Salvation Army Headquarters building (Fig. 9.3, 10). At least two periods of substantial monumental Roman walls were found. The later 'Period II' masonry was constructed on two terraces cut into the natural hillside and consisted of oak piles driven into the London Clay with a chalk platform above. The upper terrace, which was only seen in section along the northwestern part of the site, lay at a top height of 6.27m OD to the north, and had an east–west retaining wall on its south side. The lower chalk terrace lay at *c.* 2.84m OD. Large ragstone walls were observed built on the lower chalk platform.

To the south of the site two parallel walls were observed apparently zigzagging east–west across the site; to the west another ragstone wall with a double tile bonding course had collapsed to the south and lay at a steep angle; to the

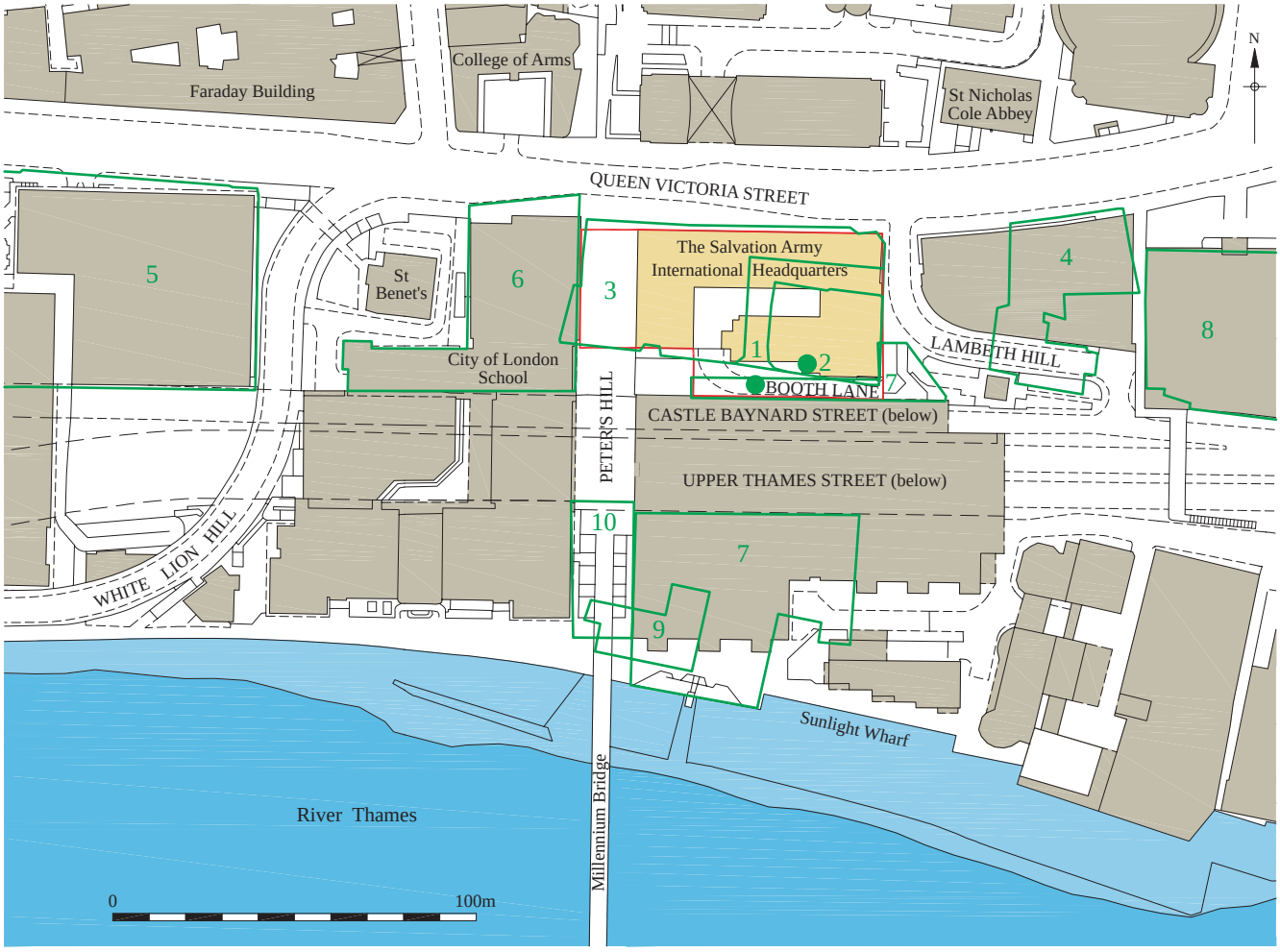


Fig. 9 Other sites excavated in the vicinity of the Salvation Army International Headquarters (scale 1:2,000)
1) Roach Smith's observations, 2) Brook's Yard, 3) Marsden's watching brief, 4) Grimes' observations, 5) Baynards Castle, 6) Peter's Hill, 7) Sunlight Wharf, 8) Huggin Hill, 9) Trig Lane, 10) Millennium Bridge.

Fig. 10 Watching brief conditions in the 1960s, as recorded by Peter Marsden

west was an apparent return. All these walls appeared to lie beneath the chalk platform, and thus belonged to an earlier phase of 'Period I' building (Marsden 1967a; Merrifield 1965, 220–223; Williams 1993, 63–71; Schofield with Maloney 1998, 62).

In 1962 an investigation by Professor Grimes, of cellars on the east side of Lambeth Hill, between Queen Victoria Street and Upper Thames Street, revealed the natural slope of the London Clay down to the Thames (Fig. 9.4). Covering the London Clay was a dark brown silt which was in turn sealed by a layer of Roman building debris consisting of stones, mortar and wall plaster. There was thus no evidence of Roman terracing into the London Clay in this location (Grimes 1968, 57–59).

In 1974–1975 two investigations at Baynard's Castle to the west revealed a 115m length of Roman masonry which was found to be Roman London's riverside wall (Fig. 9.5). The wall had been heavily truncated on its southern face, presumably by river erosion and had toppled over rather surprisingly to the north, i.e. landward, side. The wall exhibited two different forms of construction with that at the east lying on a substantial foundation of squared timber piles and a chalk raft, whilst its western length included large fragments of re-used sculpted masonry from a monumental arch, a screen of gods and two altars, which were suggested to have been located in the vicinity (Hill *et al* 1980).

In 1981 an archaeological excavation by the Department of Urban Archaeology of the Museum of London at Peter's Hill immediately to the west of the Salvation Army Headquarters site found a fragment of the same riverside wall together with a similar sequence of two terraces with oak piles and chalk platforms above, consistent with the 'Period II' structures (Fig. 9.6). On the lower terrace a massive north–south foundation, *c.* 3.75m wide, and east–west foundation, 8.5m wide, were observed. These formed the west and south elements of a massive structure for which the upper terrace wall formed the north element. An internal surface of *opus signinum* and an external surface of gravels were recorded. This masonry was interpreted as a continuation of the 'Period II' masonry recorded by Marsden to the east (Williams 1993).

In 1986 further excavations at Sunlight Wharf to the south and east of the Salvation Army Headquarters revealed more of the 'Period II' building complex (Fig. 9.7). The southwestern corner of a substantial piece of Roman masonry was found measuring *c.* 17m east–west by 2m north–south resting on a rammed chalk platform supported by a series of dumps and timber piles (Hunting 1988, 12–13; Williams 1993, 57–62; Schofield with Maloney 1998, 234–235).

The other noteworthy Roman public building in the vicinity of the site was the Huggin Hill bathhouse which was first observed in 1964 and 1969 and re-excavated more recently in 1988–1989 at Dominant House to the east of the Salvation Army Headquarters (Fig. 9.8). The baths were dismantled in the late 2nd century and during the 3rd century clay and timber domestic buildings were

constructed incorporating surviving masonry (Marsden 1980, 103–105; Rowsome 2000a, 271).

Interpretations of the masonry found in the vicinity of the site have altered over time as more discoveries have been made, especially with regard to the wall found in the sewer work in 1841 by Roach Smith, initially regarded as being part of the riverside wall (RCHME 1928, 80) and later also thought to incorporate a gate or postern at Lambeth Hill in its length (Hill *et al* 1980, 68). Marsden, after his observations at the Salvation Army Headquarters site, rather felt it was part of the 'Period II' structures (Marsden 1967a, 154), a suggestion supported by Williams who felt that Roach Smith's recorded observations were misleading and his intermittent visits to the sewer excavations had erroneously led him to believe that different walls on the same alignment many metres apart were part of the same structure (Williams 1993, 72–74).

The most recently published interpretation (Williams 1993) proposes that the earliest structures ('Period I') were probably constructed in the late 1st or early 2nd century, possibly as part of a programme of public works in the waterfront area which included the public baths at Huggin Hill. A temple was possibly part of this complex, which explains the monumental masonry reused in the later riverside wall found at Baynard's Castle to the west. The monuments indicate that the complex was refurbished or repaired on several occasions, the most notable being marked by a monumental entrance of possibly Severan date and a mid 3rd-century rebuilding of a temple, revealed by inscriptions on two altars. During the last quarter of the 3rd century a riverside wall was constructed to the south of the complex. At the end of the 3rd century the 'Period I' structures were levelled and the ground was prepared by terracing for the construction of a massive public building complex stretching more than 150m east–west by *c*. 100m north–south ('Period II'). Construction of this complex was started in AD 294, a date obtained by dendrochronological analysis of the oak piles, and has been attributed to Allectus who reigned from AD 293–296. He may have sought to construct a palatial complex which functioned as 'an administrative centre... to house the primary functions of the late Roman state: armoury, treasury, mint, supply base, administrative offices, residential quarters, temples, public amenities' (Williams 1993, 32), but it is possible that it was never completed, as he was overthrown by Constantius in AD 296.

A late Roman domestic building found at Peter's Hill suggested that that area of the complex had almost certainly ceased to serve a public function by the later 4th century, although the numerous earth floors and hearths recorded within this building indicate that it remained in use for an extended period of time (Williams 1993, 32).

Medieval and post-medieval

There is little evidence of occupation in the area of the site in the immediate post-Roman period, with a general migration to the west by the Saxons in favour of a new location, *Lundenwic*, in the vicinity of modern-day Covent Garden and the Strand (Malcolm *et al* 2003; Leary *et al* 2004). This is likely to have been due to a number of factors, including a reliance on a more rural lifestyle following the decline of Roman London and the empire as a whole. The decline in the urban centre may also have forced the move to the west in search of good beaching facilities rather than utilising the presumably poorly-maintained and disintegrating quays and wharfs (Tatton-Brown 1986, 22; Blackmore 1997, 124). Despite documentary evidence that a religious enclave may have developed in the vicinity of St. Paul's after a church dedicated to the saint was founded in the City of London in AD 604 (Sherley-Price 1979, 104), only small tantalising pieces of evidence of Middle Saxon activity in the area have been found. These consist of three sherds of Middle Saxon pottery recovered from a deposit onto which the Roman riverside wall had collapsed at Baynard's Castle (Hill *et al* 1980, 14) and hearths, stakeholes and occupation surfaces at Peter's Hill dated to the 5th to 8th centuries (Williams 1982, 28).

Saxon *Lundenwic* was itself abandoned for the more readily defensible walled area of the old Roman town in the late 9th century; the redevelopment including the laying out of a new street system with associated properties and churches by King Alfred. The area of the site appears to have lain immediately outside the planned Alfredian town of the late 9th and 10th centuries which was located to the east with its nucleus around Queenhithe (Milne 1990; Clark 2000, 211 fig.11.2; Cowie 2000, 197–198). It has been suggested that Thames Street and Lambeth Hill came into existence during the 11th century as part of the process of linking the late Saxon waterfronts at Queenhithe, Dowgate and Billingsgate with the rest of London and that at this time the waterfront had advanced little beyond Thames Street (Dyson 2002, 8–9). Excavations at Baynard's Castle to the west would suggest, however, that Thames Street was not laid out until the 12th century, after the remnants of the riverside wall had been deliberately toppled over (Hill *et al* 1980, 16–17), whilst the road surfaces at Peter's Hill suggested an 11th- or 12th-century date (Williams 1982, 29). Three churches were founded along the north side of Thames Street; St. Benet Paul's Wharf to the west of the site which was founded sometime in the 12th century and first mentioned in 1111 (Weinreb & Hibbert 1983, 696; Williams 1982, 29), St. Peter, Paul's Wharf on the western part of the site itself which was first mentioned in 1170 as St. Peter the Little (Weinreb & Hibbert 1983, 763; Schofield 1994b, 127) and St. Mary Somerset to the east of the site which once again has its earliest references in the 12th century (Weinreb & Hibbert 1983, 743). It was also at this time that the practice of land consolidation and reclamation in the immediate area began in earnest, with the north bank of the Thames gradually extending south from where it had been in the Roman period. Evidence of such a process has been revealed on a multitude of sites including those at Sunlight Wharf to the south (Fig. 9.7) where the earliest waterfront structure was dated to the late 12th century (Hunting 1988, 16) and the Trig Lane and Peter's Hill Millennium Bridge excavations to the

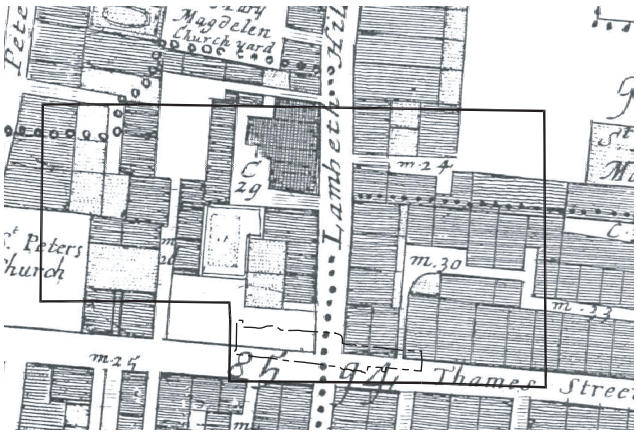
southwest (Fig. 9.9, 9.10) where the earliest recorded waterfronts were mid 13th century in date (Milne & Milne 1978; 1982; Ayre & Wroe-Brown 2002, 18–23). Documentary evidence suggests that between the 11th and 13th centuries in Cheapside, situated to the north of the site, plots of land were being progressively subdivided and the density of building increased (Schofield *et al* 1990, 185), and it is reasonable to assume that the same pattern of development was occurring further to the south in the vicinity of the site. The documentary and archaeological evidence would suggest that laying out of the roads and churches and reclamation of the Thames was taking place from the 11th to 12th centuries, with communities clustering around the parish churches. Most of the southern part of the site lay within the parish of St. Peter's which ran from Peter's Hill to Lambeth Hill and the parish of St. Mary Somerset, the boundaries of which ran from Lambeth Hill in the west to beyond the east side of the parish church.

London continued to expand rapidly throughout the medieval period. By the 12th and 13th centuries lanes were established leading down from the south side of Thames Street to the waterfront, which with its wharves and quays, was ever encroaching into the river (Dyson 2002, 9). By the time of the Agas map of *c*. 1562 (Fig. 11a) the area was shown as thickly populated with buildings fronting Thames Street, St. Peter's Hill and Lambeth Hill, all of which are named on the map. Stow records Lambeth Hill as 'Lambert Hill Lane', named after a man of that name who owned land thereabouts (Stow 1994, 329). On the west side of the lane stood the Blacksmiths' Hall and 'a churchyard for the burying of the dead of St. Mary Magdalen's by Old Fish Street' (Stow 1994, 341–342). Everything was to change in 1666 when the Great Fire swept through the city, destroying all the buildings in the area of the site, including the three churches. St. Benet's was rebuilt between 1677 and 1683 by Wren, whilst St. Mary Somerset was also rebuilt by him between 1686 and 1695. However, St. Peter's was never rebuilt and the parish was united with that of St. Benet's (Weinreb & Hibbert 1983, 696, 743, 763).

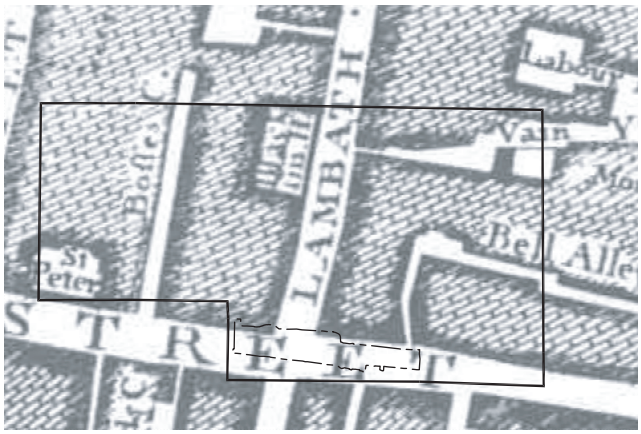
It appears that redevelopment after the Fire was generally rapid and largely respected the pre-Fire property boundaries. The Ogilby and Morgan map of 1676 (Fig. 11b) records that, only 10 years after the Fire, most of the City of London had been rebuilt. However, there were occasional vacant plots depicted, on which redevelopment had not begun. One of these was on the subject site on the north side of Thames Street running between Lambeth Hill on its east side and Green Dragon Court (m26) on its west side. Further to the north lay an alley leading off the west side of Lambeth Hill in which Blacksmiths' Hall (C29) lay. The Hall originally occupied the site in 1494 and was rebuilt in 1671 after destruction in the Great Fire (Weinreb & Hibbert 1983, 163). On the east side of Lambeth Hill lay Labour in Vain Yard (m24), whilst off the north side of Thames Street was Brook's Yard (m30) and Bell Alley (m33).

By the 18th century the wharves along the waterfront such as Wood Wharf, to the south of the site were busy and prosperous. Thames Street, from which the lanes led down to the wharves, shared in the prosperity and 'enjoyeth a

a. Agas 1562

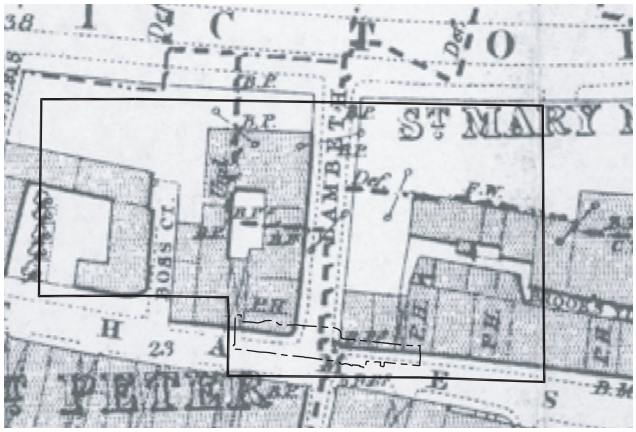


b. Ogilby and Morgan 1676

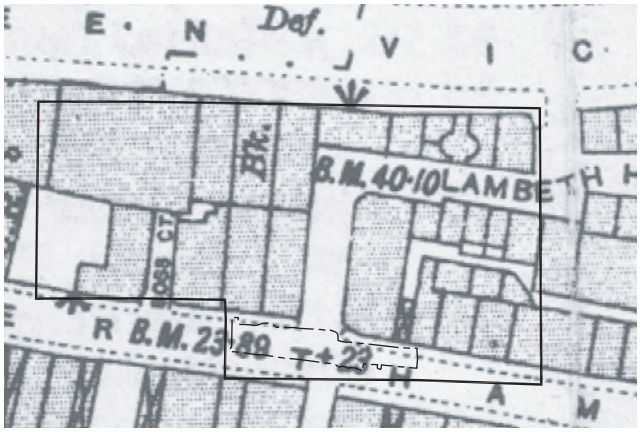


c. Rocque 1747

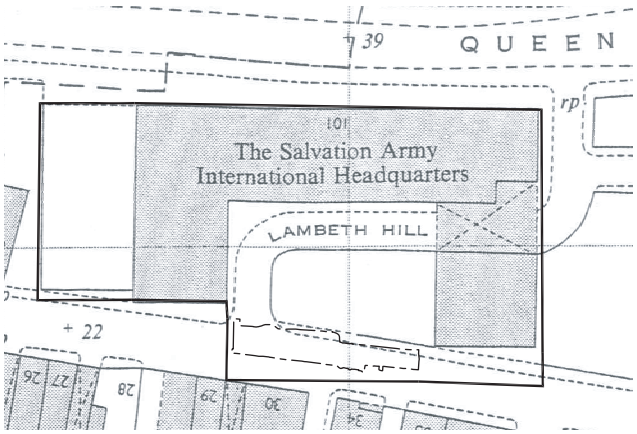

d. Horwood 1813



e. Ordnance Survey 1873



f. Ordnance Survey 1914



g. Ordnance Survey 1962

Fig. 11 The site and area of excavation shown in relation to 400 years of map evidence (scale 1:1,250, Agas not accurately scaled)
The extracts from the A to Z series of historical maps of London (Figs 11a to 11d) are reproduced by kind permission of the publishers, Harry Margary at *www.harrymargary.com* in association with the Guildhall Library, London.

good trade and hath a great resort occasioned by the several wharfs on the waterside and therefore much pestered with carts' (Strype 1754, quoted in Hunting 1988, 62–63). Rocque's map of 1747 (Fig. 11c) shows that Green Dragon Court had been renamed Boss Court with the southern part of Old Fish Street Hill now known as Labour in Vain Hill. Horwood's map of 1813 shows the houses in more detail than Rocque's with street numbering in place. Bell Alley has by this time been renamed George Court (Fig. 11d).

During the 19th century London was the largest port in the world. Reclamation of the river was unsustainable, however, and wharves and large warehouses were constructed along the river frontage. Alteration and redevelopment of the properties along the line of Thames Street continued throughout the 19th century. However, the greatest change to the medieval street plan came with the construction of Queen Victoria Street between 1867 and 1871 as is shown on the First Edition Ordnance Survey map of 1873 (Fig. 11e). The new road swept straight across the northern parts of Peter's Hill and Lambeth Hill demolishing slums (Hunting 1988, 76–77). A number of pubs were shown on the north side of Thames Street, now renamed Upper Thames Street, one on the west side of the junction with Lambeth Hill and three to the east between Lambeth Hill and the site of St. Mary Somerset. The Salvation Army moved their headquarters in 1881 onto the present site from Whitechapel Road, which had been the site of the first headquarters in 1867 (Weinreb & Hibbert 1983, 770).

By 1914 (Fig. 11f) the route of Lambeth Hill had changed, linking with Upper Thames Street to the south in its original location, but then dog-legging to the east before connecting with Queen Victoria Street, with one branch continuing to the east and then proceeding south back to Thames Street on the line of Old Fish Street Hill. The Goad Fire Insurance Plan of 1928 (not illustrated) shows the area of the site as it stood prior to the Second World War, being occupied by commercial premises, including offices, warehouses and shops, as well as the Salvation Army Headquarters. The area was devastated during the Blitz in the Second World War with reconstruction taking place only slowly. The construction of the Salvation Army Headquarters was undertaken in 1961. The new building, opened by the Queen Mother in 1963, was described by the architectural historian Nikolaus Pevsner as 'large and fussy' (Pevsner 1981, 281). It was with this redevelopment that the route of Lambeth Hill was finally blocked, and it now runs to the east of the site (Fig. 11g). This change in layout of the roads in the area continued in 1972 with the construction of Castle Baynard Street and Upper Thames Street; the latter road superseded the old route of Thames Street, and was a considerably wider dual carriageway constructed on an exact east–west axis as it passed to the south of the site. The site of the original Thames Street was replaced by a small access road into the Salvation Army Headquarters and named Booth Lane, after the organisation's founder. Lambeth Hill was diverted even further to the east where it swept past the tower of St. Mary Somerset and met Upper Thames Street on its eastern side.

Chapter 2: The Roman Archaeological Sequence

As discussed above the natural (Phase 1) deposits encountered on site comprised London Clay, the upper surface of which demonstrated a steep slope from north to south, down towards the Thames (see Geology and Topography, Chapter 1). In places the surface of the London Clay showed evidence of being traversed by channels draining water down the slope into the river; this water run-off being a feature that continued to affect the site.

THE EARLY ROMAN WATERFRONT

Phase 2: Waterfront structure (1st century AD)

Part of an east–west aligned, shattered oak plank [890] measuring 1400mm by 250mm by 20mm thick was found in P8 lying on the foreshore at a height of approximately 0.55m OD (Fig. 12). Its eastern end was supported by two apparent off-cuts, measuring 460mm by 170mm by 15mm thick and 620mm by 130mm by 15mm thick, and all the timbers were tangentially faced with traces of cream lime or mortar on them. The two latter timbers may represent reused pieces of the head of a cask, although oak was an unusual wood for Roman casks as softwood was preferred (D. Goodburn, pers comm). The date of the timbers could not be determined with any degree of accuracy as no pottery was recovered from their immediate environment and the wood did not contain enough tree rings for dendrochronological analysis. A definite interpretation of the function of this planking could not be ascertained due to both later truncation and the restricted area of excavation. However, the timbers lie below the high tide levels for the 1st century AD (Brigham 1990), and are unlikely to form part of a substantial structure. It may be that they were simply dumped off-cuts from waterfront construction, or they may possibly have been deliberately laid as duck boards in order to create a safe working platform on the tidal foreshore.

Phase 3: Dumping or foreshore reclamation (1st century AD)

Three silty organic layers overlay the putative duckboards, and these were capped by a deposit of charcoal and wood chips [794]. These chips were a mix of oak and pale softwood, and the oak chips could derive from carpentry or similar woodwork in the immediate vicinity (see Goodburn, Chapter 3). The softwood chips, however, are more diagnostic of particular activities. They are typical Roman waterfront debris where imported European wine casks were being opened on quaysides, and such debris has been found around the AD 63 quay at Regis House (Goodburn forthcoming). Whilst these deposits are likely to derive from foreshore industrial waste, it is unclear whether they represent deliberate ground reclamation or merely incidental dumping. No datable artefacts were recovered from these deposits, which make precise dating difficult.

Phase 4: 1st-century AD quay

Timber quay structure

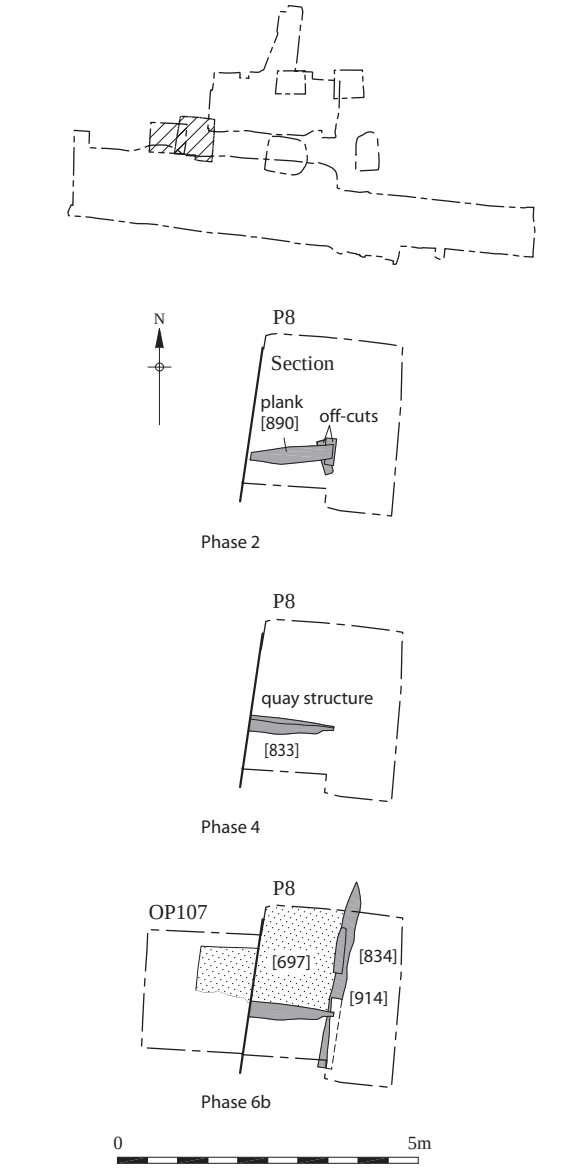
A large east–west orientated oak beam [833], laid horizontally, was identified across the western side of P8 (Fig. 12). It was a box-halved beam *c.* 500mm by 260mm by 1300mm (as exposed) set on its edge, with the eastern side having been hacked through by later Roman development. Although only a small amount of the structure was revealed, this beam was interpreted as forming part of a 1st-century quay structure (see Fig. 15).

Since excavations in the 1970s and 1980s it has been known that the waterfronts of the Roman city were often built using similarly large baulks of horizontally-laid oak in a variety of arrangements (Milne 1985; Brigham 1990; Brigham *et al* 1996). The OD levels of the early and later Roman port are also now relatively well known, with the river level dropping from 2.00m OD in *c.* AD 50 to 0.50m OD by AD 250 (Brigham 1998, 33) and timber [833], at a height of 1.57m OD, would have fitted well within the levels of the 1st-century quay. The topographic location of the timber close to the predicted line of the waterfront is also compelling evidence for this forming part of the 1st-century quayside. Tree-ring dating has confirmed an early date for the timber, with the last heartwood ring dating to 12 BC and whilst some heartwood and sapwood had been removed, a 1st-century felling date was indicated (see Tyers, Chapter 3).

The use of large, horizontal baulks has also been found in cribwork foundations, such as at No.1 Poultry (Goodburn in prep), and it appears that this waterfront baulk was later incorporated into such a structure with two north–south timbers with much later, 3rd century AD, felling dates (see Phase 6B, below and Fig. 12). It is, however, possible that despite the early felling date of the timber it was not *in situ* and that it had been reused at a much later date.

Quayside building, Building 1

About 5m north and 8m east of the putative quay baulk another large horizontal east–west beam [503], recorded in P2, measured 400mm wide by 310mm thick by 1540mm



long (as exposed) with a highest level of 1.96m OD. This had been cut into the London Clay but had collapsed to the south, apparently in antiquity, and lay at an angle of approximately 45° to the horizontal (Fig. 13, 14). This collapse had presumably been caused by the instability of the ground to the south, which sloped away steeply. The beam extended into the limit of excavation to the east, but had been cut through to the west to facilitate the insertion of a concrete foundation during the 1960s' development of the site.

This large oak beam, described in detail below (see Goodburn, Chapter 3) had several features of considerable interest, including on the upper face a large through-mortice at the west end and a blind mortice set into a shallow trench at the exposed east end. The distance of 1.2m between them might be of the order needed for a large doorway, with a circular recess *c.* 60mm in diameter which could have held the pivot of a large 'har hung' door. Broadly similar beams with similar types of jointing have been found at the entrance to riverside buildings of early Roman date, such as Regis House (Brigham & Watson forthcoming). However, it is possible that only just over half of the doorway was exposed, and the smaller blind mortice was actually for the end of a square iron bolt used for locking one leaf of a large two-leaf door or gateway. A somewhat similar arrangement, using a slightly smaller-sized oak threshold beam, was found at the two-leafed eastern gate at the London amphitheatre (Bateman 2000, 22). Thus it may be that the doorway would have been large and secure, and ideal for a substantial quayside warehouse, Building 1.

The beam was found slumped forward towards the river, caused by subsidence to the south, which rotated the northern arris upward. If allowance were made for this rotation then the upper surface of the threshold would have been at *c.* 1.86m OD, which would fit neatly with a 1st-century City quay frontage level (Milne *et al* 1983; Brigham 1990). This was clearly high enough to be above the vast majority of high tides of the year but still in very wet ground that was waterlogged after land-fill deposits were dumped over it. Whilst it is possible that the timber might have been reused, this seems unlikely.

Two courses of bricks and tiles measuring 0.89m long by 0.30m wide and 0.10m high, dated by their fabrics to between AD 55 and 165 (see Sudds, Chapter 3), were constructed on the oak beam between the two mortice joints (Fig. 14). A further section of brickwork, also two courses high, was recorded to the east of the eastern mortice joint, although part of this section, consisting of seven courses of tile, 0.30m wide by 0.42m high had collapsed to the south (Fig. 13, 14 section). This fragment was constructed from a mixture of *lydions*, *pedales* and *tegulae*, apparently roughly faced on both sides with some evidence of a mortar chamfer towards the last remaining course on its southern side. Together the element of masonry comprising that *in situ* to the east of the shallow groove cut into the

Fig. 12 Plans and section showing Phase 2 planking on the foreshore, Phase 4 timber quay baulk and 'Period I' Phase 6b timbers and packing (scale plans 1:125, section 1:40)

Fig. 13 The threshold beam in P2, looking southeast

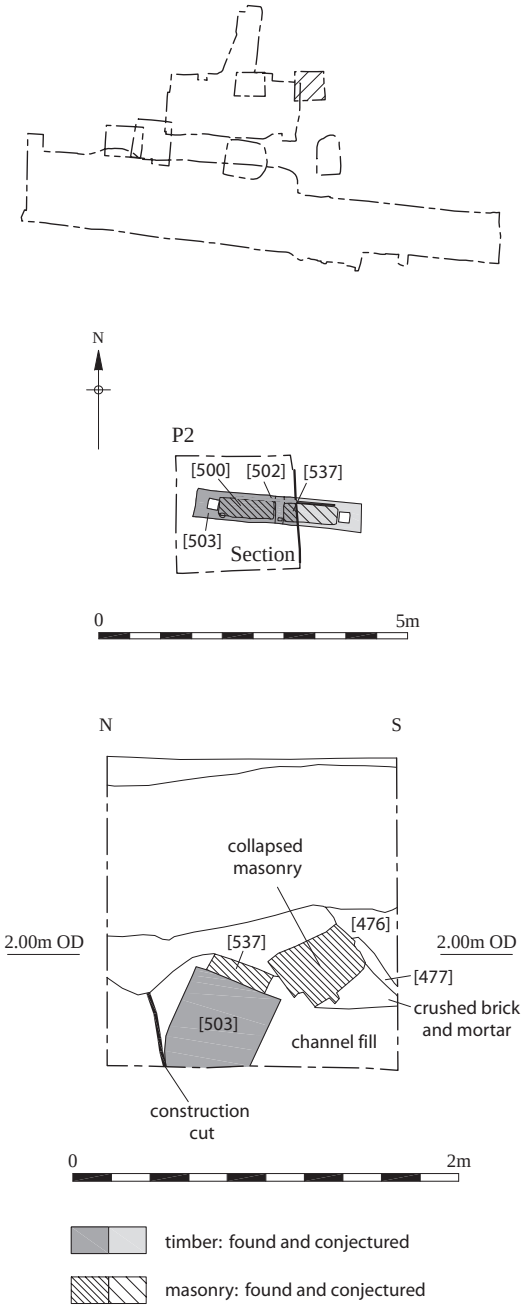


Fig. 14 Plan and section of threshold beam and masonry in P2 (scale plan 1:125, section 1:40)

beam and the collapsed section would have stood 0.52m high. These fragments of masonry represented the only surviving superstructure of the building and both seemed to respect the shallow rebate in the timber beam suggesting that perhaps a timber was set into the recess dividing the two pieces of masonry, however the masonry covered the circular recess to the west. The remains of probable timber shuttering immediately to the north of the western fragment of *in situ* masonry were recorded. There is a suggestion of similar timber shuttering on the south side as a wooden plank was found beneath the large piece of masonry, which had collapsed to the south.

The Roman masonry was located in the area of the structure suggested by the mortice joints to be occupied by either one or two doors. This indicates that either the timber had been re-used from a previous structure on the site with the mortices dating from that period of use and that the timber beam formed the baseplate for a largely brick-built superstructure (a construction methodology without obvious ready parallels in Roman London), or else that two phases of use are evident. It is perhaps more probable that the timber did indeed form the foundation of a Roman 1st-century quay front building with timber doors. It is possible that there may have been some modification of the doorway and that the western piece of masonry represents a strengthened threshold with the eastern portion representing the remains of a door jamb or tile and brick framing of a doorway. However, if the mortices suggest a double door construction with the second door standing to the east beyond the limits of excavation, the masonry would in effect be blocking the second doorway. Although it is possible that such a modification took place converting the doorway from two doors to one by constructing a masonry surround on the eastern side it is perhaps more probable that the masonry represents later blocking of the whole double doorway. This might explain the remains of the timber shuttering behind the western *in situ* fragment of masonry and the fact that the masonry appears to cover the western circular recess. At a later stage the building may have been modified with this entire length of doorway blocked by the insertion of timber planking on its internal face and Roman masonry filling the void to the south.

Whilst the evidence discussed above is very fragmentary, it does appear that an outline of the early Roman use of the site is beginning to appear. If the large east–west timber in P8 is in its original 1st-century position despite its later reuse, it can be tentatively suggested that the western early Roman waterfront here included a substantial quay of horizontal baulk construction with large, probable warehouse buildings, including Building 1, a few metres behind the frontage (Fig. 15).

THE 'PERIOD I' DEVELOPMENT

Phase 5: Dumping and ground consolidation (mid 2nd century AD)

A series of six dumped deposits were recorded overlying the collapsed threshold beam and associated masonry in

P2. Together these deposits had a maximum thickness of approximately 0.90m, with a highest level for the sequence of 2.26m OD. They were made up of mixed sands, silts and clays, and contained moderate amounts of pottery, brick, tile and bone. It is likely that they were laid down to level the ground at the base of the hillside prior to large-scale development of the area (see Phase 6A, below). Although pottery recovered from these layers spans the date range AD 50 and AD 150, the ceramic building materials recovered from the upper layers date to after AD120/140 (see Sudds, Chapter 3), suggesting that this dumping took place towards the middle of the 2nd century, incorporating much residual material.

Further evidence of dumping, apparently to level the slope, was recorded to the southwest in P8, where deposits survived to a highest level of 1.54m OD, although the sequence was truncated by the construction of a concrete slab during the building of the 1960s Salvation Army Headquarters. In OP201, to the north of P8 and west of P2 a sequence of similar deposits was encountered. As only very limited excavation was permitted during the evaluation phase it was difficult to determine their nature with exactitude and retrieval of finds to date the deposits was not possible. However, the earliest deposits consisted of sandy gravels up to 0.50m thick, which contained few inclusions and may have represented either original, or redeposited foreshore deposits used as dumping material. This sequence was capped by a 0.17m thick consolidation deposit of brickearth, which levelled the area to a height of *c*. 2.38m OD, a similar level to P2, but a level truncated by the modern basement. At the extreme west of the site in P31/32 and P33/34, and in a section along the eastern side of Booth Hall, further potentially contemporary dumped deposits were revealed up to 1.70m in thickness, though only one fragment of pottery was recovered, dated to AD 80–120. A band of peaty organic material was recorded in auger cores recovered from these piles at a height of approximately 1.31m OD, with a thickness of approximately 0.50m. As marsh deposits dating to the Neolithic period have been previously revealed to the east at Suffolk House (Brigham & Woodger 2001, 12–14) and possibly at Cannon Street Station (Burch & Hill 1988), it was decided to subject the peat to radiocarbon dating. The results suggested that the base of this material was laid down between 120 BC and AD 180 and the top between 120 BC and AD 220. Although this sediment may have formed over a short period of time *in situ*, the presence of domestic waste, together with coeval radiocarbon dates from both the top and bottom of the deposit (see Branch *et al*, Chapter 3), suggest that it was redeposited, representing further reclamation of the foreshore prior to the 'Period I' construction.

Phase 6A: 'Period I' Structures, Building 2 (mid 2nd century AD)

A number of substantial masonry and timber features were recorded during the evaluation, excavation and watching brief phases of work which had been cut through the ground consolidation layers discussed above, and appeared to form elements of the 'Period I' complex identified by Marsden in 1961–1962.

The eastern apse, Building 2

The remains of a heavily truncated masonry structure [2050], Building 2, were observed at the extreme southeast of the site during the watching brief phase of work (Fig. 16, 17). This area of masonry consisted predominantly of

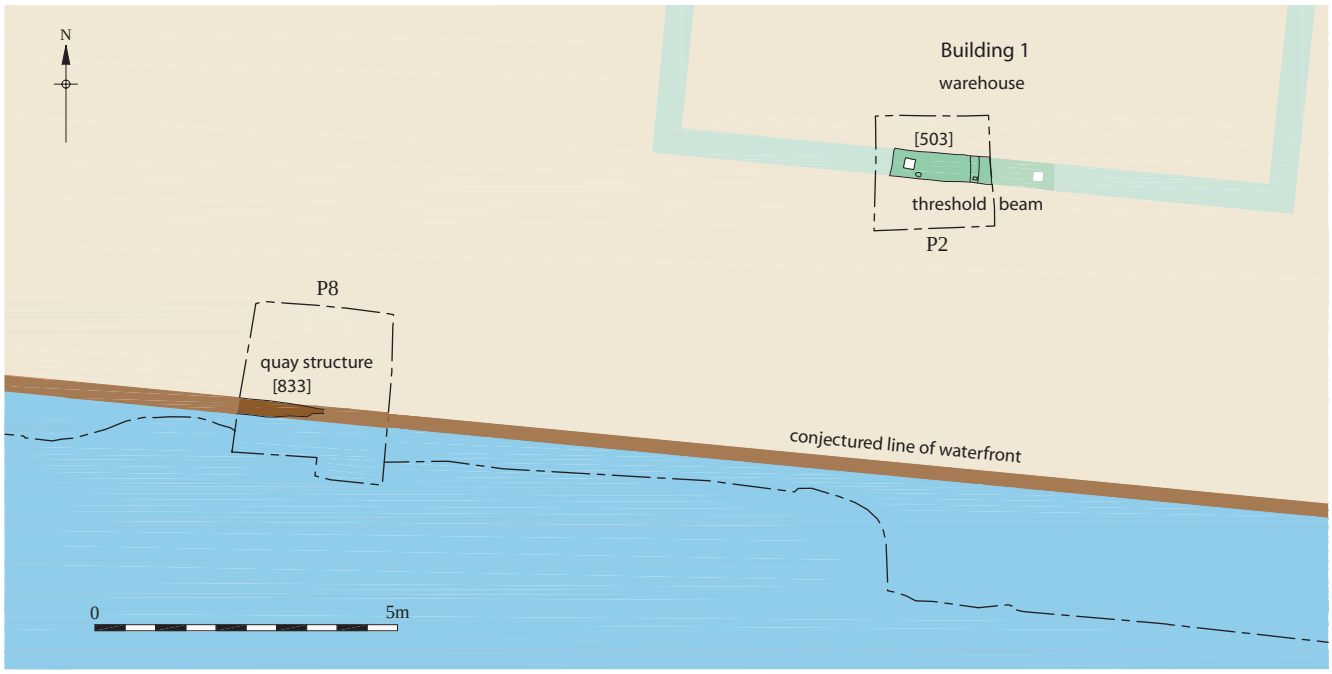


Fig. 15 1st-century quay timbers shown in relation to conjectured line of early Roman waterfront and possible warehouse, Building 1 (scale 1:125)

Roman concrete with fragments of tile and nodules of flint within the fabric of the wall, particularly along its northern face. It measured 2.40m east–west by 1.00m wide and survived to a height of 0.91m. It was apparently trench built on its northern side but had some evidence of facing on its internal, southern side. Although heavily truncated by the 1960s' construction, especially on the east, the masonry appeared to be curved and may have formed part of an apse.

To the south of, and adjacent to, the outer wall of the apse was a fragment of masonry [2051] constructed from pinkish concrete with tile fragments and flint nodules. It measured 2.40m long east–west by at least 0.75m wide north–south, although was heavily truncated to the east and south by modern foundations. This may represent the foundation of the floor of the apse. Both this internal infilling and the outer wall of the apse were apparently built together, within a construction trench *c.* 0.50m deep into the natural London Clay, which appeared to have a real cut edge on its western side, suggesting that the masonry originally stopped at this point. Within the foundation cut were set 12 oak piles, made from whole logs and formed boxed hearts (see Goodburn, Chapter 3). The piles varied in size between 260mm by 230mm and 420mm by 380mm. Their length was unknown as they were left *in situ*

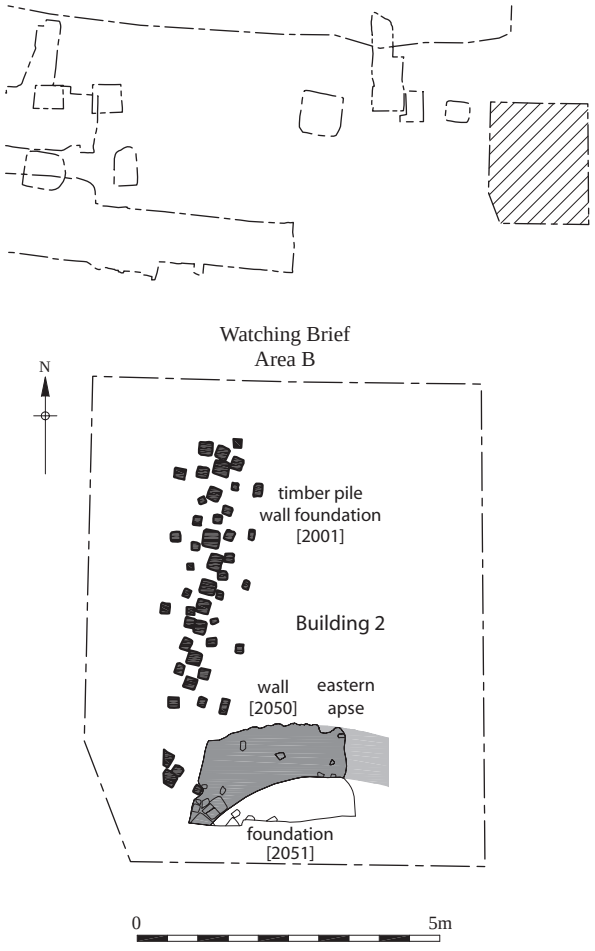


Fig. 16 'Period I' structures seen during the watching brief: Building 2, Phase 6a apse and later piles [2001] (scale 1:125)

Fig. 17 Linear foundation piles [2001] with part of apse [2050] visible in foreground, looking north (scale 2m)

with only samples taken from the tops of the timbers for dendrochronological analysis. Only one sample provided enough rings for full analysis and this gave a probable felling date of AD 165 (see Tyers, Chapter 3). Assuming that this area of masonry formed part of the 'Period I' development, this provides the first dating evidence for the complex, and places the development slightly later than the previously postulated late 1st or early 2nd century date (Williams 1993). Alternatively the apse may represent a slightly later addition to the initial complex, albeit the earliest part with dating to be yet found.

It would appear that the outer masonry [2050] may have formed part of Feature {36}, previously recorded by Marsden in this area of the site, which was also interpreted as forming part of a probable apse (Williams 1993, fig. 54). He described the wall as 'faced on its south side only, but

there was some indication that it might have been curved as part of an apse. The south face had three double courses of bonding tiles set in pink cement, separated by single courses of ragstone.' He observed the tile courses extending 0.6m into the wall and the fabric of the masonry containing 'ragstone, flint and pebble concrete 1.01m (3ft 4in) thick' (Williams 1993, 67). The differences in description can be explained by the fact that he observed the wall standing to a height of 0.6m (2ft) just below the later chalk raft, whilst the masonry uncovered in the recent excavations had been truncated to foundation level. Marsden did not observe the internal masonry of the apse as it was covered by 'a mass of Roman building rubble' (Williams 1993, 68), which may represent demolition debris covering the internal floor of the apse. The masonry infilling may also be the same as Feature {50} which Marsden described as 'a mass of Roman building rubble, including a quantity of chalk' which lay against the south face of Feature {36}, interpreted as possibly being the foundation for a wall (Williams 1993, 68).

Phase 6B: 'Period I' additions (early 3rd century AD)

A north–south alignment of 47 oak piles was recorded extending northwards from the western side of the possible eastern apse (see Fig. 16, 17). The piles were of box-heart conversion, with slightly larger timbers, measuring up to 250mm by 280mm, positioned along the centre of the line and smaller posts, 110–170mm by 110–180mm, either side. The alignment was recorded over a length of 5m with a maximum width of 1.50m. The posts were driven into the London Clay at a slight angle leaning to the south, possible further evidence of collapse along the south of the site. The posts were mainly left *in situ* with only samples of their exposed tops being taken for dendrochronological analysis, however one timber which was removed suggested that the timbers had tapering ends and were at least 1.00m in length. They clearly formed the foundation of a further large masonry wall, which had apparently abutted the western part of apse [2050], as the timber piles continued onto the line of the wall. The posts adjacent to the apsidal wall were partially covered by loose lumps of ragstone, which may represent the remains of the masonry above.

A dendrochronological date provided by one of the piles indicated a felling date for this timber of between AD 203 and AD 239. Both the stratigraphy and the dendrochronological date suggested that this phase of building took place after the initial construction of apse [2050], representing a later addition to the 'Period I' complex in the early 3rd century. However, it is possible that these remains may represent parts of an entirely different, later phase of building. During Marsden's observations a similar alignment of posts, Feature {38}, was recorded in the vicinity apparently immediately to the west, with ragstone and one tile lacing-course lying on the timber foundation. These timbers may be associated with the same phase of development and represent another north–south aligned wall. However, the close proximity of the two lines of timbers might also suggest that they represent the same foundation structure, the slight difference in location being explained by the watching brief conditions and the difficulties of locating features that Marsden was faced with in the 1960s.

Further possible evidence of an intermediary phase of construction during the AD 230s was provided to the west in P8. The quay baulk [833] which may have been originally part of a 1st-century waterfront appeared to be reused at this time to retain a stiff orange brown clay containing frequent large fragments of building material, including pieces of *opus signinum* measuring up to 500mm by 200mm by 200mm, smaller fragments of ragstone, tile and lumps of mortar (see Fig. 12 section, Fig. 18), all of which presumably originated from an earlier structure located in the vicinity. This deposit, which was up to *c*. 1.00m thick, had apparently been packed around the upper of two smaller north–south orientated oak beams [834], [914] which had been positioned one over the other with a gap of 1.00m between. It would appear that both the two north–south timbers, which measured at least 830mm by 145mm by 160mm and at least 2m by 200mm by 200mm respectively, were driven horizontally into the bank of London Clay (see Fig. 12). Indeed the lower of the two, [914], had a tapered point at its northern end and was only found during reduction of natural London Clay to level off the base of the trench; it was almost entirely sealed by the clay within the trench. There was no evidence of a cut through the clay suggesting it was driven horizontally in from the south, which suggests that there was a large working space on this side and no masonry structures (see Phase 6C, below). However, it is doubtful whether it would indeed be possible to drive a timber of such a size horizontally into London Clay and perhaps a more likely scenario is that the timbers, including the reused 1st-century example, had been laid as some form of timber framework subsequently covered by redeposited London Clay. Augering through the top of the London Clay deposits to the northeast in OP201 revealed streaking and lensing within the top of the deposit, which might be evidence of redeposition of the clay.

The dendrochronological dates provided by these

Fig. 18 Section across packing behind timber terrace wall, looking southwest, with western apse visible to south (scale 1m)

timbers suggest that they were felled between AD 204 and AD 233 (see Tyers, Chapter 3) and it appeared that, together with the reused quay baulk timber [833], they formed part of a timber lattice work. The timbers, and indeed the whole structure, were truncated by later masonry walls to both the south and east (see Phase 6C, below). The large east–west timber had been broken off at the east and a later ragstone wall [708] had been built around the broken-off end. Both north–south timbers had been cut off at their southern ends, the higher timber [834] was cut off further to the north by the wider construction cut of a western apse [706] (see Phase 6C, below), whilst the lower [914] was cut off where it met the base of the foundation of this apse. A north–south section (see Fig. 12) across the east–west timber and the packing demonstrates that further east–west baulk timbers, that had once been placed above the surviving timber [833], had been removed for the insertion of the later masonry with the packing material slipping slightly into the backfill of the construction cut for the apse. At least one timber was removed below the existing baulk which would have been used to retain the lower redeposited foreshore dumps, and it is probable that one or more would have originally have been placed above to retain the packing material of clay and building material. It is possible that a number of posts would originally have supported the baulks on their southern side, all of which had also been removed during the construction of the apse.

Whilst the confines of P8 made precise interpretation of this grid of timbers and packing material difficult, they may have formed part of a foundation or temporary support during a period of construction. Such timber foundations have been found in an area of equally wet ground near the Walbrook at No. 1 Poultry (Rowsome 2000b, 24). The clay and rubble packing survived to a height of 2.31m OD, which was much too high for any structure associated with the waterfront such as a quayside or dock, as during the 2nd and 3rd centuries the River Thames was in a period of tidal regression when the level of the river fell quite dramatically (Brigham 1990, 141–149). Perhaps a more likely interpretation of the feature is that the timbers and packing represent the remains of terracing of the area with natural London Clay being removed from up the slope to create a level platform and the material being used to dump behind a timber terrace wall and build up the land further down the slope. This activity would be associated with the possible early 3rd-century phase of construction recorded to the east of the site.

Phase 6C: 'Period I' rebuilding, Building 3 (mid 3rd century AD)

The most substantial elements of masonry found during the investigation identified as being parts of Marsden's 'Period I' complex, were revealed in the southwestern part of the site (Fig. 19).

An east–west aligned wall [51] was recorded during the evaluation in OP201, which measured at least 8.36m long by 1.28m wide by at least 1.40m high, and had survived to a height of 2.62m OD. The masonry had been truncated to the west by a modern basement but continued beyond the eastern limit of excavation. The wall was constructed from faced ragstone blocks with a core of rough ragstone bonded with pink mortar. Remnants of a double tile bonding-course were visible in the western part of the wall with a single tile-bonding course below. The foundation of the wall was offset to the north and the remains of timber plank shuttering [81], [128] were recorded resting against its northern face; the wall had collapsed south, apparently in antiquity, and rested at an angle of 45° (Fig. 20, 21, 22). As with the earlier timber threshold beam, this had probably been caused by the instability of the ground to the south. Further evidence of this collapsed wall was recorded further to the east as [427], during the excavation of P10, which would suggest that it continued for a length of at least 11.70m.

The remnants of an originally arched culvert constructed from tiles and ragstone and measuring 0.29m wide by at least 0.35m high was recorded within the wall. It sloped down steeply to the south due to the subsequent collapse of the wall but would originally have been constructed to conduct one of the natural watercourses to continue towards the Thames.

To the north of wall [51] was a north–south aligned ragstone wall [38], between 0.85m and 1.15m wide by 0.75m high, of similar construction, consisting of ragstone facing blocks with a tile bonding course and ragstone rubble core (see Fig. 19). The two walls did not meet due to subsequent collapse, though whether they were contemporary and bonded, or merely abutted, is unknown as the gap caused by separation of the two walls was filled with demolition debris which could not be removed during the evaluation phase, as excavation was kept to a minimum as part of the preservation *in situ* strategy. The wall only survived for a length of 2.86m to the north, suggesting that it was originally stepped up the hillside. An area of ragstone rubble [164] set into the London Clay to the north may be the remains of a foundation for the continuation of the wall to the north. This apparent stepping of the wall, together with the identification of considerable dumped material recorded towards the bottom of the hillside, provides further evidence for the putative terracing of the natural slope down to the Thames in order to facilitate construction.

The location of wall [51] correlates well with Marsden's Feature {14} (Williams 1993, fig. 54), which he described as 'a wall of ragstone with a double course of bonding tiles, at least 3ft 4in (1.01m) wide, which appeared to have fallen over to the south'. His Feature {12}, which was between 1.14m and 1.32m wide (Williams 1993, 67), may be a northern return to the wall in the west, being a continuation northwards of wall [708] (see Chapter 4 for a fuller discussion of this and other problems with correlating recent findings with Marsden's work).

Dating of walls [51] and [38] was problematical. Only very limited excavation was permitted during the evaluation phase during which these walls were encountered and only one sherd of pottery, dating to the second half of the 1st century AD, was recovered from a probable foreshore deposit through which the base of wall [51]

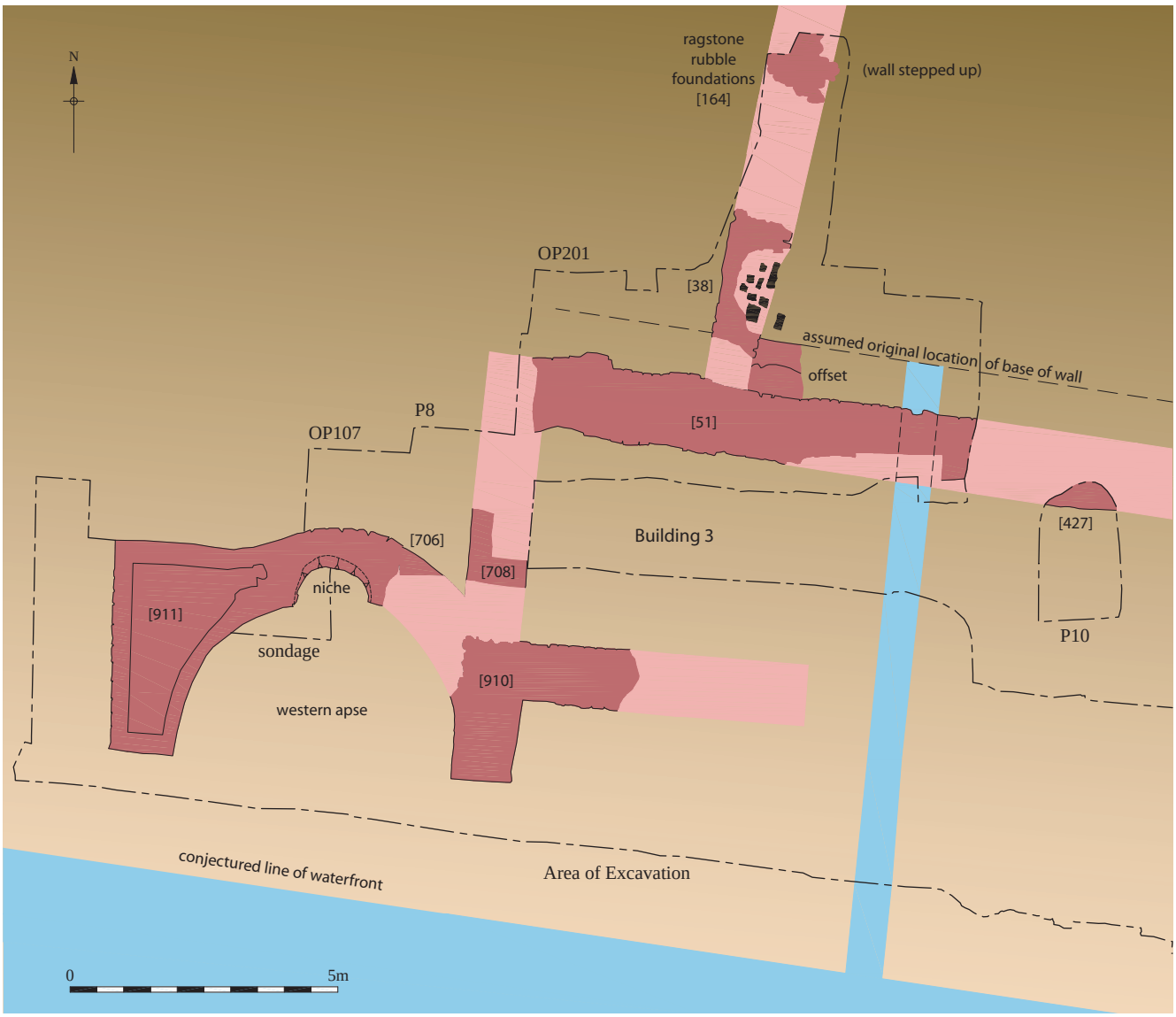


Fig. 19 'Period I' Building 3, Phase 6c western apse and associated walls (scale 1:125)

cut. Two samples of the timber shuttering were taken for dendrochronological analysis; however, they did not contain enough growth rings to obtain a felling date. Dating of the masonry could only thus be obtained by their relationship to further masonry walls to the south (see below).

A series of timbers were recorded below a truncated portion of wall [38], exposed when a later medieval chalk-lined well was removed (Fig. 23). These timbers appeared to be following the alignment of the wall, and were thus initially interpreted as forming part of the piled foundation for the wall. Because of the policy of preservation *in situ* it was not possible to remove the wall to see if they were part of a piled foundation. However, they were set at an angle of 60° to the north and as such they might represent sloping chocks used to push up the heel of a very large timber shore for holding up a wall to the north that was collapsing southward. Of course it would be the greatest coincidence if these 'chocks' just lay in the area of the later chalk well and it is probable that they continued beneath the wall at least in part. It would therefore suggest that two phases of propping were present on the site. The first consisting of probably a large timber brace resting on the timber chocks. This was then replaced with a masonry buttress, of which wall [38] is the remains. If these timbers and masonry do represent an impromptu and substantial attempt to avert the collapse of a large wall to the north, this process may have occurred during the later development of the site in the late 3rd century.

It is likely that collapsed east–west wall [51] also originally continued to the west, where it probably joined north–south wall [708], the western face of which was recorded during the excavation of P8. This wall was 1.10m wide, was traced for a length of 1.40m and survived to a height of 2.05m. The join between the walls was not observed due to truncation in this area by the basement wall of the Salvation Army Headquarters. Wall [708] was constructed in an similar fashion to wall [51], however, consisting of faced ragstone blocks with a double tile lacing-course and a single tile lacing-course towards the base of the wall and the remains of timber shuttering observed against the base of the wall's western face. It was thus interpreted as forming part of the same build as east–west wall [51].

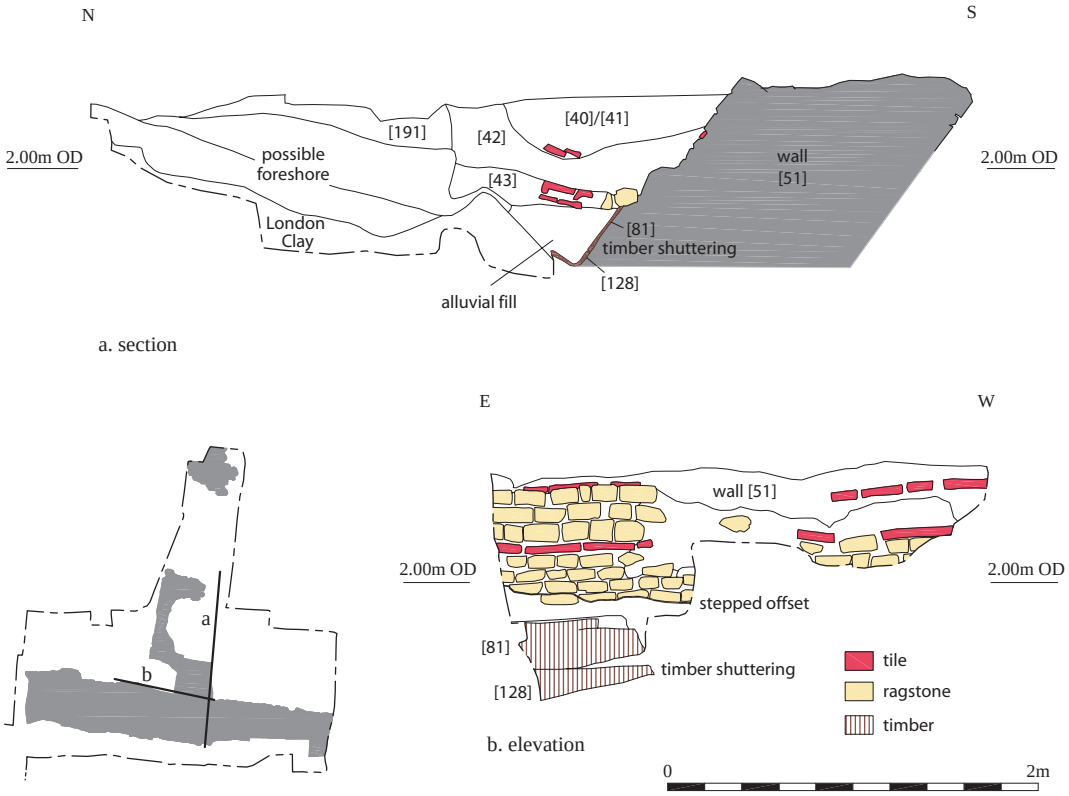


Fig. 20 Elevation and section across 'Period I' wall [51] showing collapse (scale 1:40)

Fig. 21 'Period I' wall [51] from the north (scales 1m, 0.5m)

Fig. 22 Collapsed 'Period I' wall [51] from the west (scale 0.5m)

Fig. 23 Timber chocks below wall [38] looking south, the two circular piles to the left of the image are part of the later 'Period II' piling (scale 0.5m)

The base of the wall respected the slope of the London Clay and rose to the north; the lowest point of its base was at 0.25m OD compared to the base of wall [51] as observed on its northern face at 1.22m OD. Wall [708] would appear to occupy the same approximate location as Marsden's (unphased) Features {9} and {10}, which are not described but thought to be probably of ragstone, Feature {10} being the superstructure of Feature {9} (Williams 1993, 66).

The western apse

Although truncated, wall [708] presumably extended south to meet a large, predominantly ragstone, apse [911] (Fig. 24) and the similar construction techniques, materials and mortar suggest that the two walls were contemporary. The apse was mainly recorded in plan with only limited excavation undertaken, these interventions being confined to P8 against its external face and a sondage against its internal face, which made the exact relationships between the walls difficult to determine with any precision. This substantial apse had an open southern end, measured 5.40m across internally by 2.80m north–south and was constructed predominantly of faced ragstone blocks with three double tile lacing-courses, only recorded on the northern external face, with flint above the lowest tile lacing-course (Fig. 25a, 26). The internal face of the apse featured a recessed niche 1.25m wide, and the basal two courses of the domed roof of this niche survived (Fig. 25b, 27). The *in situ* portion of the roof consisted of *voussoirs* overlain by squared tufa stone blocks, presumably specifically selected for their light weight. The base of the niche was not encountered during the excavation of the test pit and a series of auger holes were driven through the deposits which suggested that the niche and internal part of the apse may continue to a depth of at least 2.45–2.55m beneath the surviving top of the masonry. However, the auger did not seem to be impeded by a solid obstruction such as a floor surface and it is more likely that it might have struck looser demolition rubble near the base of the structure. A large crack, up to 80mm wide, was recorded on the western internal face of the niche, which extended the full height of the exposed internal face. This was likely to have been caused by slumping to the south, with the entire apsidal structure having a slight southern tilt. The exceptional survival of this element of the 'Period I' complex is due to both the absence of later 'Period II' development in this area of the site, and also the location of the apse outside the basement of the Salvation Army Headquarters.

Crucially the eastern part of the apse was truncated by later activity. This prevented the exact relationship between north–south wall [708] and the apse being determined in plan and also the relationship with an east–west ragstone wall [910] which appeared to extend from the eastern side of the apse for a length of 3.30m before being truncated to the east. Although only the top of the wall could be examined in plan and its northwestern part was truncated by later activity, scarring of the wall on its northwest corner and a protruding lump of ragstone suggested that this wall was keyed into the apse and formed part of the same phase of building. It was similar in width, at 1.12m, and ran parallel, to wall [51] to the north, which would suggest that they were contemporary, forming an interior room, approximately 4m wide, between them.

Dating of the apse and apparently adjoining walls was provided by their relationship to the earlier timber structure, which gave a *terminus post quem* of *c.* AD 230 (see above) and pottery recovered from the backfill of the construction cut for the external face of the apse recovered from P8. The primary fill was dated to *c.* AD 60–150 and probably contained residual material derived from earlier foreshore deposits used to backfill the cut; however, the secondary fill was dated to *c.* AD 180–270, which would fit with a mid 3rd-century AD date for the construction of this part of the 'Period I' complex, Building 3.

Fig. 24 Western apse and associated walls during excavation, looking east (scales 2m, 1m)

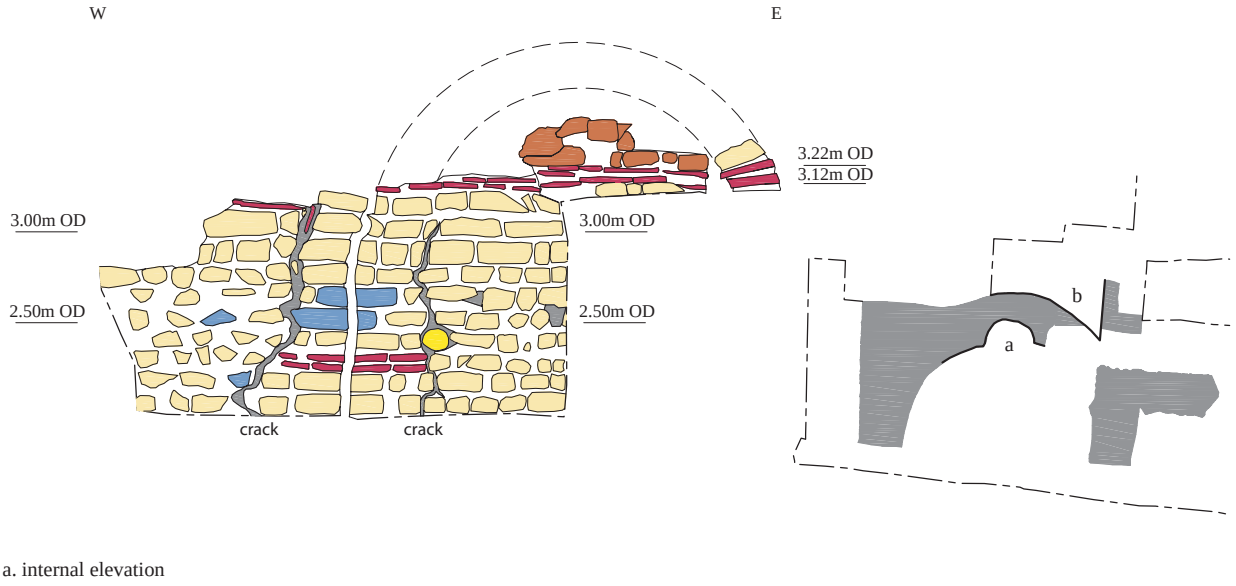


Fig. 25 Elevations of apse [706] and adjoining wall [708]: a) internal elevation, b) external elevation (scale 1:40)
nb levels in alcove distorted because of curvature

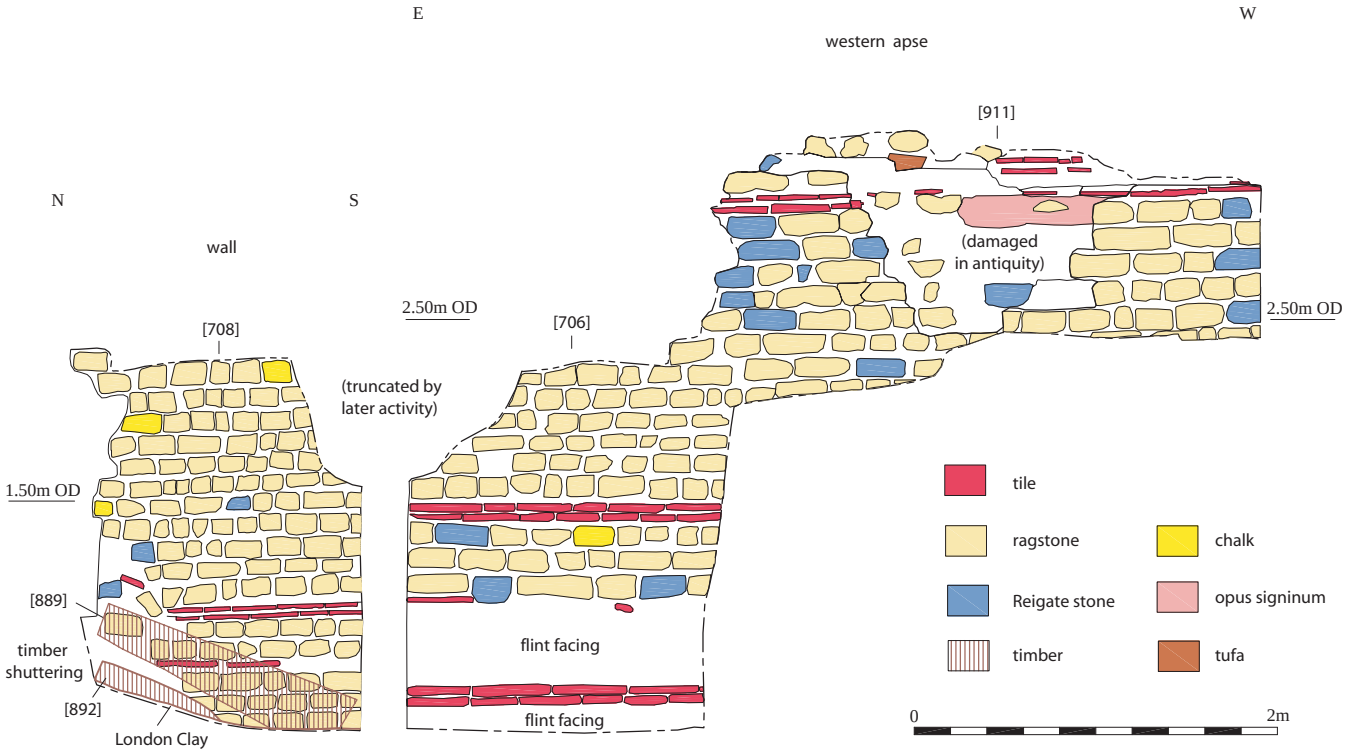
Fig. 26 External view of western apse, looking south (scale 2m)

Fig. 27 Internal view of western apse, looking northwest (scale 0.5m)

THE 'PERIOD II' DEVELOPMENT

Phase 7: 'Period I' demolition and ground consolidation (late 3rd century AD)

If the postulated mid 3rd-century AD construction date is correct for the construction of Building 3 elements of the 'Period I' complex then it could not have survived for long. Despite possible attempts to prop the walls (see above) the walls, at least at their western end, seem to have suffered a catastrophic collapse caused by subsidence to the south. Both wall [51], which listed to an angle of 45°, and the apse, which exhibited large cracks within its internal face, showed the results of this subsidence. Sometime following the collapse the buildings were demolished and the area



b. external elevation

levelled in preparation for another substantial phase of construction (see below).

In the area adjacent to wall [51] the consolidation initially took the form of the infilling of the large void along its northern face which had been caused by collapse to the south. The primary fill [43] consisted of a mixed deposit of sand clay and mortar with ragstone and fragments of roofing tile (*tegulae*), which may represent debris from the collapse or later demolition of the wall or superstructure. This was covered by a sticky deposit of apparently puddled London Clay [42], which continued further up the slope to the north beyond the void as [191]. This sticky puddled clay may represent the washing down of London Clay from the bank above, suggesting that the area had been either subject to abnormally high rainfall, which may have contributed to the subsidence and the collapse or else following the collapse the network of culverts which had previously channelled the water from the spring line up the hill had become blocked causing the area to flood and depositing liquid clay in the void. The remainder of the void was infilled with deliberately dumped rubble material consisting of two different deposits. The lower fill [41] consisted of lumps of ragstone and mortar whilst the upper fill [40] was made up of large fragments of *opus signinum*, ragstone, mortar and Roman ceramic building material consisting of *tegulae*, *imbrices* and fragments of box flue tiles. The occurrence of the box flue tiles, which made up approximately half of the recovered ceramic building material component of this context by number, suggests an origin in a bathhouse, or at least heated rooms, however although a large proportion of the material consisted of box flue tile, the group only includes 36 fragments in total and is thus not statistically very reliable. The presence of the box flue tile led to an initial suggestion that the material may have originated from the redundant Huggin Hill baths to the east, brought in as levelling. However, the length of time which had elapsed between the demolition of the baths in the mid to late 2nd century and this late 3rd-century ground consolidation coupled with attendant putative robbing of the baths for the construction of the 'Period I' complex and other contemporary structures renders this unlikely and it seems more probable that this material may have come from the demolition of the 'Period I' buildings themselves.

The western apse appeared to have been deliberately infilled following its disuse. Deposits of sandy silt and clay material were recorded which contained pottery, bone and building material representing domestic waste. Pottery recovered from these dumped deposits consistently dated to between AD 170 and 270 and included bowls, dishes and cooking pots. Deliberate dumping was recorded during excavation of pile locations along the southern area of the site, representing further ground consolidation prior to the large-scale redevelopment of the area in the late 3rd century.

Of particular note among the make-up deposits attributed to this phase of activity was layer [828]. This was a loose mid pinkish brown sandy silt which contained both pottery and large quantities of building material deposited over the western side of apse [911], subsequent to its infilling. Among the building material recovered from this deposit were significant amounts of painted wall plaster, stone *tesserae* and polished marble veneer fragments that attested to the opulence of the building(s) from which they derived (see Sudds, Chapter 3). Debris of similar composition was recorded immediately pre-dating

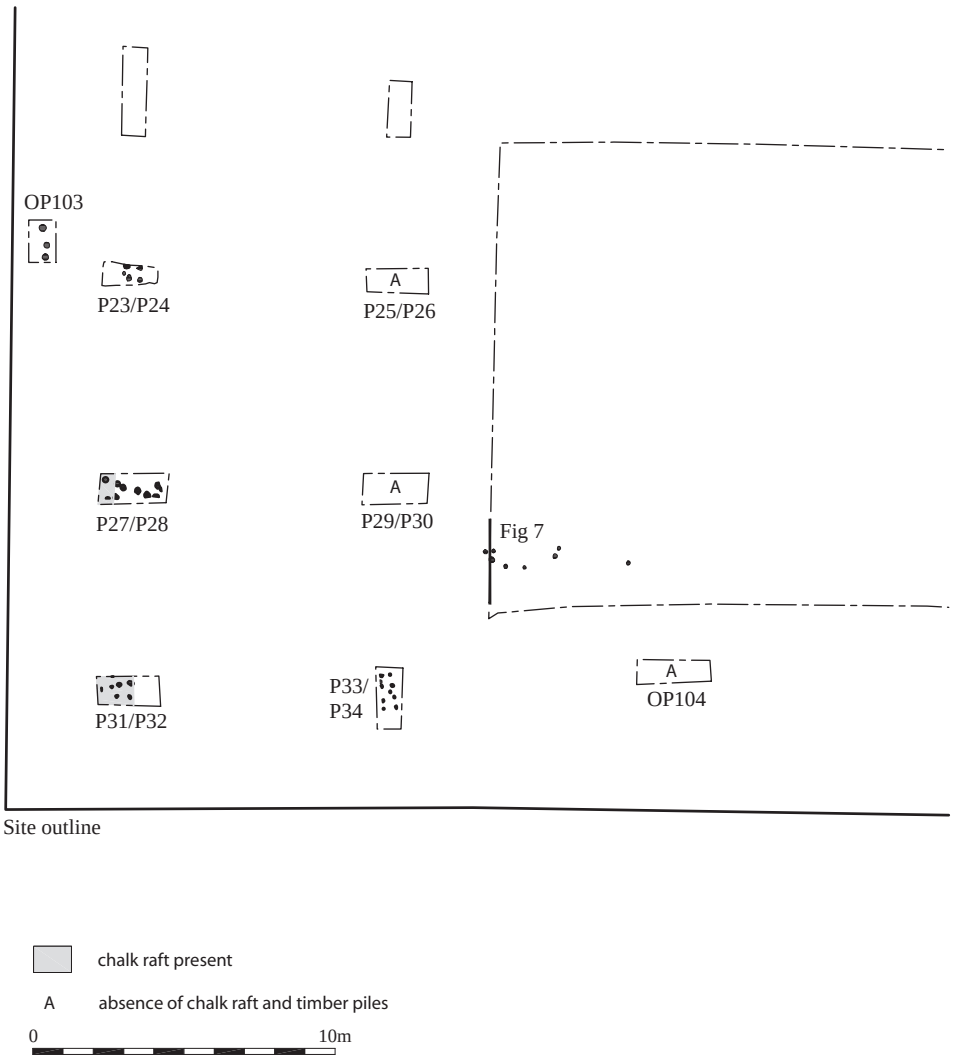


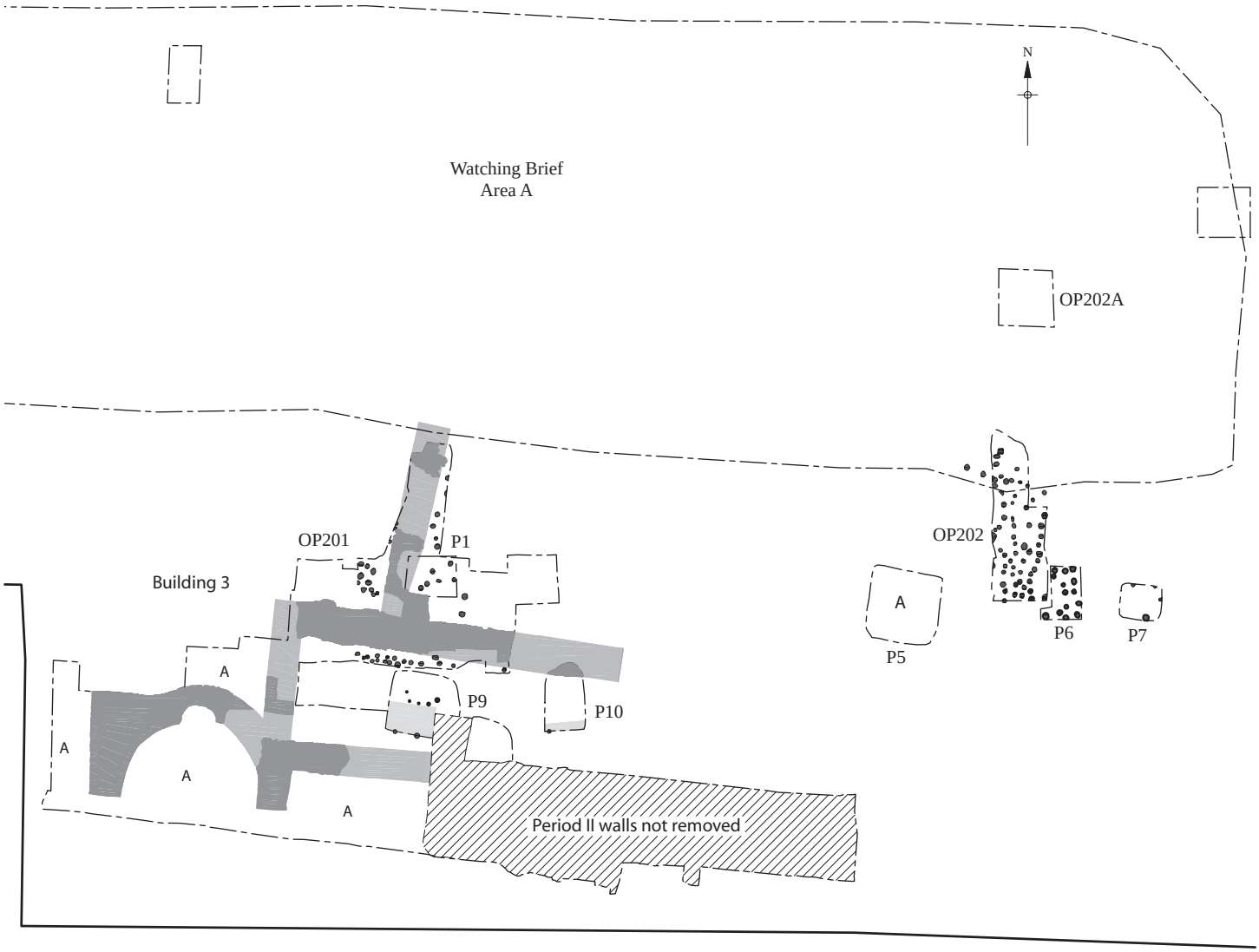
Fig. 28 'Period II' pile distribution, shown in relation to 'Period I' masonry of Building 3 (scale 1:250)

the 'Period II' development at Peter's Hill to the west (Betts 1993, 88–89, 99–100). The pottery recovered from this deposit and other similar dumps covering the 'Period I' masonry suggested that it had been deposited between AD 270 and AD 300, indicating that it must also have been deposited almost immediately prior to construction of the 'Period II' complex. As discussed below (see Sudds, Chapter 3) the quantity, condition and nature of the recovered building material indicate a single source in the immediate vicinity. It seems likely, therefore, that this material may have derived from the final destruction of the 'Period I' buildings.

The dumps covering the 'Period I' walls were consistently dated to the period after AD 270 and probably between *c.* AD 270–300. This accords well with the rest of the evidence, which suggests that the last phase of rebuilding of the 'Period I' complex took place after the AD 230s probably in the mid part of the century. The demolition dumps would suggest that the building had collapsed and gone out of use sometime after AD 270, which suggests a life for the last phase of the complex of as little as *c*. 20–40 years.

Phase 8: 'Period II' development, Building 4 (AD 294)

Massive masonry foundations were recorded towards the southern area of the site (see Fig. 30), in the main Area of Excavation beyond the limits of the pre-existing basement under Booth Lane. A large east–west orientated ragstone foundation [429] resting on a base of large reused limestone blocks was encountered which measured 4.50m north–south by 15m east–west by a maximum of 1.90m high with a highest level of 4.80m OD. It had been truncated to the south by a large 19th-century sewer, so its full width could not be established, although elements of its northern face remained intact. Extending from the western end of this wall was a further wall [428], which measured 5.50m north–south by 1.5m east–west by 1.80m high (see Fig. 31a). This had been truncated to both the south and west by the 19th-century sewer, and to the north by the basement of the Salvation Army Headquarters. These walls formed Building 4, part of the 'Period II' phase of construction recorded during previous groundwork in the vicinity.



Ground preparation

The masonry foundations were constructed on large timber piles, which had been driven through the London Clay and, where present, the consolidation dumps (Fig. 28, 29). Where 'Period I' foundations were present these had been used in place of the timbers as a stable foundation. The piles were recorded across the southern area of the site during all phases of archaeological work. To the west of the site they were revealed in P23/24, P27/28, P31/32 and P33/34 with their most northerly survival recorded in OP103 at the extreme west of the site. Their absence further to the north suggested the presence of the upper terrace of the complex in this area of the site. However, the timber piles were recorded slightly further to the north towards the west of the site (OP103), but were absent the same distance north further to the east (OP202a). This suggested the northern terrace was further to the north in the western part of the site.

The 'Period II' piles did not appear to be arranged in any pattern. Most were whole boles, often with the bark intact. They had diameters of between 150–300mm and, where excavated, varied in length from between 1.50m to 3.12m. In all instances the piles had been hewn to a long tapering point. The preservation of the piles was generally good, although where they had been previously exposed during the 1962 development they were much more decayed, sometimes having completely decomposed to a depth of up to 0.50m. Piles recovered which were suitable for dendrochronological analysis suggested that the timbers had all been felled in winter AD 293 or spring AD 294, and were therefore consistent with the dates from the timber piles found at Peter's Hill and Sunlight Wharf (see Tyers, Chapter 3).

The timbers were found in three clusters across the site, to the west in Booth Hall, in the centre in OP201 and to the east of the site. Their observation in these three areas obviously reflected the three main areas of archaeological investigation but there were some surprising gaps in P29/30 even though they were observed immediately to the east in section only

Fig. 29 'Period II' piles in OP202, looking south (scale 0.5m)

2m away (see Fig. 7, Chapter 1) and along the western part of the main watching brief area. This may in part be due to deeper modern foundations having removed them in certain areas, and Marsden did reveal large areas of piling along the southern part of the site to the west (Williams 1993, fig. 54), however, observations at Peter's Hill to the west suggest that the entire area was not piled but only areas in which terrace dumping was present or where massive foundations were built above (Williams 1993, fig. 33).

The timber piles had been sealed by a very compacted layer of chalk. This survived below the level of the concrete slab in P31/32 and P27/28 and immediately to the south of the slab in the southern section of P9. It was recorded at heights of between 2.74m OD in P9 and 2.46m OD in P31/32, and where it had not been truncated, was up to 350mm thick. Where observed, the raft appeared to be rammed flat around the piles so that the surface of the chalk was level with the top of the piles. The function of the chalk raft appeared to be to provide a solid platform for construction. In P10 a slightly different sequence of ground preparation was evident. A dumped deposit of sandy silt with frequent ragstone and chalk fragments overlay the timber piles and may represent a degraded fragment of chalk raft. However, above this were two mortar deposits up to 0.29m thick on which a pink *opus signinum* mortar bedding for the 'Period II' masonry lay.

The massive programme of ground preparation instigated prior to the construction of the 'Period II' foundations must have been undertaken in order to combat the clear topographic limitations of the area for large-scale development, principally the slope down to the Thames, which appears to have become severe immediately to the south of the site and also the considerable volume of water which is likely to have run down the slope into the river. That these issues had implications for development had been starkly demonstrated by the previous attempts at construction in the area. Firstly the quayside warehouse had collapsed down the slope to the south, followed by the more dramatic collapse of the large masonry wall of the 'Period I' complex. As well as the wall, the western apse showed signs of severe subsidence, and the angled timber chocks recorded further to the north may also have been inserted in an attempt to halt collapse of walls further up the hillside. These previous failed attempts to construct large buildings towards the base of the hillside would have been clearly evident to the engineers planning the 'Period II' construction works, and would have played a large part in dictating the enormous scale of the ground preparation identified during the archaeological fieldwork.

Construction of Building 4

Where it had not been truncated by the basement slab, a layer of *opus signinum* bonding material overlay the chalk raft to a maximum thickness of 50mm. Large foundation blocks were then laid on the *opus signinum* bedding, seemingly whilst it was still wet given that it had been forced up between the gaps in the foundation stones. Where observed, the foundation stones consisted of oolitic limestone, identified as Weldon stone and Bath stone, and two blocks of Ham Hill stone, a shelly limestone, one of which had broken in two. The oolitic limestone blocks measured between 215–807mm long by 107mm wide (where visible) by 310mm tall, and the Ham Hill stone blocks between 259–382mm long by 110mm wide (where visible) by 388mm tall. In one instance two limestone blocks had been fitted together by matching a vertical chamfer in one stone with a corresponding hollow rebate in the next in order to create a very fine joint. Similarly large blocks of limestone were observed at Peter's Hill (Williams 1993, 48-49, fig. 2 & 4), although the single sample retained was of Barnack stone. However in common with the Salvation Army Headquarters site these also appeared to be reused and therefore derived from a previous large and high status building, possibly the 'Period I' complex.

The walls [428], [429] were constructed in the *opus mixtum* style, being faced in well defined, predominantly ragstone courses with tile lacing, although more unusually Reigate stone, *septaria* and occasional chalk, flint and tufa were also used (Fig. 31, 32 and see Sudds, Chapter 3). Above the large reused shelly and oolitic limestone blocks were two courses of squared faced ragstone blocks. Above this was a double tile lacing-course, which had up to five courses of ragstone above. The surviving northern face of the wall consisted of a second double tile lacing-course.

Fig. 30 'Period II' Building 4 walls shown in relation to those found at Sunlight Wharf and the projected line of the riverside wall as indicated by Williams (1993, fig. 9) (scale 1:125)

The ragstone face of the wall exhibited signs of a mortar render having been applied. The core of the walls consisted of irregular roughly squared ragstones set in a matrix of very hard concrete, and where visible this core appeared to have been laid down in definable courses.

There was evidence of an internal space or room within the masonry suggested by facing stones in the southeastern part of the large east–west wall [429] (Fig. 33). Observations at Sunlight Wharf, where the southern and eastern faces of this room were observed (Williams 1993, 58–59, fig. 48), suggested that the internal space would have measured 3.60m east–west by 3m north–south (see Fig. 30). Along the northern edge was a 0.48m wide piece of masonry constructed from ragstone and covered in reddish pink *opus signinum*. It would appear to be an internal facing wall but was *c*. 0.34m below the surviving level of the masonry to the north, which might suggest that it was more likely part of a flight of steps leading down into the room. The room was backfilled with grey silt but as this part of the structure was to remain preserved *in situ* no excavation of the backfill was undertaken.

A section through the core of the large east–west wall between the two culverts (see below) provided by later Victorian truncations produced some evidence that the masonry may not have been one solid block of the same thickness throughout. The ragstone core of the wall rested on a layer of *opus signinum* as elsewhere in the 'Period II' complex, however, it was at a much higher level, at 4.13m OD, than the rest of the masonry at 2.95m OD, and beneath the *opus signinum* was a much thicker deposit of chalk, consisting of at least a 0.89m thickness of looser fragments rather than the compact material seen elsewhere (Fig. 34).

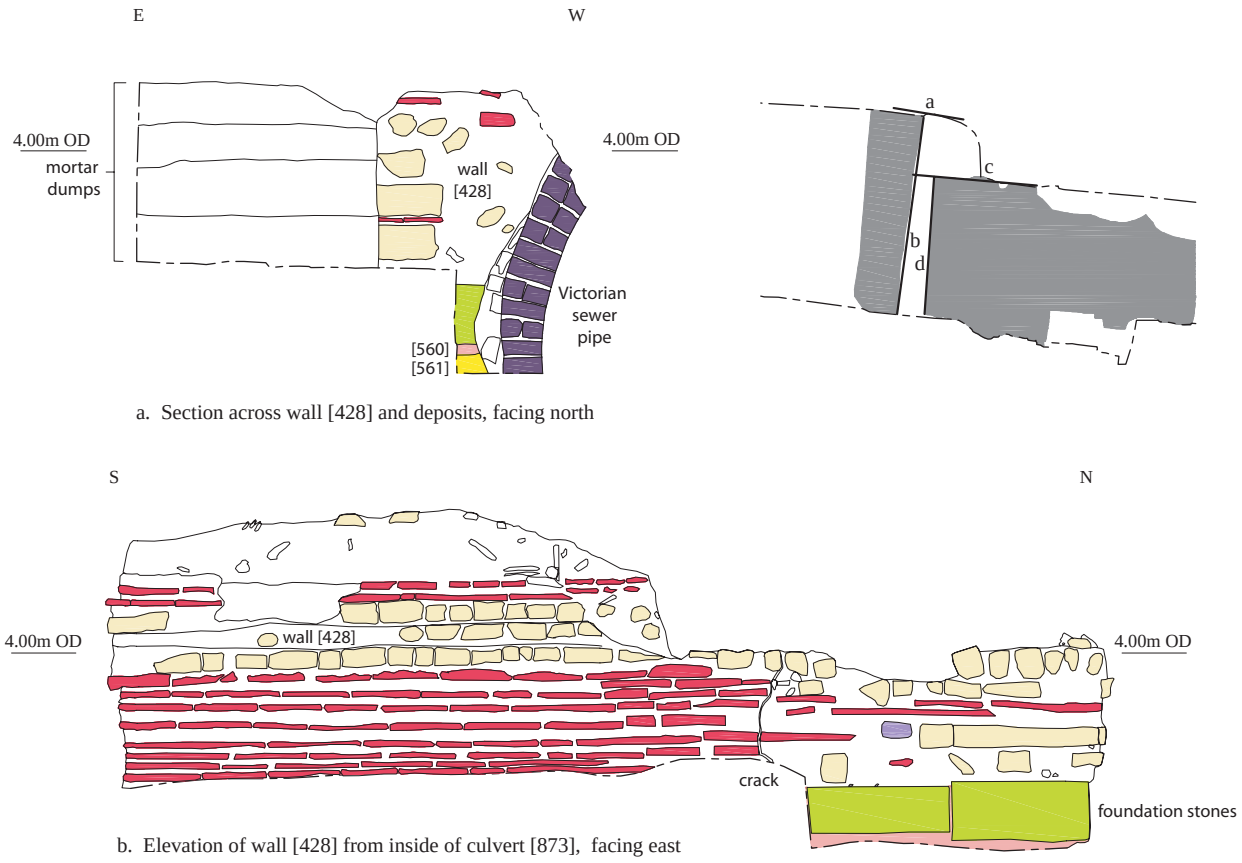


Fig. 31 Section across wall [428] (a) and elevations of 'Period II' wall [428] and culvert [873] (b–d) (scale 1:40)

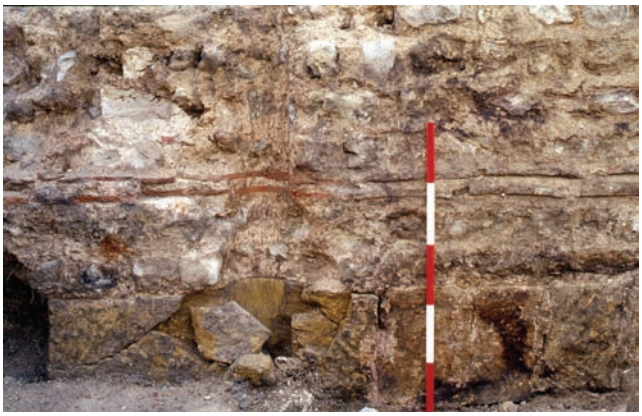
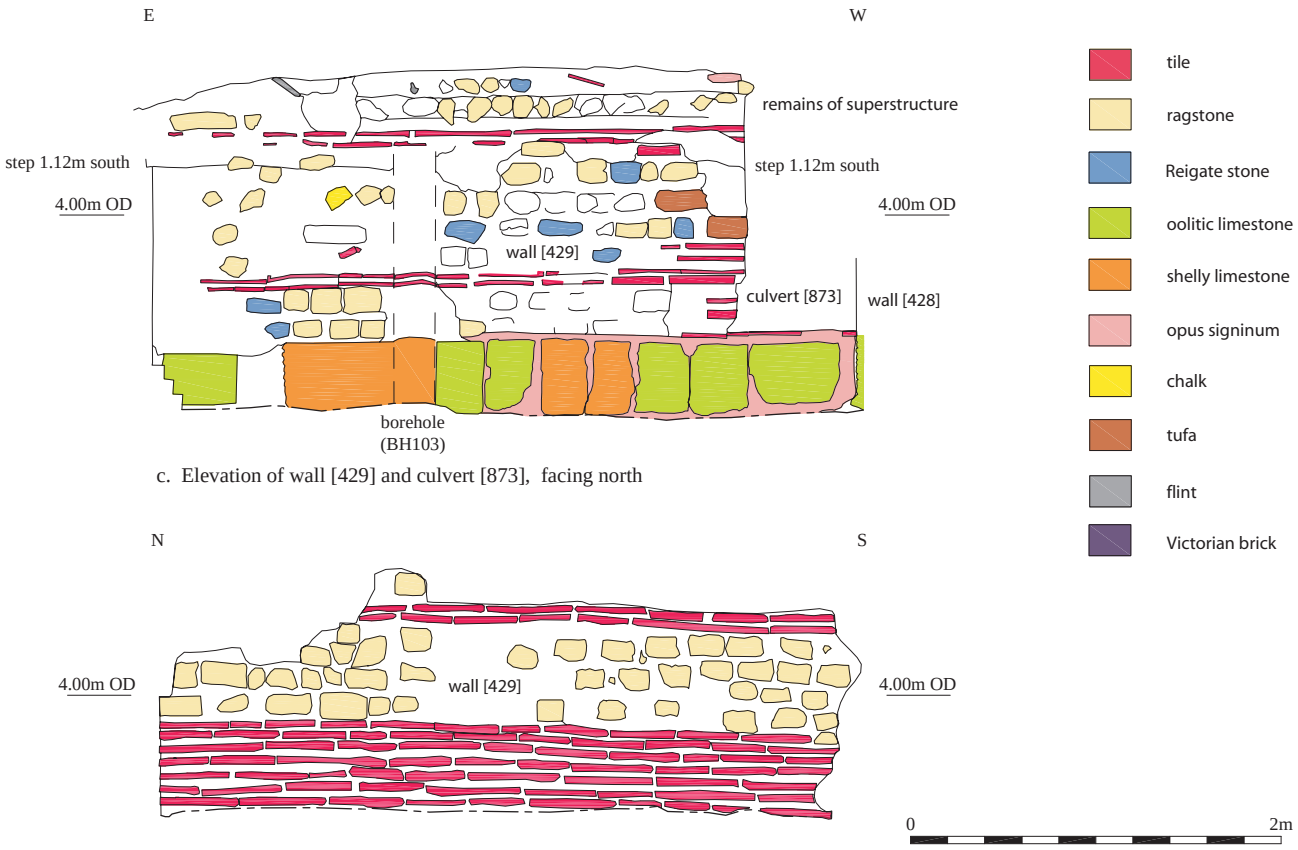


Fig. 32 Detail of 'Period II' wall, north facing elevation (scale 1m)

Fig. 33 'Period II' podium during excavation, showing step and room within, looking northwest

Fig. 34 Thick chalk raft below 'Period II' podium, between the western and central culverts, looking north (scale 1m)



c. Elevation of wall [429] and culvert [873], facing north

d. Elevation of wall [429] from inside of culvert [873], facing west

On top of the main east–west wall there was some evidence of the possible superstructure to the 'Period II' foundations (see Fig. 24, top right, Fig. 30). Running from the western culvert and aligned east–west were the scant remains of an apparent wall resting on the massive foundation. The wall measured *c*. 1.13m wide and continued for a length of *c*. 4.10m, with evidence of tile facing along its southern face; the northern face and any eastern continuation having been truncated away by later activity. To the south was an apparent return, measuring 1.12m wide by 1.97m long, faced with a mixture of small ragstone blocks and tile. The walls survived to a maximum height of 0.23m above the rest of the massive foundation.

Culverts

Two north–south oriented culverts, [873] (west) and [913] (east), were constructed within the foundations. The western one (Fig. 35) measured at least 3.60m long by 0.65m wide and survived to a height of 1.28m but would have been higher as no remains of an arched cover was found. The eastern one was more heavily truncated from above and measured 2.20m long by 0.60m wide by 1.00m high. These were tile-built along their bases and for the first seven courses in height, and faced predominantly in limestone above. Several small tufa stone blocks were recorded in the eastern face of culvert [873], however, which may have originated in the domed roof of the niche in the 'Period I' Building 3 apse. A reused *voussoir* tile was also identified in the base of this western culvert, which may also have derived from this structure, and the *opus signinum* pointing was still visible in places.

The culverts were likely to have been constructed in order to manage the water generated by the natural run-off, and are considered unlikely to have any direct association with the function of the complex. An earlier culvert performing the same function was recorded immediately to the north. Two similar culverts were also recorded during the excavations of Sunlight Wharf to the south, which are likely to have formed part of the same system of water management with the western one being a continuation of the Salvation Army Headquarters eastern culvert (Williams 1993, 60; fig. 51 & 52). However, one of the most striking things about these culverts was their large size compared to that revealed in 'Period I' Building 2 at 0.60–0.65m in width compared to 0.29m.

Immediately to the west of culvert [913] in wall [429], an element of the masonry [428] was recorded which was faced on its eastern side. This wall survived to a width of 1.4m and was found to have been cut through, and indeed undercut in places, on its western side by a Victorian brick lined culvert. This was the wall which, together with the western side of the massive foundation to the south, was first observed by Roach Smith in 1841 during the construction of the brick sewer itself and later recorded by Marsden as Features {17} and {18} (Williams 1993, 67, fig. 54; see Chapter 4, Fig.

Fig. 35 'Period II' western culvert, looking south (scale 2m)

53). Although heavily truncated, this suggested a possible northern return in the foundations at this point. The massive width of [429] (in excess of 4.50m as observed on the site which together with the Sunlight Wharf remains gave a total width of *c*. 8m) allowed for the possibility of several above-ground elements being supported which, during demolition of the building, had been largely removed down to the level of the foundations.

The only area where any possible internal floor surface could have been expected to survive was in the internal space formed by the east side of wall [428] and the north side of wall [429]. However, beneath various mortar dumps (see below) only the thin layer of the same *opus signinum* layer on which the foundations rested was observed. There was no evidence of floor surfaces or the make up for floor surfaces which might have been expected in any case to lie at a level above the top of the culverts and no evidence of a drain leading to the culvert.

The apparent absence of floor surfaces recorded in the area of the excavation might also be explained by the total demolition of all above ground elements of the building. No evidence was recovered to suggest a definite date for demolition of the superstructure, and, as with other excavations of the 'Period II' complex in the vicinity, an almost complete absence of demolition material, including decorative details such as *tesserae*, wall plaster and marble suggested that either the process of truncation was very thorough, or that the complex was never completed in the first place. Activity recorded in the 4th century suggested that the complex had ceased to serve its original function by this time, if indeed it was ever completed.

LATE ROMAN ACTIVITY

Phase 9: 4th-century activity

A series of mortar dumps was recorded against the eastern side of wall [428] and the northern side of wall [429] (see Fig. 31a). The dumps contained only small fragments of chalk, tile and ragstone and their make-up, mainly of crushed mortar, suggests that this material was the residue left after partially demolishing the building and robbing it for stone. All the large fragments of building material had been removed leaving only mortar and small fragments that could not be reused. Both culverts were backfilled with similar material. Only three sherds of pottery were recovered from these dumps, all dated to the period AD 270–400 (see Lyne, Chapter 3), suggesting a probable 4th-century date for the demolition.

Further evidence of 4th-century activity was provided by two pits, which were recorded immediately to the west of the 'Period II' masonry (Fig. 36). Dating evidence for the features was sparse with only one sherd of pottery dating to the late Roman period (AD 240–400), along with residual early Roman material. However, possibly the greatest evidence of 4th-century activity on the site was provided by a residual assemblage of late Roman pottery recovered from an 11th-century pit. The pottery was abraded and included a sherd of Alice Holt storage jar dated AD 350–400, which suggests at least limited late 4th-century activity on the site, disturbed by the later medieval pitting.

Two postholes cut through the masonry of the 'Period II' building. One left no more than a shallow depression in the base of the floor of the culvert, whilst the second was driven through the fabric of the masonry to the southeast. Several fragments of ceramic building material were recovered from the fill of the latter which may point towards a Roman date for the postholes, and they may have formed part of a 4th-century timber-framed domestic building, such as that recorded at Peter's Hill (Williams 1993, 52–54), though they may represent later, possibly Saxon, activity.

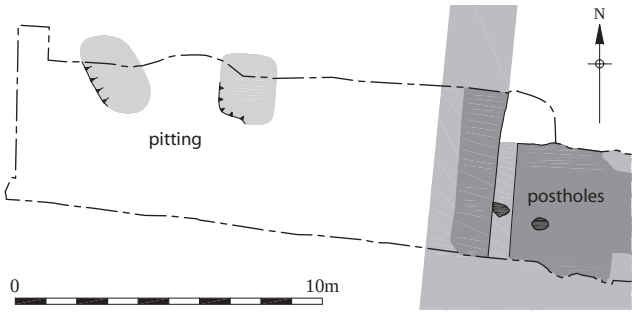


Fig. 36 Phase 9: 4th-century pitting (scale 1:250)

Chapter 3: Roman Specialist Reports

Pottery

Malcolm Lyne

The site yielded 412 sherds (10,301g) of Roman pottery from 50 contexts. The pottery ranges in date between *c.* AD 50 and 400 but the bulk is mid to late 3rd century and derives from the Phase 7 dumps over the 'Period I' building. In the following report fabrics are described using the standard MoLSS codes (Symonds 2002), expansions of which can be found in Table 1. Vessel forms have been described using a variety of sources that arguably allow for greater chronological resolution.

MoLSS Fabric Code	*Common Name*	*Date Range (AD)*
AHFA	Alice Holt / Farnham Ware	250-400
BAET	Baetican amphora	50-300
BB1	Dorset Black Burnished ware	120-400
BB2	Black Burnished ware 2 (Thames estuary)	120-250
BIV	Late Roman Amphora, Peacock and Williams Class 45	70-400
CADIZ	Cadiz (CAM186) amphora	50-140
HWB	Highgate Wood B	40-100
MHAD	Much Hadham ware	200-400
NAFR	North African amphora	200-400
NVCC	Nene Valley Colour Coat	150-400
OXMO	Oxfordshire mortaria	240-400
PRW3	Pompeian Red Ware 3	50-150
TSK	Thameside Kent greyware	180-300
VRG	Verulamium Region Grey Ware	50-200
VRW	Verulamium Region White Ware	50-200

Table 1 MoLSS Roman pottery fabric codes used in the report (after Symonds 2002)

THE ASSEMBLAGES

Phase 3: Foreshore reclamation

A single sherd from a closed form in VRG, which is not closely datable but probably belongs to the period *c.* AD 50–140 was recovered from Phase 3 foreshore reclamation deposits.

Phase 5: Dumping or ground consolidation

From deposits dumped during ground consolidation prior to the construction of the 'Period I' structures a total of 24 sherds (632g) of pottery; broadly datable to the period *c.* AD 70–150, were recovered. The fragments included three abraded pieces from a VRW mortarium of Frere type 2665 (1984, *c.* AD 110–140), four fresh sherds from a South Gaulish Samian Dr. 22 dish (*c.* AD 70–100) and a sherd from a lid in HWB (*c.* AD 40–100). A date can be inferred of later than AD 110–140 for the ground consolidation.

Phase 6: 'Period I' structures

The upper fill of the construction cut for Phase 6C western apse wall [706] produced eight sherds of pottery (158g), including one sherd each from a jar in reddened TSK (*c.* AD 180–270), a bowl in late BB2 fabric (*c.* AD 150/170–250) and a Class 4H bowl in off-white VRW (Fig. 37.1) fired rough buff-pink (*c.* AD 150–250). These fragments suggest a date of *c.* AD 180–250 for the construction of Building 3.

Phase 7: 'Period I' demolition and ground consolidation

Ground consolidation

The dumps within the western apse [911] of the 'Period I' building yielded 71 sherds (1,466g) of pottery. The assemblage is too small for any form of detailed quantification but has fresh BB2 sherds from North Kent making up the most significant single element (38%). The forms include a bowl of Monaghan's Class 5D1 (1987, *c.* AD 110–180), bowls of Types 5C1–5 (*c.* AD 170–240), 5C4–2 (*c.* AD 170–270) and 5C6 (*c.* AD 190–240), dishes of Type 5E0–4 and Class 5F3 (*c.* AD 130–230) and everted-rim cooking-pots. Small numbers of TSK sherds from the same source make up a further 8% of the assemblage and include fragments from an everted-rim cooking-pot of Monaghan's Class 3J9 (*c.* AD 170–270). The few 3rd-century BB1 sherds (8%) include fragments from a lid with burnished scrolling on its underside (Fig. 37.2), similar to that found on the undersides of 3rd-century straight-sided dishes in similar fabric (*c.* AD 200–250) and a straight-sided dish with burnished steep arcading on its exterior (Fig. 37.3). The pottery sequence from the production site at Bestwall Quarry, Wareham (Lyne forthcoming a) indicates that dishes with steep arcading of this type

developed out of similar forms with acute-latticing at the end of the 2nd century but had been supplanted by those with flatter arcading by *c*. AD 270.

Sherds in a variety of other fabrics include a closed form body-sherd in MHAD oxidised fabric (*c*. AD 250–400), a funnel-necked beaker of Perrin Type 173 (1999) with beaded rim, in orange NVCC fabric with metallic-black colour-coat (Fig. 37.4) (*c*. AD 250/70–370) and a basal sherd from large dish with two concentric double foot-rings in very-fine sanded off-white fabric with internal marbled orange/black colour-coat and rouletted decoration (Fig. 37.5). The form and decoration are very similar to that of Class 4J dishes in PRW3 fabric (Davies *et al* 1994, fig. 113, 719), although the fabric here is unusually light in colour (*c*. AD 120–160). These sherds suggest that the dumping took place during the third quarter of the 3rd century.

Demolition debris

From the demolition debris overlying the soil dumps within the apse [911] of the 'Period I' building a very fresh 82-sherd (2,279g) pottery assemblage with a significant BB1 element (25%) was recovered. Sherds in this fabric include fragments from everted-rim cooking-pots of *c*. AD 200–280 date, an incipient beaded-and-flanged bowl with burnished arcading on its exterior (Fig. 37.6) similar to Gillam type 44 (1976) (*c*. AD 210–290), and a developed beaded-and-flanged bowl with burnished external arcading (Fig. 37.7). A vessel of this type came from low down in the fills of the *c*. AD 235–245 dated Roman quay at New Fresh Wharf (Richardson 1986, 1.173) and indicates that such bowls had appeared by AD 240. Examples with arcaded decoration are characteristic of the late 3rd century but become plain or sloppily decorated after AD 300. Other sherds include a straight-sided dish with steep burnished arcading on its exterior (Fig. 37.8) (*c*. AD 200–270) and an example with flattened arcading (Fig. 37.9) (*c*. AD 220–300).

Open form and flask fragments in North Kent Cliffe BB2–2238 and TSK fabrics form the most significant element in the assemblage (33%) and include pieces from a beaker of Monaghan type 2C6–1 (1987) in BB2 fabric (Fig. 37.10) (this Moselkeramik beaker-inspired type is dated *c*. AD 190–210/30 by Monaghan but probably continued being made until after AD 250), a Class 4H5–7 type bead-rim bowl of Monaghan type 5C4–2 in similar fabric (Fig. 37.11) (*c*. AD 150/70–250), a similar vessel in similar fabric but of Monaghan type 5C4.3 with undercut bead (Fig. 37.12) (*c*. AD 150/80–250), a dish of Monaghan type 5F4.2 in similar fabric (Fig. 37.13) (*c*. AD 130–270) and a jar with undercut everted rim in grey TSK fabric (Fig. 37.14). The jar is paralleled at Colchester (Symonds & Wade 1999, fig. 6.72, 542) in an assemblage dated *c*. AD 225–250.

AHFA greywares are very much a minority element in this assemblage (2%) but include an incipient beaded-and-flanged bowl in self-slipped grey AHFA ware (Fig. 37.15). This form was paralleled in *c*. AD 200–270 archaeomagnetic-dated kiln assemblages from waster-dump AH.52 in Alice Holt Forest (Lyne forthcoming b) but unlikely to have reached London much before AD 250 (Symonds & Tomber 1994, 71) (*c*. AD 250–270). A dish of Lyne and Jefferies Type 6A–4 (1979) with internal black/white slip extending over the rim dating to *c*. AD 270–370 was also present (Fig. 37.16).

Fine and specialised wares include fragments from OXMO mortaria and amphorae including an OXMO mortarium of Young's type M17 (1977) with evidence for burning (Fig. 37.17) dating to *c*. AD 240–300 and from NVCC beakers (12%) including an overfired funnel-necked beaker with bead-rim in NVCC fabric fired purple (Fig. 37.18), the type of which Perrin dates to *c*. AD 250/70–370 (1999, 96) and a cornice-rim beaker in similar fabric (Fig. 37.19) dated to *c*. AD 160–250.

Other sherds include residual fragments from GAUL and CADIZ amphorae, NAFR amphora sherds (*c*. AD 200–400) and a corrugated thin-walled BIV amphora sherd in cream-buff fine-grained fabric with external red-brown colour-coat (Fig. 37.20). An absence of rim sherds or any indication as to whether the vessel had one or two handles makes precise dating impossible. The general type has a *c*. AD 50–600 date range.

The relative percentages of BB1, BB2/TSK and NVCC sherds in this assemblage, coupled with the presence of only two Alice Holt/Farnham ware sherds suggests a *c*. AD 225/50–270 date for the bulk of the material. This date range is very similar to that for the pottery from the dumps beneath; the black-slipped AHFA dish (Fig. 37.16) does, however, push the date of deposition of some at least of the assemblage to after AD 270, although there is nothing which need be later than AD 290/300. The dating of this assemblage is similar to the *c*. AD 270+ arrived at for the material from the chalk raft foundation of the 'Period II' building excavated nearby at Peter's Hill (Williams 1993, 55).

Phase 8: 'Period II' structures

Very little pottery was associated with the Phase 8 timber piles or any other features belonging to the Period II structures and none of it was contemporary. A large residual sherd from a BAET amphora was associated with one of the foundation piles, Pile [382], and the crushed mortar dumping associated with wall [428] yielded two late 2nd- to early 3rd-century sherds.

Phases 9 to 12: Post-Roman activity

The few residual Roman sherds associated with post-Roman contexts include very little which needs to be later than AD 300. The 13 sherds of pottery from the fill of wall robbing trench [855] includes a body sherd from an AHFA storage jar of late 4th-century date and several of the other sherds could be equally late. This wall robbing was dated to the period 1050–1100, which explains the abraded nature of the sherds. The wall robbing trenches for part of the same complex at Peter's Hill produced ceramic evidence for robbing during the period *c*. AD 1050–1150 (Williams 1993, 55).

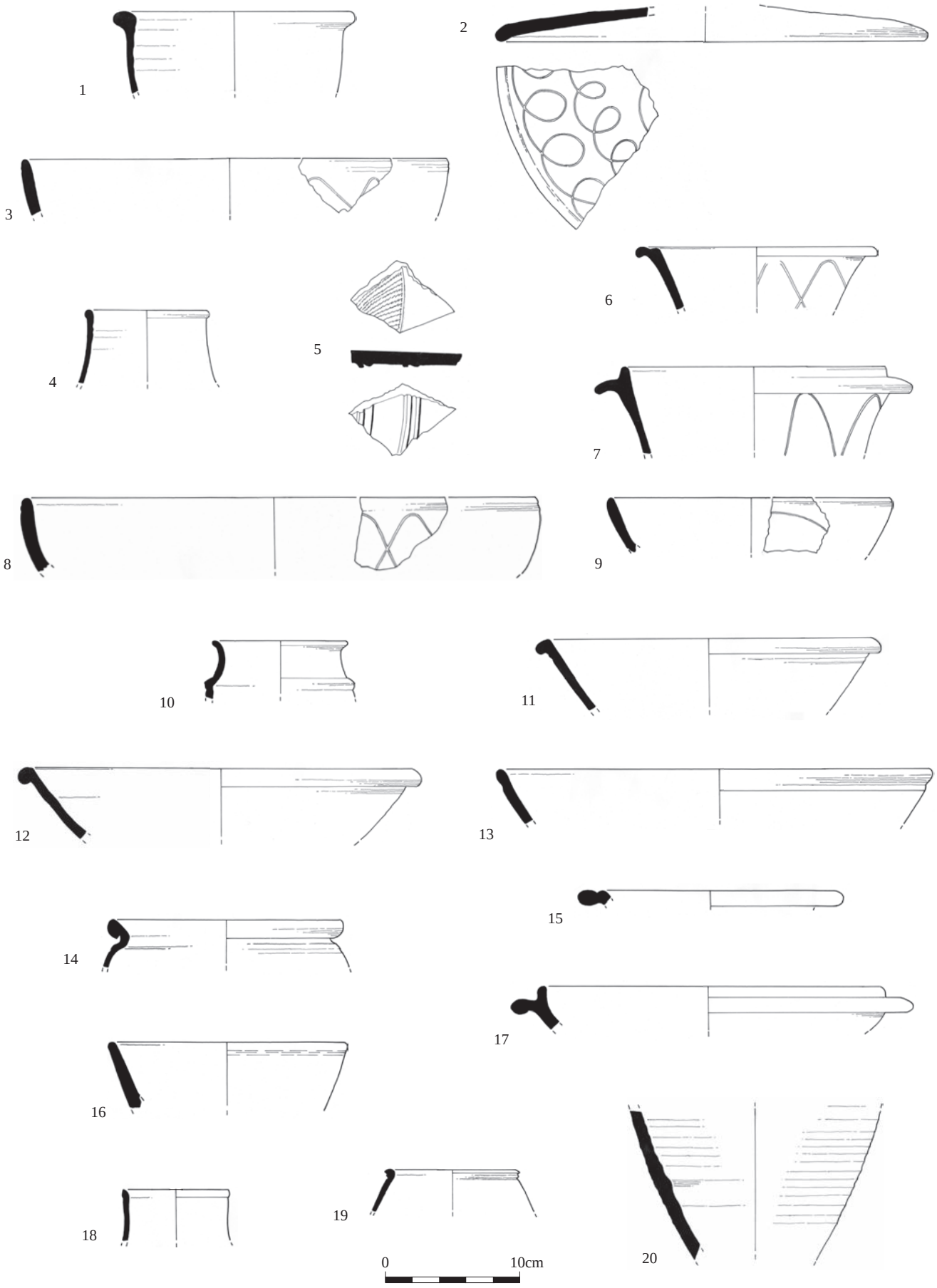


Fig. 37 Roman pottery from 'Period I' structures (1) and demolition deposits (2–20) (scale 1:4)

Ceramic and Stone Building Material and Structural Remains

Berni Sudds

A total of 661.053kg of ceramic and stone building material was recovered from 166 separate contexts during the evaluation and excavation. Of this 547.173kg, representing 1,465 fragments, was examined in detail using standard methodologies. The majority is loose material, derived primarily from dumping and ground consolidation layers, but 28 samples were taken from *in situ* structural remains. The material is largely fragmentary, although several complete pieces were recovered, mainly from masonry contexts. Nearly 60% (by weight) was collected from Roman deposits and is discussed below. The remainder is of medieval and post-medieval date and is presented below (see Brown, Chapter 6).

All the ceramic building material fabric types mentioned in the text are represented in the fabric reference collection which is housed in the London Archaeological Archive and Research Centre (LAARC) and can be consulted on request. The descriptions of the fabric types and forms were detailed in the assessment report (Brown 2004), have been published elsewhere (Betts 2003; Brodribb 1987) and can also be found at LAARC.

Over half (59% by number) of the stratified Phase 1 to 9 Roman building material was recovered from the large scale 'Period I' demolition and ground consolidation (Phase 7). Unfortunately, much of the building material from excavations in the vicinity, namely related to the construction of the 'Period II' complex at Peter's Hill, was recorded and discarded before the current fabric classification system was fully developed (Betts 1993, 99–100). However, both specialist and marked tiles and bricks were retained so it has been possible to make some comparison. Importantly, having encountered the same stratigraphy as on previous excavations at the Salvation Army Headquarters, including elements of the 'Period I and II' complexes, it has also been possible to more fully characterise and date the Roman structures in the vicinity.

THE EARLY ROMAN WATERFRONT: PHASES 1 TO 4

Building material from the first four phases of the site accounted for under 10% of all the primary Roman assemblage, and approximately one third of that material was seen to be heavily abraded, suggesting exposure to water action. Aside from one fragment in Eccles fabric 3022, all of the early phase material was in local fabric group 2815. With the exception of the local brick and tile excavated and sampled from the Phase 4 quay and quayside structure this material most probably represents in-wash and dumping or ground consolidation of the Roman foreshore.

Brick and roof tile represent the most frequently found types although two specialist hypocaust tiles were also identified. Two reclamation deposits from Phase 3, [893] and [894], included high quality painted wall plaster with evidence for architectural moulding on some fragments. Unfortunately, too little is present to determine the nature of the structure from which the material derived and was re-deposited, even if the assemblage is likely to have originated from a building in the immediate vicinity.

Phase 4: Quayside building, Building 1

Over 20 samples were taken from Building 1. Two sections of *in situ* brickwork were identified, set upon an oak beam, represented by [500] in the west and [537] to the east (see Fig. 14, Chapter 2). These were constructed of fragments of brick, including *lydion* and *pedalis* types, and roof-tile (*tegula*) in local 2815 fabrics dating primarily from *c.* AD 55 to AD 160 (fabric 2452). Although mostly collapsed, up to eight courses of mortared brick were identified, forming a wall approximately one Roman foot (*pes* = 0.296m) thick. The dimension in this instance represents the width of the *pedales*, *lydion* and *tegulae* used in construction.

In the absence of further excavation it is not possible to see how far the eastern section of brickwork continues, or indeed how it is coursed. The latter may represent the abutment of a longer wall, or perhaps both sections form brick piers or more likely blocking walls. With so little of the superstructure revealed it is impossible to be conclusive.

'PERIOD I': PHASES 5 TO 7

Phase 5: 'Period I' dumping or ground consolidation

A total of 11% of the Phase 1 to 9 assemblage was recovered from the dumping or ground consolidation layers attributed to Phase 5. Again, the ceramic building material is composed primarily of local 2815 fabrics, although fragments of 1st-century Kentish tile (2454 and 2455), painted wall plaster, Kentish rag and oolitic limestone were also recovered. In terms of dating, the majority of the 2815 group dates from the mid 1st to mid 2nd century AD, but two of the upper dump layers contain examples that suggest deposition is not likely to have occurred until the early-mid 2nd century. If primary the presence of roof tile in fabric 2459b in layer [478] indicates a deposition date post *c.* AD 120. Similarly, the recovery of roof tile in fabric 2459c from layer [477] would suggest an even later *terminus post quem* of *c.* AD 140.

Unlike earlier and later phases no specialist forms were identified. Roof tile occurs most frequently, with few other forms identified. The fragments of painted wall plaster from the 2nd-century dump layers [477] and [478] would indicate a degree of affluence at the source, although this may not necessarily have been in the immediate vicinity.

Phase 6: 'Period I' structures and additions (late 2nd to mid 3rd century)

The Phase 6 material accounts for just 5% of the Phase 1 to 9 assemblage and comprises primarily samples taken from *in situ* structural remains. A number of walls

were recorded, apparently relating to two separate but morphologically similar structures, Buildings 2 and 3, both of which represent elements of the so-called 'Period I' structures previously excavated on site. Indeed, wall sections previously observed by Marsden in 1961–1962 were uncovered again, in addition to new structural sections (Williams 1993).

Phase 6A: Eastern apsidal structure, Building 2

An east–west, curved wall, thought to belong to Phase 6, was observed to the far east of site as [2050] and probably [2051] (see Fig. 16, Chapter 2). All that survived, however, were the lowest courses, built over squared timber piles driven into the London Clay. The masonry above the piles was comprised of randomly set fragments of tile and stone, probably representing remains of the wall core.

In addition to the same local fabric group 2815, which predominated in Phase 5, a brick in Eccles fabric 2454 was recovered from a sample of [2050]. The latter fabric dates to the 1st century AD, but is likely to be reused in this structure given that the timber piles used in the construction have been dated to *c*. AD 165 (see Discussion, below).

Phase 6B: Timber structure

The assemblage of ceramic building material used to help pack the horizontal timbers identified in P 8 ([834], [914] see Fig. 12, Chapter 2) is composed primarily of local 2815 fabrics dating from the mid 1st to mid 2nd century AD, although a single large fragment of brick in fabric 2459b dates from *c*. AD 120 to 160. Dendrochronological dating of the structure to the AD 230s would, however, suggest that the packing was brought in from earlier structures that were being demolished. The group also contained painted and decorated wall plaster.

Phase 6C: Western apsidal structure, Building 3

Five separate sections of wall ([38], [51]=[427], [708], [910], [911]), identified to the west of the main area of excavation, appear to form elements of the same structure (see Fig. 19, Chapter 2). In the absence of detailed excavation the relationship between some sections remains ambiguous, however, it is possible that wall [38] was keyed together with wall [51]=[427] but the latter had collapsed to south and no excavation of the area between was permitted, and similarly [708] presumably abutted the apse to the south (walls [910], [911]). The homogeneity evident in the construction of these walls, and in the materials and mortar used, would further indicate a contemporaneous date. Together walls [51]=[427], [910] and [708] form a narrow linear structure, orientated east to west, and terminating to the west with an open, niched apse [911]. To the north wall [38] runs perpendicular to wall [51], running north to south.

The walls are substantial in scale and built with evident precision and skill. They are constructed from a rubble core, comprised of rough Kentish ragstone and pink mortar, and are faced with regular rectangular ragstone blocks bonded by double tile and brick lacing-courses. Unfortunately, it is not evident if these lacing courses run throughout the wall or are just used within the face, but in either case they provide structural stability and help to maintain level coursing both during and after construction. The tile bonding courses do not appear to be inserted at regular intervals, although with so little surviving this is difficult to determine.

Samples taken from the tile bonding courses are of the local 2815 fabric group dated from *c*. AD 55 to 160. The apse wall ([911]) represents the best preserved of the structural remains on site, standing to the base of the dome and including a complete, although unexcavated, arched niche. The base of the domed section incorporates tapered bricks, known as *voussoirs*, above which are laid lightweight tufa squared blocks. The use of calcareous tufa is rare in London but has thus far been associated with 1st-century construction (Betts 2003, 105). If this dating is accurate the blocks would be reused in this feature (see Discussion, below).

The similarity evident in the construction of the walls does not appear to extend to the foundations. Walls [38], [51]=[427] and [708] are built upon shuttered and poured rubble foundations, whereas the apse (wall [911]) appears to have been built in courses straight off the base of a stepped foundation cut into the London Clay. It is not clear why different techniques have been used but it may relate to topographical considerations, the more northerly foundations having to be cut back into the slope of hillside.

'PERIOD II': PHASES 7 TO 8

Phase 7: 'Period I' Demolition and ground consolidation

Phase 7 accounts for 59% (by number) of the excavated Roman assemblage. The large quantity, good condition and homogeneous nature of the building material recovered from layers attributed to Phase 7 indicate they were derived from a single, well-appointed building in the immediate vicinity. The most significant group was recovered from demolition layer [828], accounting for approximately 46% by number and 26% by weight of all the Roman material from this phase.

The distribution of form types is fairly equal with brick, tile, box flue tile, painted wall plaster and *tesserae* each representing between 11% and 20% of the phase assemblage by number. A small group of hollow *voussoir* tiles were also identified. By weight brick and tile naturally dominate but by number their frequency is likely to be over-represented, when compared to stone objects in particular, due to the relative degree of fragmentation.

The brick, roof-tile and box flue occur most frequently in the local 2815 fabric, primarily as 2452, 2459a and 3006, dating from the mid 1st to mid 2nd century AD. A small number can be dated to the 1st century, or into the first two decades of the 2nd century including examples from Kent, Hertfordshire and/or Buckinghamshire (2454; 2455; 3018; 3022; 3028; 3069; 3238; 3023). The presence of examples

in fabric 2459b from London or Essex and a few pieces of *imbrex* in the non-local, unsourced calcareous fabrics 2453 and 2457 would suggest a *terminus post quem* of AD 120 or 140 for the group.

The box flue tiles are predominantly combed with a combination of vertical, diagonal, horizontal and curvilinear keying. A small number of scored and relief-stamped examples were also identified. The majority occur in the local 2815 group (2452; 3006) as paralleled elsewhere in London, but also in 3018 and 3028 from north Kent or the Weald and in fabric 3069 from Hertfordshire or Buckinghamshire (Betts 2003, 114–116). The scored box flue tiles, typically diamond latticed, are thought to represent the very earliest type used in London, dating largely to the late 1st century (Betts 2003, 114; Pringle 2006 Types 1 and 4). The relief-stamped tiles occur in fabrics 2452 and 3006, represented by die types 3, 65, 101 and 106. The presence of these dies in dated contexts on other sites and the fabrics in which they occur would suggest they date from the early to mid 2nd century (Betts *et al* 1997). The example in die 101 is of particular interest as it reveals more of the design than previously identified (Fig. 38.1).

Hollow *voussoir* tiles are very similar to box flue tiles but have one tapered end and often four keyed faces, as opposed to two. Forming a wedge shape they were designed for use in roof vaulting for heated buildings, particularly bath-houses (Betts 2003, 116). A small number were identified in the assemblage, all with combed keying. When fragmented they can be difficult to distinguish from box flue and thus are likely to be under-represented. Much of the box flue and *voussoir* tile identified in Phase 7, and a significant proportion of the brick and roof tile, is evidently re-used with mortar appearing over broken edges.

A single fragment of procuratorial stamped *imbrex* in fabric 2459a (Fig. 38.2) was recovered from the Phase 7 demolition ("[P]R. BR", die 10 worn; context [40], <2>). The letters probably stand for '*Procuratores provinciae Britanniae'* meaning the procurators of the province of Britain, and are thought to link the procurator to tile production for the supply of public building works in the city from *c*. AD 70 to 125 (Betts 1995, 209). Where evident in later buildings, private or public, these tiles are reused, salvaged from earlier public buildings (Betts 2003, 117). It remains possible, however, that building material produced at these tileries was sold off directly to the private sector with only their production, not use, being publicly controlled (Betts 1995, 209).

A substantial quantity of fragmented painted wall plaster was also identified, some of which is of very fine quality, occasionally preserving detail such as chamfered edges. A wide variety of colours seem to have been used for decoration, although the predominant background would seem to be white. Few fragments were large enough, or could be reconstructed convincingly to provide a clear indication of the decorative schemes. Generally it would appear that coloured panels with polychrome borders and detail were painted on white ground, a scheme popular during the 2nd century AD (Ling 1985).

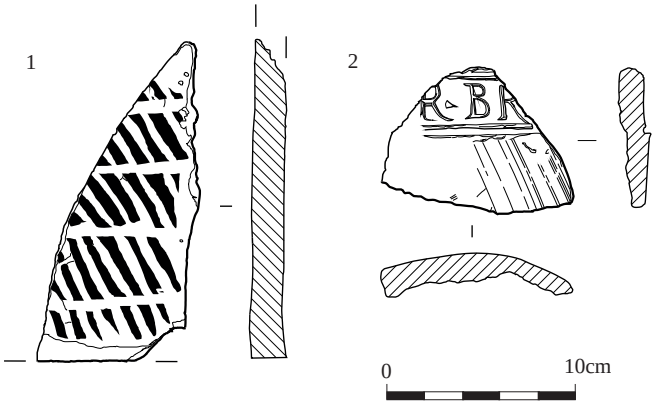


Fig. 38 Stamped tiles from Phase 7, 'Period I' demolition deposits: 1) Relief-stamped box-flue tile 2) "[P]R. BR" stamped tile (scale 1:4)

A number of fragments of cut and polished stone veneer were recovered, primarily from demolition layer [828], including metamorphic, igneous and sedimentary examples (Table 2; Fig. 39). The imported stone, amounting to 23 fragments, derives from a broad geographical area including France, Italy, the eastern Mediterranean and North Africa. Coloured marbles account for the majority of the group although one piece of igneous quartz diorite sourced to the Eastern Desert of Egypt was also recovered. The fragments vary in thickness but are likely to represent wall veneers and inlays, either in the form of panels or thin panel borders. Marble veneers were commonly used on the lower section of the wall, often in dado panels, but could have been set into concrete as part of another internal feature. The types identified at the Salvation Army Headquarters can be paralleled elsewhere in London, but the range encountered is significant and indicative of a high-status building (Pritchard 1986; Pringle 2002; Betts 2003; Crowley 2005). Unlike much of the other building material from Phase 7 the imported stone shows no sign of re-use.

The sedimentary stone types are all indigenous to Britain and include siltstone, mudstone, hard chalk and a distinctive dark shelly limestone known as Purbeck 'marble' from Dorset. Again, it is difficult to be certain but the range of thickness evident in the Purbeck assemblage would indicate that both wall veneer or inlay and paving are

Fig. 39 Fragments of cut and polished stone veneers recovered from Phase 7 demolition deposits (scale 100mm)

Region	Name	Source	Description
Britain	Dolomitic cementstone	Kimmeridge Bay, Dorset	Compact hard black mudstone
	Liassic mudstone	Dorset coast – Lyme Regis area	White calcareous mudstone
	Grey siltstone	No parallel	Hard, dark grey laminated siltstone
	Indurated chalk (clunch)	Southern Britain	Hard chalk
	Purbeck 'marble'	Upper Jurassic beds, Purbeck, Dorset.	Hard, shelly limestone
France	Cipollino mandolato/campan vert	Pyrenees	A brecciated green and white marble
Italy	Carrara-type	Luni, Tuscany	Uniform fine white marble
Greece	Cipollino	Carystos, Euboea	Off-white chloritic marble with light grey-green micaceous bands
	Fior di pesco	Chalcis, Euboea	White or pink-orange marble with fine to heavy purple-red veining
Turkey	Pavonazzetto	Nr Docimium, Phrygia	White to cream, fine grained marble with purple and red veining
	?Proconnesian	Marmara Island	White marble with grey veining. Two examples also have less frequent yellow-brown veining
Egypt	Quartz diorite*	Mons Claudianus, Eastern Desert	Mottled black and white granular quartz diorite rich in hornblende
Algeria	Greco scritto*	Cap de Garde, nr Annaba	White with grey veining

Table 2 Stone veneers from Phase 7 demolition and ground consolidation deposits
*The Greco scritto and quartz diorite fragments represent residual finds from Phase 9 and 10 but are morphologically very similar to the Phase 7 assemblage

represented. In contrast to the imported marble, however, the Purbeck fragments appear to be entirely re-used, probably as part of a pavement. The chalk and much of the siltstone/mudstone are present as loose *tesserae*, recovered in addition to a small number of larger cut tile examples. The examples are mortared and evidently derive from a mosaic surface of some quality. Two fragments of siltstone also represent inlays or panel borders.

Although Purbeck marble was exploited soon after the Roman Conquest (Pritchard 1986) and the white marbles by the Neronian period, it is likely that the coloured varieties of ornamental stone were not utilised in Britain until the 2nd or 3rd century (Pringle in prep). Furthermore, given the relative infrequency with which they occur on Roman sites it has been argued that they would not have been sourced and imported direct from the quarries, but rather brought to Britain, perhaps via Rome, for use in designated high-status buildings (Pringle 2002). The exception to this rule may be the *Campan Vert* from the Pyrenees, which may have arrived on the back of other goods imported on a large scale from Gaul and Spain (Crowley 2005).

Evidently the Phase 7 assemblage originated from an opulent structure in the immediate vicinity. It is also clear that in addition to newly sourced high-status internal decorative appointments, much of the building material used in construction was salvaged from an earlier structure. Although much of the material is dated from the mid 1st to mid 2nd century the presence of a small quantity of later tile and imported coloured marbles, taken together with evidence of re-use, would suggest that this building is unlikely to have been constructed before the mid 2nd century. Although representing ground consolidation for 'Period II' structures, potential sources for this material, and implications it has for characterising the 'Period I' complex are discussed below.

Phase 8: 'Period II' structures (AD 294)

Several masonry samples were recovered from the Phase 8 structural remains, representing elements of the 'Period II' complex. Similarly to 'Period I' the majority of the brick and tile can be attributed to the local 2815 fabric group. As in 'Period I' *tegulae* were used in the construction of walls, but the samples suggest a greater use of standard bricks for wall bonding in this phase, the most common form noted being the rectangular *lydion* brick. There was also an increase in the range of building stone utilised. Most significantly the construction of several of the Phase 8 walls showed that, in general contrast to the earlier remains, *opus signinum* had been used as a construction material. The massive scale of the 'Period II' structures is likely to have been a factor in the use of the latter, as opposed to a softer lime-based mortar.

The method of construction of the 'Period II' complex has previously been described (see Chapter 2) and is not repeated here, although a few observations have been made. The sequence of construction is very similar to that observed previously with a few minor exceptions (Williams 1993, 15–17). Two successive rammed chalk rafts were identified or implied through earlier investigations but only one was recorded during the recent excavations. The lower of the two rafts recorded previously was constructed of almost pure chalk, whilst the upper was observed to be more mixed (Williams 1993, 15–17). The chalk raft

identified at the Salvation Army Headquarters during the present investigations contained fragments of local 2815 tile, Hassock sandstone and Kentish rag.

A layer of Kentish rag was also recorded beneath part of the chalk raft sealing the timber piling that had not been observed previously. This may simply represent the use of available and changing materials as building progressed (Williams 1993, 15). Although present, in contrast to the earlier observations, the *opus signinum* bedding layer sealing the chalk raft contained no large fragments of tile. Slight variations in the stone types set onto the *opus signinum* to form the base of the foundation were also observed. At Peter's Hill large oolitic Lincolnshire limestone blocks, probably from Barnack, comprise the only types used. At Sunlight Wharf Barnack stone also represented the most common type used although Kentish rag and Hassock sandstone, both from the Lower Greensand, occurred with some frequency. Rarer types were represented by tufa and possibly Gatton Stone from the Upper Greensand. At the Salvation Army Headquarters oolitic limestone was again identified and although Barnack may well have been present the samples taken have been identified as Weldon stone, the closest source of Lincolnshire limestone to London, and Bathstone (identified by K. Hayward) (Fig. 40). Interestingly, blocks of Ham Hill stone, a honey coloured shelly limestone from Somerset, were also identified. The use of this stone is so far unparalleled in Roman London (K. Hayward, pers comm).

The walls were similarly constructed with a roughly coursed Kentish rag and *opus signinum* core, faced with squared, regularly coursed Kentish rag blocks set between tile lacing. The Kentish rag used in the core was also observed to be roughly square in proportion, indicating the re-use of facing material from an earlier building. Reigate stone, Septaria and occasional chalk, flint and tufa were also used, not recorded previously in the face, although as noted above the use of tufa and Gatton stone was identified in the foundations at Sunlight Wharf. Both Gatton and Reigate stone derive from the Upper Greensand and their identification is notable in that the former remains

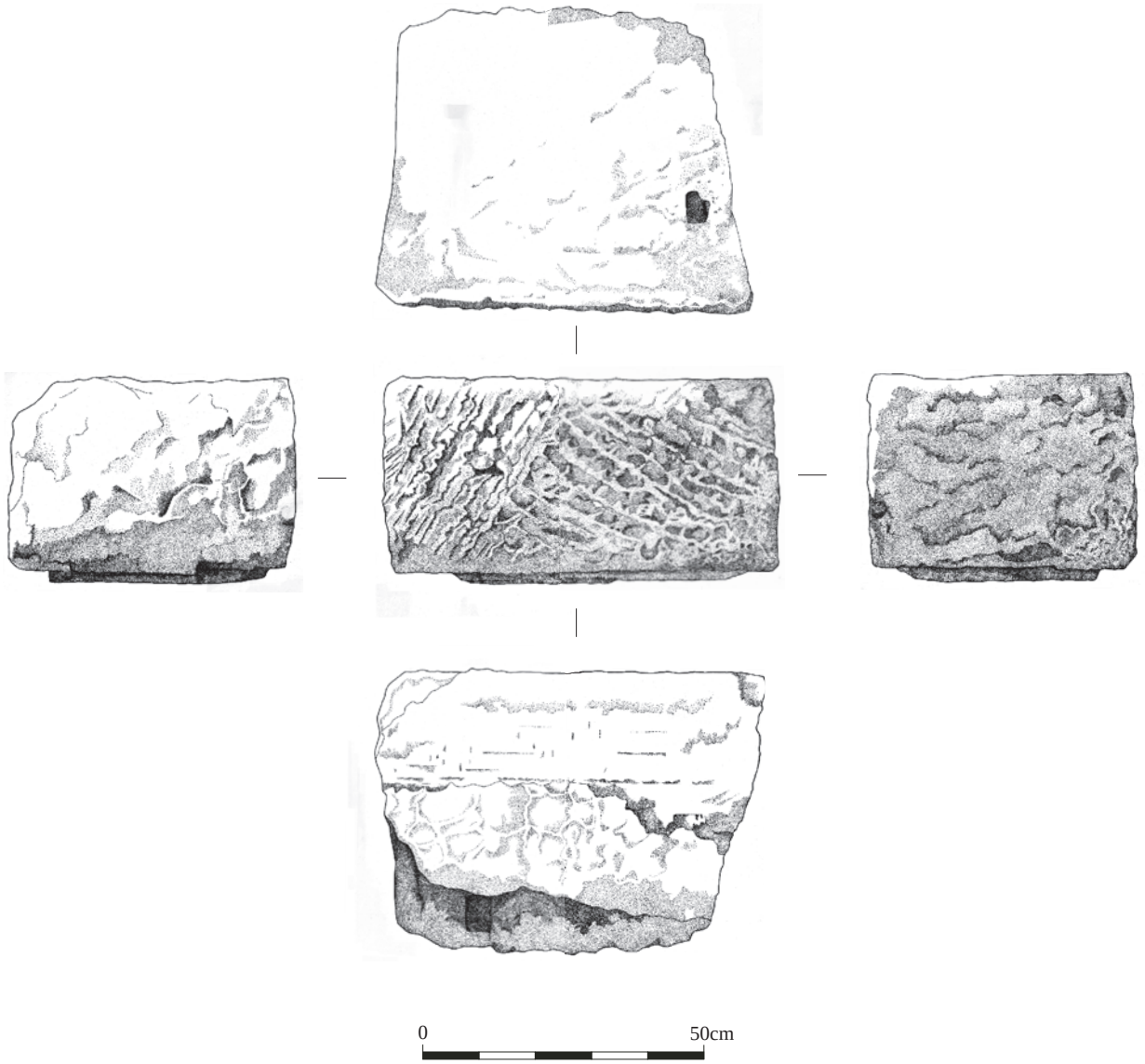


Fig. 40 Oolitic limestone block from 'Period II', Building 4 (scale 1:12.5)

unparalleled in Roman London and the latter occurs infrequently (Betts 1993, 101; Drummond-Murray *et al* 2002, 25–26, Henig in prep). The use of the rare 3019 tile fabric was also noted for a second time (Betts 1993, 100). In addition to 3019, fabric 3009 was utilised; both originate from Hampshire and date from *c.* AD 100 to 120 but here are evidently re-used with mortar appearing over broken edges. The use of both of these fabrics in the construction of the masonry culverts attributed to Phase 8, along with *opus signinum* bonding, would corroborate a contemporaneous date.

Phase 9: 4th-century activity

The Phase 9 assemblage is comprised primarily of local 2815 fabrics dating from the mid 1st to mid 2nd century AD, although a single example in fabric 2455 derives from Kent and a later local 2459c example can be dated from *c.* AD 140 to 250. The range of forms and fabrics is very similar to that recovered from earlier phases on site, including brick, roof tile, box flue tile, painted wall plaster and imported marble. The majority is likely to represent re-deposited material from earlier phases of activity.

DISCUSSION

It is clear that the structural remains identified at the Salvation Army Headquarters form part of the 'Period I and II' structures excavated previously by Marsden in 1961–1962 (Williams 1993). Although recent observations have revealed further structural remains the ground plan of both periods is still piecemeal and their function remains ambiguous. Importantly, however, the investigations have provided a narrower date range for the construction of 'Period I' and revealed further information about character and appearance of the complex, including evidence for the elaborate 3rd-century renovation. The investigations have also confirmed the scale, date and character of the 'Period II' complex, and provided additional sources of quarry for the materials used in construction.

'Period I'

Although similar in orientation and ground plan it is unlikely that the western and eastern apsidal structures form part of the same building, or at least they were not constructed at the same time. Similar general construction techniques were used in both but the masonry coursing differs. Marsden's Feature {36}, equated with the eastern apse, has three double lacing courses separated by only single courses of Kentish rag (Williams 1993, 63). The western apse, uncovered during recent excavations, has a far greater proportion of Kentish rag coursing in comparison to tile lacing. Furthermore, the two features are on slightly different alignments. The dendrochronological dating of the timbers cut by the western apse (see Tyers, below) might suggest that there was almost a century between construction of the two. Both share enough in common, however, in terms of ground plan and morphology, to indicate that they could have been laid out in respect of each other.

In terms of function the narrow east to west walls and open apsidal features may form part of an ambulatory or colonnade. The additional presence of the north to south wall sections on both 'Period I' structures may, however, suggest they form part of a portico or entranceway to a larger platform or structure extending northwards. The scale and quality of construction would indicate, as Marsden suggested, that they are likely to be of public aspiration (Williams 1993, 9).

The same demolition and ground consolidation deposits for the 'Period II' complex, observed at The Salvation Army Headquarters as Phase 7, were also identified at Peter's Hill, recorded as group 2.11 (Betts 1993, 88–89, 99–100). At Peter's Hill the origin of the demolition deposits formed the focus of discussion and the cohesion of the assemblage was suggested to indicate a single building or source of quarry in the immediate vicinity (Betts 1993, 89). As the 'Period I' complex and the Huggin Hill baths were thought to be roughly contemporary and as large in scale, probably public in nature and in the right location, they were both considered as potential sources (Williams 1993, 11–12). Significantly, if from the 'Period I' buildings, the demolition material held the potential to inform on the appearance of the complex.

A greater variety of decorative stone was recovered at Peter's Hill than observed in the Huggin Hill assemblage. The relief-patterned box flue tile die-types at Peter's Hill (dies 12 and 101) could not be matched at Huggin Hill and a comparison of the wall plaster revealed differing schemes (Betts 1993, 88–89). Additionally, in contrast to Peter's Hill no late Roman ceramic brick or tile was identified at Huggin Hill.

Overall the status, public character, cohesion and freshness of the demolition group were taken to suggest a source within the 'Period I' complex. This was argued to be particularly likely as Huggin Hill was demolished in the late 2nd century, whereas 'Period I' in its latest manifestation was probably finally levelled immediately prior to the construction of the 'Period II' complex in the late 3rd century (Williams 1993, 9–12, 88–89). Furthermore, the late 2nd- and 3rd-century tile, marble and stonework identified within the demolition material and the late Roman decorative and monumental architectural masonry associated to 'Period I', assumed to represent later renovation or refurbishment of the complex, exclude the, by then defunct, baths (Williams 1993, 9–12, 88–89). The 'Period I' complex would therefore appear to have been a heated structure, opulently decorated and possibly official in character given the size, precision of construction and presence of procuratorial stamps (Williams 1993, 88–89).

The recent investigations at Salvation Army Headquarters, however, have established that the 'Period I' structures possibly post-date *c.* AD 140 and AD 165 and in their final form, with the western apse and associated walls, may date to as late as the mid 3rd century. This means, as evidenced above, that much of 'Period I' complex was constructed of re-used material. Furthermore, as the western

Material	*Salvation Army HQ*	*Peter's Hill*	*Huggin Hill baths*
Procuratorial stamps	Die 10	Dies 1, 2A, 3, 4, 7, 8B	Dies 1, 2A, 3, 8B, 9, 10, 12
Relief-stamped tile	Dies 3, 65, 101, 106	Dies 3, 8, 12, 14, 42, 85, 90, 91, 93, 101	Dies 42, 85

Table 3 Comparison of procuratorial and relief-stamped die types from Salvation Army Headquarters, Peter's Hill and Huggin Hill Baths

wing of the Huggin Hill baths were probably demolished by the mid 2nd century and the eastern wing by AD 180, rather than providing a potential source of ground consolidation for the 'Period II' complex the baths actually provide a potential source of quarry for construction of 'Period I' (Rowsome 2000a, 270–271). Interestingly, the comparison of the Salvation Army Headquarters assemblage to the Peter's Hill and Huggin Hill material appears to reveal affinities to both. The 'Period I' demolition at the Salvation Army Headquarters includes procuratorial and relief-stamped die types paralleled in part at both Huggin Hill and Peter's Hill (I. Betts pers comm) (Table 3). Furthermore, a crossover in die types between Peter's Hill and Huggin Hill can also be demonstrated.

It seems apparent that at least some of the material re-used in construction of the 'Period I' complex can be paralleled at the baths, namely the box flues, hollow *voussoir* tiles and the fragmented Purbeck marble paving slabs (I. Betts, pers comm). The latter are more specific to this building than the Kentish rag and local 2815 brick and tile that could have come from any number of structures, perhaps those encompassing the procuratorial die types evidenced at Peter's Hill but not at the Salvation Army Headquarters or Huggin Hill. The baths, however, tie in with the proposed dating and are in close proximity, providing convenient quarry. The late 2nd-century construction date and 3rd century refurbishment of 'Period I' would also explain why a more extensive range of marble and late Roman tile appears in demolition group than seen at Huggin Hill. The difference in the painted plaster is further explained when it is considered that the assemblage from Peter's Hill and the Salvation Army Headquarters derive from the 'Period I' decorative scheme, and not from the demolished Huggin Hill baths.

The analysis of the demolition deposits has revealed that although partially constructed of re-used material, probably salvaged from more than one structure but perhaps including the Huggin Hill baths, the 'Period I' complex was opulently decorated with new contemporary high-status stone veneers, paving, mosaics and painted wall plaster. Given the proportion of the box flue and hollow *voussoir* tiles that demonstrate evidence of re-use as building rubble, evidence for an extensive hypocaust is scanty. Furthermore, the procuratorial tiles would also have been re-used and cannot be taken to denote the complex was official in character, although the latter is intimated by the range of imported marbles and general precision of construction.

'Period II'

The paucity of any late tile fabrics, extensive re-use of material quarried from earlier buildings and the use of *opus signinum* in the 'Period II' complex potentially reveals insights into the method and circumstances of construction. The use of 'concrete' is likely to have held the same advantages during the Roman period as it does today, allowing for the rapid construction of massive architectural elements (Brown 2004, 178). The re-use of brick, tile and stone readily to hand would also provide a cheap, cost effective build.

The re-use of early Roman building material in late Roman structures in London is commonly recognised, but is often supplemented with late Roman tile for roofing. The latter is entirely absent from the 'Period II' complex, but then so is much of any type of demolition material that might be expected, perhaps indicating the complex was never completed. The source of at least some of the building material used in construction is likely to have been the 'Period I' complex but additional tile fabrics were identified (3009; 3019) that were not recovered during the earlier phase and may possibly indicate additional sources of quarry.

Themes could be drawn from this material relating to the economics of supply and resource during the later Roman period, particularly given the association of the 'Period II' complex with the usurper Allectus, or perhaps Carausius. Large-scale, rapid construction may have been aspired to at time when establishing or consolidating authority was of paramount importance. The death of Allectus in AD 296, presuming he was the man responsible for commissioning the 'Period II' complex, may substantiate the idea that work was never completed.

Glass

John Shepherd and Sarah Carter

Sixteen fragments of glass (catalogued as nos.1–16) obviously Roman in date were found in the course of the excavation of this site. Three of these are window glass fragments, coming from the cast matt and glossy variety that was prevalent during the 1st and 2nd centuries (nos. 14–16). Of the thirteen vessel fragments, eight are from bowls and beakers (nos. 1–8) and two come from narrow-necked vessels (nos. 9–10). Three (nos. 11–13) come from indeterminate forms. A late 2nd- or early 3rd-century emphasis is provided by two 'Airlie' type beakers (Fig. 41.1, 41.2). These vessels are very distinctive, are very common and can therefore be regarded as type-fossils of the period. (Price & Cottam 1998, 99). A full catalogue of all recovered fragments is held with the archive. Both 'Airlie' type beakers were recovered from Phase 7 demolition deposits and are dated to the late 2nd or 3rd century: one recovered as two fragments from the rim and body of a straight-sided, 'Airlie'-type beaker (Isings 1957,

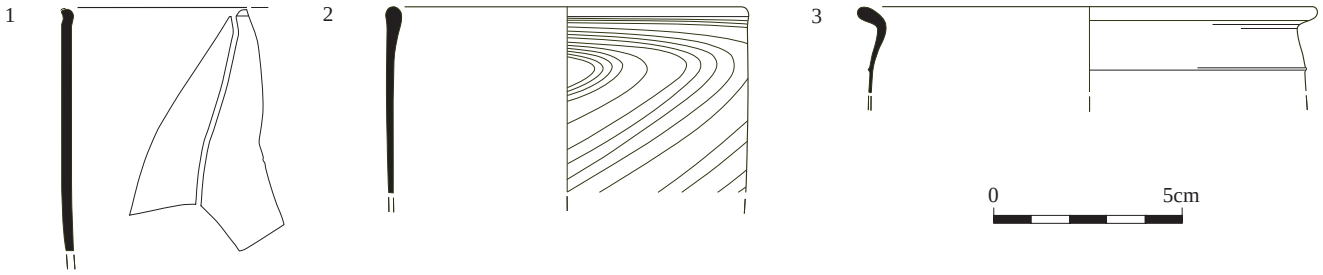


Fig. 41 Fragments of glass beakers recovered from Phase 7 demolition deposits (scale 1:2)

form 85b) with a thickened, fire-rounded rim (nos. 2–3), (Fig. 41.1); the other (no. 4) recovered as a fragment from the rim and side again of a straight-sided, 'Airlie'-type beaker (Isings 1957, form 85b) with thickened, fire-rounded rim (Fig. 41.2). A small fragment from the rim of a beaker in free-blown; colourless glass with an everted rim and body decorated with applied trail of the same metal was also recovered from Phase 7 demolition deposits (Fig. 41.3).

The assemblage is extremely fragmentary and diverse. Other than a late 2nd- or 3rd-century emphasis for the Roman material, there is little that can be concluded about the supply of glass in general to this site.

Registered Finds

Märit Gaimster and Damian Goodburn

Only ten registered finds together with two fragments of possible writing tablets were recovered from Roman contexts; of which the majority consists of iron nails and bars. The paucity of finds may reflect the limited nature of the areas of excavation on site, but the lack of personal items might suggest that the activity on site precluded their casual loss or disposal. The only items of interest were a glass melon bead (Fig. 42) and a silver coin, a denarius dated AD 206–210 and probably of Caracalla, which were retrieved from dump and demolition layers associated with the 'Period I' complex. Additionally a Roman bone hairpin <3> was found residually in a 19th-century context.

Two very fragmentary pieces of worked wood were found in a Phase 5 ground consolidation deposit in P8, which may very tentatively be identified as writing tablet fragments (Fig. 43). One fragment is broken but has a rectangular form about 110mm long by 58mm wide and 5mm thick. It was tangentially faced with a shallow broken upstanding ridge at one end and appears to have been made of a pale deciduous wood. The other fragment was 180mm long and 40mm wide by 6mm thick. It was clearly of radially cleft softwood and had a shallow score at one end. It is just possible that this was a tablet of luggage label type as found at the waterfront site of Regis House (Brigham & Watson forthcoming).

Fig. 42 Glass melon bead from 'Period I' structures

Timber

Damian Goodburn

A variety of Roman waterlogged wood was revealed during the archaeological investigations on the site. This report uses information provided in a tree-ring study by Tyers (see below) and a relevant tree-ring study by Hillam on the adjacent sites (Hillam 1993). This report will also briefly reappraise aspects of that analysis carried out in the late 1980s where directly relevant.

Apart from the largely unavoidable pressures and difficulties of urban rescue archaeology of time and access constraints, this project posed its own specific problems. Many of the timbers were deeply driven into underlying mainly clayey deposits. After exposing the tops of many timbers they had to be salvaged during the machine excavation of otherwise natural deposits. This machine work was controlled but unavoidably resulted in much abrasion and damage to many of the timbers. However, in some cases preservation, particularly of the lowest parts of the timbers, was very good. The small size of some trenches and partial excavation of others limited the inferences that can be drawn in some cases. In some areas a policy of preservation *in situ* prevented further excavation.

THE CHARACTER AND SURVIVAL OF THE ROMAN WOODWORK

The site straddles the point where the natural low hill, on which St. Paul's cathedral now stands, would have met the earlier Roman riverside, just on the north side of Castle Baynard Street. At lower levels the deposits just behind the contemporary waterfront were waterlogged, to varying extents, and timbers of mainly Roman date were found. Some of the most deeply buried woodwork survived in

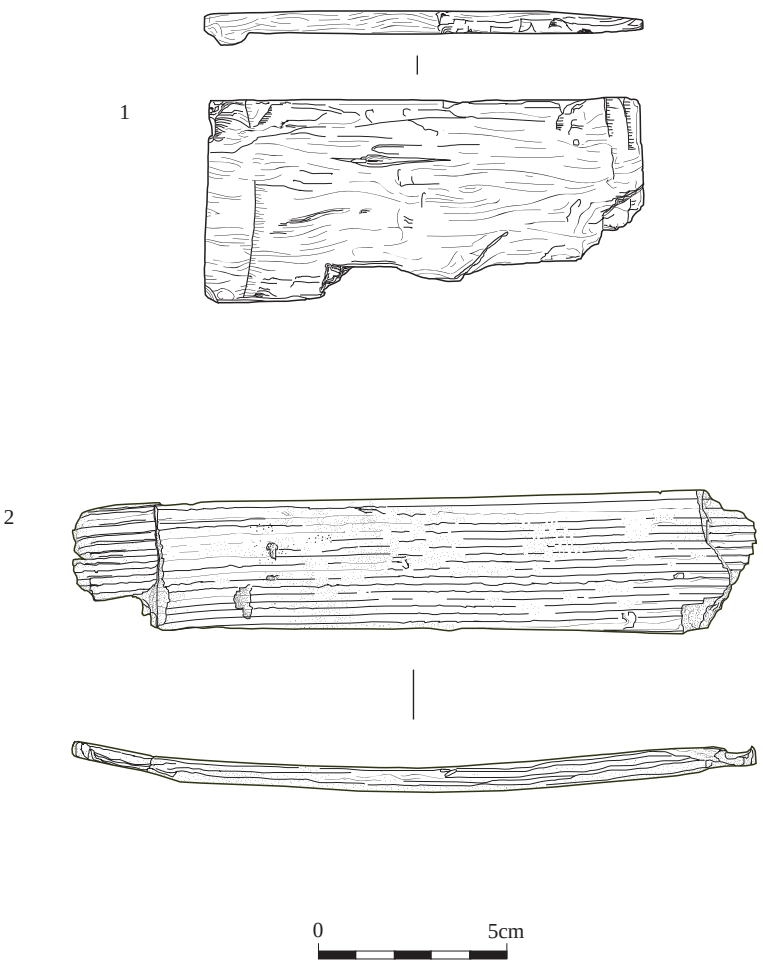


Fig. 43 Fragments of writing tablets from Phase 5 ground consolidation deposits for 'Period I' buildings (scale 1:2)

pristine condition with well-preserved tool marks with signature marks intact and little degradation. In contrast, other elements, particularly some from earlier excavations at Peter's Hill, only survived as peaty voids or impressions.

The vast bulk of the Roman period woodwork found during the recent and earlier excavations were foundation timbers, mainly piles. Large scale terracing and dumping took place before many of the pile timbers were driven. The known masonry structures in the immediate area included the east–west riverside wall, the recycled remains of a monumental arch, and what has been described as a large 'palace complex' in two main phases ('Periods I and II').

Apart from various groups of piles, other foundation timbers included construction trench shuttering. Importantly, during the latest phase of excavation some timbers of a baulk quay and a probable warehouse threshold were also found which predated the 'Period I' masonry walls. However, there was no evidence on the Salvation Army Headquarters site of some timbers, which were part of the foundations of the 'Period II' complex at Peter's Hill. These timbers from Peter's Hill consisted of voids and traces of horizontal cribbing beams set above the piles. Another group of timbers from that site which were not found during the recent investigation, which this writer would argue must also predate 'Period I' constructions and indeed probably represent the first Roman structures built on the site, have been called a 'timber lattice' and preceding 'angled stakes' (Williams 1993, 42; see below).

THE EARLY ROMAN WATERFRONT: PHASES 2–4

Phase 2: Timbers possibly associated with a Roman quay

Part of an oak plank [890] aligned east–west was found in P8 (see Fig. 12, Chapter 2) with its east end supported by a stack of at least two off-cuts [891] and [892]. The north–south plank was exposed for *c*. 1400mm and was 250mm wide by 20mm thick. All three shattered oak plank fragments had traces of cream lime or mortar deposits adhering to them. The two smaller pieces have very tentatively been identified as fragments of cooperage, possibly the damaged end of a cask set in the ground to slake lime. This identification is based on the fact that they were tangentially faced very fast grown oak, with occasional traces of saw marks, and ends that had been crudely axe bevelled to a curve as if to fit in the 'croze' groove of cask staves. However, oak is not the normal material for Roman casks as a softwood was preferred. Timber [892] also had a residual nail in it. The OD levels on the upper surface were from 0.35–0.49m, well below high tide levels in the 1st century. It is possible that the

plank was used as duck boards whilst building a quay. The timbers were sampled but were not considered suitable for measuring and dating.

Phase 3: Associated wood chips, typical waterfront debris

In P8, close to the later Phase 4 quay beam [833], organic deposits were found which were rich in charcoal and more importantly, wood chips. The chips were clearly a mix of oak and a pale softwood. The oak chips could derive from carpentry or similar woodwork in the immediate area whilst the softwood chips (silver fir?) are more diagnostic of particular activities. Indeed, they are typical Roman waterfront debris where imported central European wine casks were being opened and recycled on the quaysides or in adjacent warehouses. Such debris has been found around the AD 63 quay at Regis House and other sites (Goodburn forthcoming).

Phase 4: Fragments of timber quay structure from the early Roman waterfront

Since excavations in the 1970s and early 1980s it has been known that the waterfronts of the Roman city were often built using large baulks of oak timber laid horizontally in a variety of arrangements (Milne 1985; Brigham 1990). At such sites as the Pudding Lane excavations extravagant use was made of such large, neatly hewn, rectangular baulks of oak for the quay frontages (Bateman & Milne 1983; Milne 1985). A large horizontal rectangular oak baulk [833] revealed here in P8 (see Fig. 12, Chapter 2) suggested the possibility of it having been part of a quay structure. The OD levels of the early and later Roman port are also now relatively well known (Brigham 1990, 143) and that of timber [833] at a little under 2.0m OD would have fitted with the level of a 1st-century quay. The topographic location of the east–west aligned baulk close to the predicted line of the waterfront was also suggestive. However, the use of large horizontal, baulks has also been found in cribwork foundations such as at No. 1 Poultry (Goodburn in prep) so a certain origin in a quay frontage cannot be confirmed. Tree-ring dating has established an early date with the last heartwood ring dating to 12 BC (see Tyers, below). Although some heartwood and sapwood had been removed a 1st-century felling date is indicated. Thus, it is quite reasonable to see this baulk as a small exposure of a little-explored early western quay.

The quay baulk [833] was a box-halved beam *c*. 500mm by 260mm used set on edge (Fig. 44 and see Fig. 12, Chapter 2). The beam appears to have been half of a large baulk, and it would have originally measured *c*. 500mm by 528mm in section, assuming it had been cut in half evenly and allowing *c*. 8mm for the saw kerf. It is uncertain how the parent baulk was cut, but sawing timber of these dimensions was within the range of the Roman sawyers or '*sectores materiarum*' (Meiggs 1982, 355; Goodburn 1998a). However, weathering of the surfaces removed the tool mark evidence. In other cases patterns of saw marks have been found on Roman planks and sometimes beams from London and elsewhere in Britain which have shown us that there were at least three different basic methods of sawing known in the province and in all the timber had to be lifted up rather than rolled over a pit (Goodburn 1995, 44; 2001a, 192). Lengthways sawing and the production of regular rectangular beams were key features of the new Roman woodworking technology.

The baulk would have been cut from a parent oak at least 0.85m diameter at breast height ('DBH'). During the tree-ring work 174 fairly narrow annual rings without sapwood were found and the last ring dated to 12 BC (see Tyers, below). As the timber could not date before the Roman period the parent tree would have been a minimum of 235 years old with only 10 sapwood rings, although it was probably as much as 250 years old. By contrast, modern managed woodland oaks in Southeast England are typically felled at around 100–130 years old today and are smaller in DBH and faster grown. The characteristics of the parent tree for this timber suggest an origin in a stand of tall, dark woodland, of wildwood type. Some of the oaks used for timbers found on this site came from very different types of tree-land as noted below (also see Fig. 45a.).

The finished beam used green would have weighed *c*. 0.5 tonne at 4m long (at an average green heartwood weight for oak of *c.* 1.073 tonnes/m³ (Millet & McGrail 1987,

Fig. 44 Quay baulk [833], looking south (scales 1m, 0.5m)

106) and the original baulk could have been over twice that length and weighed well over a tonne. In other early quays a stack of horizontal baulks were common, increasing in size with depth, as in the example found at Regis House of AD 63 (Brigham & Watson forthcoming).

Traces of a substantial quayside building, Building 1

About 5m north of the alignment of the quay baulk [833] and *c*. 8m to the east of the exposed section in P8, another large horizontal east–west beam timber [503] was found in P2. This large oak beam had several features of considerable interest. The plan view shows the upper face had a large through mortice at the west end and a smaller blind mortice set in a shallow trench at the exposed east end (see Fig. 13, 14, 15, Chapter 2). The *c*. 1.2m between them might be of the order of space needed for a large door. Strongly supportive of this last suggestion is the location of a circular recess *c*. 60mm diameter, which could have held the pivot of a large 'har hung' door. Broadly similar beams with similar types of jointing have been found at the entrance to riverside warehouse buildings of early Roman date (e.g. at Regis House, Brigham & Watson forthcoming). The large through mortice is interpreted as having been for a door jamb post and the smaller blind mortice for a smaller jamb post against which the door closed (Goodburn 2003).

However, it is possible that only just over half the doorway was exposed and the smaller blind mortice was actually for the end of a square iron bolt for locking one leaf of a large two-leafed door or gateway. A somewhat similar arrangement, using a slightly smaller sized oak threshold beam, was found at the two-leafed eastern gate to the London amphitheatre arena (Bateman 2000, 22; Goodburn in prep). Thus, we may suggest that the doorway would have been large and secure, perhaps exactly what one might expect for a substantial quayside warehouse. The function of the shallow crosswise slot is uncertain but it could possibly have held a repair block where the threshold was damaged around the bolt hole, a common feature of recent doors.

The beam was hewn boxed heart to *c*. 460mm by 310mm and was used with the widest dimension horizontal. The undulating surface of the beam suggested that it was hewn out but no clear tool marks were seen. Although the section of the beam that could be sampled lacked any sapwood it had over 180 fairly narrow annual rings with a last heartwood ring at AD 30 (see Tyers, below). This is very suggestive of a mid to late 1st century AD date and a date after the first quarter of the 2nd century would be extremely unlikely. It would have to have been hewn out of a parent oak around 200 years old or older and at least 0.75m DBH. Again these characteristics are typical of temperate wildwood-type trees (Fig. 45a).

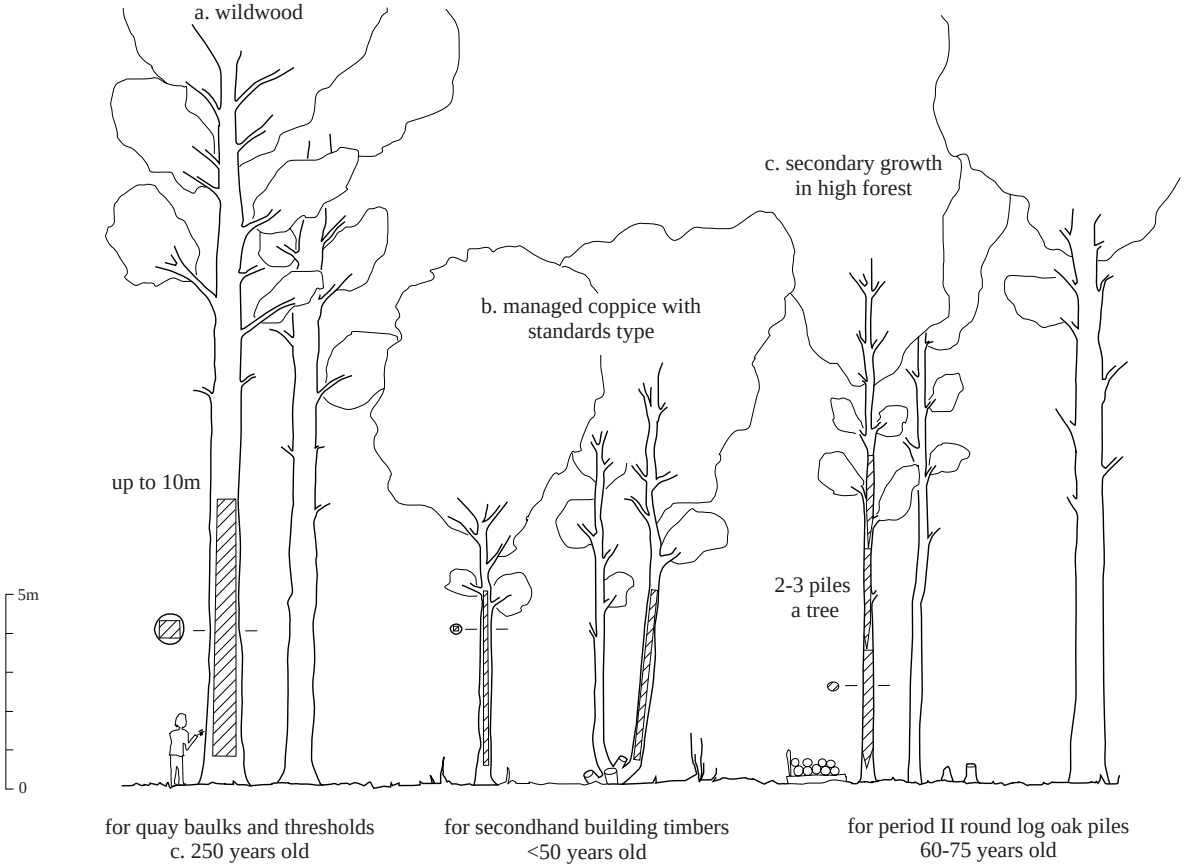


Fig. 45 Reconstructed Roman period parent trees for timbers found on site (scale 1:200)
a) Large old wildwood oaks used for 1st-century quay and threshold beams.
b) Small young standard oaks under 50 years old as used for some of the second hand building timbers reused as piles for 2nd-and 3rd-century masonry buildings found on site.
c) Slender relatively slow grown tall oaks as used for many of the 'Period II' foundation piles, probably secondary growth in high forest.

'PERIOD I': PHASE 6

Phase 6A

The 'Period I' one work included large, possibly apsidal, masonry walls at the eastern end of the site. The curved wall [2050] with masonry infilling [2051] was founded on twelve squared timber piles which varied in size from 280mm by 200mm to 420mm by 380mm. Tree-ring analysis provided close dating for this construction phase for the first time with pile [2064] having a probably bark edge date of AD 165.

Phase 6B

'Period I' pile foundation structure: c. AD 230s

A group of 42 rectangular or square-section oak piles were uncovered in the southeast corner of the site but could only be partially excavated, and some were sampled for tree-ring study. The timbers that made up structure [2001] were clearly driven as foundation piles for a substantial north–south wall believed to have been a later addition to 'Period I' Building 2. All the piles had been axe hewn fairly true and square as far as could be seen from the short lifted sections. They varied in scantling from *c*. 170mm by 130mm e.g. pile [2043] to 250mm by 280mm e.g. pile [2018]. Nearly all were hewn from whole logs but pile [2032] was made from a quarter log. The growth rate of the oak timber varied from moderately slow (average ring width 1–2mm) to medium growth (just over 2.5mm average width). It is likely that the timber derived from several different locations. Although no clear evidence of previous use was recorded for the timbers they were only partly exposed, and some use of second hand timber cannot be ruled out. Of the sampled timbers only one provided a tree-ring date, of AD 203–239 (see Tyers, below).

Possible foundation timbers for additions to the 'Period I' complex

Two north–south orientated beams, timbers [834] and [914], partially exposed in P8 near quay baulk [833], were originally thought to have been truncated remains of some form of land-tie assembly behind the quay frontage (see Fig. 12, Chapter 2). However, they were not physically joined and have been shown by the tree-ring study to have been felled between AD 205 and AD 232. They now appear to have been part of some kind of timber support for terracing, foundation works, or perhaps temporary supports for later construction such as scaffolding, which was used on the site between 'Period I' and 'Period II'. They were both hewn to a roughly square section from a quarter log.

Phase 6C

Sloping foundation piles possibly for a repair buttress

Revealed within a later cut through north–south masonry wall [38] in OP201 a group of 11 oak piles were found and partly excavated (see Fig. 19, 23, Chapter 2). The head of the piles lay well to the south of the tips as if they had been driven at an angle to support a large buttress sloping up to the north. That is, they appear to have been part of some form of impromptu and substantial repair to a subsiding wall to the north. The timbers used were all very varied including what appeared to have been fresh timbers with bark edges and some clearly second hand timbers with relict joints or signs of weathering. Some of these piles were lifted and recorded off-site. Although piles from this group were sampled no tree-ring dates were obtained.

The use of old building timbers

One of these timbers, pile [75], was found to have been a timber-framed building sill or top plate beam with typically Roman, square through-mortices for studs and an iron nail in one edge (Fig. 46). Inside the mortices chisel marks 15mm wide could be seen and on the hewn tip partial axe facets 50mm+ wide. It was *c*. 1.10m long by 160mm by 100mm and had waney corners. Unlike many of the timbers from the site the parent tree for this beam was a small, fast-grown oak only around 30 years old. This sort of oak is most likely to have grown in either open managed woodland, possibly as old coppice, which was a common type of material used for building timbers in Roman London (Fig. 45b) (Goodburn 1991a; Goodburn 1995).

Another pile, timber [78], was a box-quartered piece that seemed to have been sawn out of a larger weathered beam. Thus it is probable that there was a dealer in second hand timber in the vicinity. This work was done cheaply compared to the other foundation works recorded at this site.

Construction trench shuttering

In OP201 the remains of a large east–west masonry wall [51] were found collapsed to the south, together with a smaller masonry wall leading off it north–south. Two slightly decayed tangentially-faced oak shuttering planks, [81] and [128], *c*. 300mm wide by 20–22mm thick were found set on edge against the masonry footings (see Fig. 20, 21, Chapter 2). Very faint saw marks could be seen here and there on the planks. However, one plank had axe marks on one face showing that it had come from the

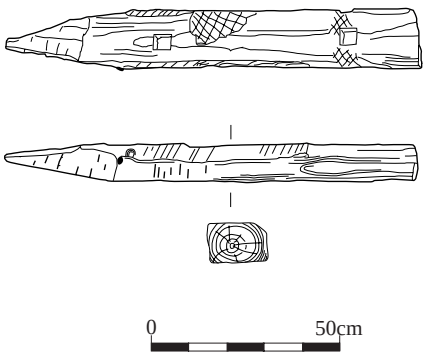


Fig. 46 Second-hand oak building timber [75] reused as a pile in the 2nd century, showing relict mortice joints, iron nails and waney corners from having been hewn from a small oak (scale 1:20)

outside of a hewn saw baulk (Goodburn 1995, 44; 2001b). A section of the planking was carefully lifted but later found to have been too fast grown to provide a tree-ring date. Another piece of rather decayed and broken sawn oak shuttering plank [889] from wall [708] in P8 was also examined off-site. This was a similar size *c*. 280mm + wide by 20mm thick after a little shrinkage. It is most likely that the planking was originally sawn from a baulk(s) about 1 *pes monetalis* square i.e. just under our traditional British foot. The tendency to use more planks of this width in the later Roman period rather than the common cubit wide (0.44m) planks which were dominant earlier has been seen on a number of sites (e.g. No.1 Poultry, Hill & Rowsome in prep). The decline in size is probably related to the decline in wild wood and increased production of smaller, fast grown oaks from managed woodlands (Goodburn 1998b).

PERIOD 'II': PHASE 8

Foundation woodwork from 'Period II' constructions: AD 294

Some of the groups of piles dealt with below were observed and sometimes lifted, sampled and recorded after being exposed in small trenches excavated on the site of pile locations for the new building development. In some cases they have been tree-ring dated in other cases they have been attributed to 'Period II' works on the basis of their form, size, location and level and limited associated stratigraphy. It must be said that they do form a remarkably coherent group from all the phases of excavation on the site, compared with piles found on some other Roman London sites, which are often of rather different forms.

Foundation piles from the 'Period II' phase of construction

In OP202 a group of oak piles was exposed (see Fig. 29, Chapter 2), nearly all were cut from whole logs and minimally trimmed with the bark edge, *c.* 120–200mm diameter. They had been cut from slow to medium growth oak (with between 45 and 75 rings). There was also one larger, boxed-heart square hewn pile [53], which was cut from a rather older tree and had been felled a few weeks earlier than the others, which mainly dated to spring AD 294 (see Tyers, below). A very small number of the piles were made from logs cleft in half.

A large oak pile timber from OP201

Pile [188] from OP201 was a well-preserved boxed-heart, hewn oak pile with a similar character to the other squared Roman oak piles from the excavation (Fig. 47). It was 2.14m long by 240mm by 235mm and was cut from a log with *c.* 75 annual rings. Unfortunately the growth pattern was erratic, starting fast and then suddenly growing slowly and so no tree-ring date could be obtained. The axe marks on the square section tip were very clear and near complete width at 67mm wide with a curve of 3mm. This might imply an axe of *c*. 70mm wide in the blade, which is right at the small end of the known Roman spectrum of axe sizes from the London evidence. The size of the marks appears to be typical of the narrow bladed axes used for pointing the vast majority of the round log piles as well. Signature marks left by nicks in the axe blade that cut the pile could also be seen but could not be clearly matched to those on any other pile. The knot orientation shows that the piles was used with the crown end down, where this could be gauged from the knot orientation this appeared to be the case with the other whole log piles as well. Small drying splits or 'shakes' on the lower parts of the pile were filled with the clay it was driven into which implies the timber had a period of perhaps a few weeks drying after conversion but before driving.

Timber piles from P7

The lifted piles from P7 were timbers [555] and [565]. The former was a hewn boxed heart timber 190mm by 170mm in section, with a short square point and a relict nail indicating that it was second hand. Timber [565] was typical of the majority of the smaller whole log piles found on this project with a diameter of 155mm and lifted length of 1.96m. It had been cut from a very straight medium to slow grown parent oak tree, and over its length had no knots, this implies that it was a log cut from the lower part

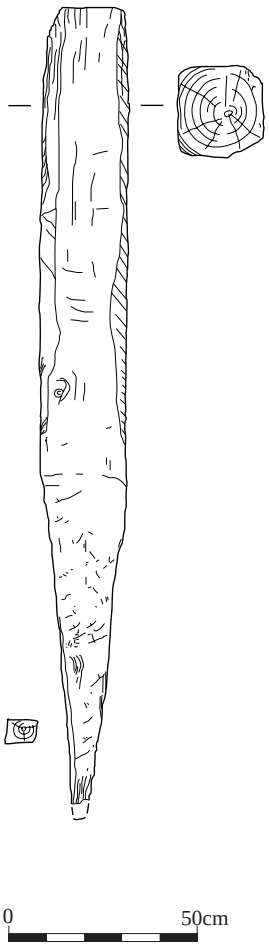


Fig. 47 Well-preserved boxed heart pile [188] showing clear axe marks on the tip (scale 1:20)

of the parent tree. The square section tip was covered in near complete narrow axe stop marks up to 62mm wide, left by a blade probably about 65mm wide.

Timber piles and evidence for short-term stockpiling from P9

All the lifted piles from P9 ([549], [551], [552] and [553]) were very similar to pile [565] above. On-site records note that pile [551] was 3.12m when initially exposed with a diameter of *c*. 190mm. This pile retained some of its bark and just under the bark oval borer channels *c*. 6mm wide full of frass could be seen. Experiments working fresh oak logs in ancient woodland on the edge of London suggest that such borer damage just under the bark often happens within 6 months storage. The felling date for this pile of spring AD 293 is about a year earlier than many of the other piles, which would fit with the borer traces noted above. Clearly, limited short-term stock piling is implied in the case of that pile at least. From this evidence it could be suggested that the felling of suitable oaks for the piles took place over about 1 year. The relative knottiness of pile log [549] indicated that it was cut from the upper parts of a trunk (Fig. 45c).

Timber piles from P23/24

Three piles were lifted from P23/24: [372], [374] and [375]. Again the whole log piles were similar to pile [565] but at the tips some were better preserved. In the case of pile [374] even the tool signature marks survived in almost pristine condition on the square section tip but they did not match any others on lifted piles. On pile [375] one of the most complete axe stop marks was found which was virtually complete at 70mm wide, with a curve of 3mm over that length. Again this implies the use of a relatively small bladed tool by Roman standards.

Timber piles from P27/28

Five piles were lifted from P27/28: [311], [314], [316], [318] and [403]. Again these piles were broadly similar to pile [565] and were whole log piles. However, [314] and [316] had a slightly different point form. Although hewn to a long tapering square section point the arrises had been neatly bevelled to strengthen them and reduce friction. In general this was true of some of the whole log piles from the site but not others. This dichotomy may reflect the work of different gangs producing the piles. This group of piles also varied considerably in growth rate with some such as [314] and [318] having only 30–40 annual rings, too few to allow for tree-ring dating.

Timber piles from P31/32

Four piles were lifted from P31/32, [304], [305], [377] and [385], all of which were whole log piles similar to pile [565] and had few distinctive features, although they seem to have had fewer rings than many of the others excavated from this phase.

Timber piles from P33/34

Three piles were lifted from P33/34: [328], [332] and [333]. Again these piles were generally very similar to whole log pile [565] but had all been rather severely machine damaged. Pile [328] had a plain square section hewn tip whilst pile [332] had a square section tip with neatly bevelled corners.

Reconstructing the parent woodland exploited for the 'Period II' piles

The dimensions and quantity of the 'Period II' piles

During the detailed analysis of the Peter's Hill and Sunlight Wharf excavations attempts were made to characterise the general nature of the 'Period II piles' and the type of trees they may have been made from based on the outline recording of a large sample (particularly from Peter's Hill). Over 90% of the piles were made from whole oak logs, which were rather straight and from 150–250mm in diameter, often with surviving bark (Williams 1993, 101). The lengths varied from 2.0–3.6m. There were also a small number of squared piles, some freshly felled and some clearly second hand, and a few of the whole log piles were used cleft in half. These generalisations also seem broadly applicable to the group of 'Period II' piles lifted and recorded in detail during the recent phase of work although the longest recovered example was only 3.12m long [551] and some were somewhat under 2m in original length.

The quantity of piles needed was clearly huge and Williams suggested that this was equivalent to 4,000 linear metres just for the foundations exposed in and between the Peter's Hill and Sunlight Wharf sites (Williams 1993, 101). In the recent excavations modern truncation and partial excavation make creating estimates of the quantity of timber used difficult but it was clearly very large, for example a 2m square at the south end of OP202 contained 28 round log piles. If we were to suggest an average length of 2.5m that would translate into *c*. 50 linear metres of piling for that 2m square. Williams suggested that the building of the 'Period II' complex created 'a substantial demand for new timber of a very consistent type, i.e. oak, with straight boles in excess of 2m, and with a diameter of 150 to 250mm' (Williams 1993, 101). However, this is a slightly confusing way of expressing the demand, as what was required was logs for the piles, in most cases the 'boles' of the trees concerned would have produced at least two such logs (see below and Fig. 45c). It is quite clear that the piles were cut from rather straight trees often with many metres of branch-free length.

The age of the parent trees for the 'Period II' piles and the type of parent oaks used

The tree-ring study by Hillam indicated that the piles had 40 to 74 rings if we take both the Peter's Hill and Sunlight Wharf information together (Hillam 1993, 95). The recent tree-ring study by Tyers (see below) provides a similar picture of numbers of annual rings per log sample, although

some samples with *c*. 35 to 40 annual rings were not passed on for dating as they had too few rings. Thus, we might expand the range in the numbers of rings per log to between *c*. 35 and 75. A factor to be borne in mind here is that the parent trees grew upward as well as outward and it is virtually certain that pile logs were taken from different levels in the trunks (or boles) of those trees. Therefore, we would expect that the number of rings would vary a little from log to log. We would expect that a 2.5m length might have perhaps 3.5 to perhaps 10 fewer rings in the top end as opposed to that of the lower end in the parent tree. In fast-grown, small oak logs from old coppice stools the average upward growth has been found to have been as much as 0.73m per season with an increase in diameter of 6–10mm in 2nd-century examples from Courage's Brewery Site, Southwark (Goodburn 1995, 38). However, as the parent trees for the 'Period II' piles grew relatively slowly the difference in the number of rings from end to end is liable to have been somewhat greater. Given these considerations we can take the age of many of the parent trees for the regular round log piles to have been *c*. 60–75 years (with some being rather younger), the total number of rings in the lowest, straightest and most branch-free 'butt' logs. This means that the bulk started growth between AD 217 and AD 234.

The parent oak types and tree-land

Trees can grow in many different environments which have often been shaped to a greater or lesser extent by people in the British Isles for as much as 6,000 years. Individual oaks might grow in a natural wildwood, a hedgerow, a heath, a fenced managed woodland, as saplings from acorns or as stems from coppice stools or pollard bollings. The varied ways such environments were managed has been termed 'woodmanship' and the many terms and their meanings have been best explained by Oliver Rackham (Rackham 1976). Williams suggested that the rather regular pile timbers of this phase probably derived from '…managed estate woodland…' (Williams 1993, 101). It is not absolutely clear what is meant by the term but plantation growth akin to modern 'forestry' is hinted at. We know that during the Roman period exotic trees were introduced to the London area if only on a small scale (Goodburn 1998b) which is a rather 'modern' forestry practice. However, we do not yet have clear evidence of large-scale modern plantations for timber production at this time in the northwest parts of the empire. The evidence we do have suggests that tree-land of many types was subject to a variety of ancient woodmanship practices such as varied forms of coppicing for roundwood and even small constructional timber (e.g. Goodburn 1991a; Goodburn 1995). Areas of wildwood with large old trees were also harvested for large timbers but it is clear that the amount of such woodland declined in the London hinterland during the Roman period and smaller, faster grown trees from managed woods became more commonly used.

The relatively slow, straight growth and age of the parent trees for the 'Period II' piles without any evidence of curved coppiced butt-ends, suggests they were not produced by that woodmanship method. The general characteristics seem to imply growth in tall dark woodland possibly on relatively poor soil. Differences in the growth habits of the two main native oak species are sometimes strongly suggested but as they hybridise and we cannot distinguish them from archaeological wood samples we cannot explore this possibility further. Examples of regular supply of small straight oaks of *c*. 60–75 years old would be impossible to find in ancient managed woodland in the Southeast of England today. Typically modern standard timber trees from 'coppiced with standards' woodland are only moderately straight, fairly fast grown and branch between 3–4m up. Plantation grown oak would have some of the characteristics of the pile parent trees, such as straight growth, but would tend to be relatively faster grown, except on poor soils. Another possibly similar method of growing these regular trees might have been some form of 'high forest' with natural regeneration where groups of trees were felled and the seed of the trees or adjacent standing trees regenerated in restricted light. There may well have been bands of secondary woodland within recently converted wildwood. Oaks of this form can be seen mixed with beech in a few established high forest areas in the Chilterns, just west of London, but the system is much commoner in most of continental Europe and they can easily be seen in Northern France or Belgium.

It might even be that the bulk of the parent trees for the piles grew in a high forest area which had seen heavy fellings for a large London region project around AD 217–234. Hillam's tree-ring study has shown that work at Chambers Wharf in Southwark and possibly some work at the Billingsgate quays, was carried out with oaks felled at about the right time (Hillam 1993, 95), and the additional construction on the 'Period I' complex linked to Phase 6B would also appear to be of this date. Perhaps it is possible similar blocks of high forest were exploited repeatedly within range of London. It is also interesting to note that the woodsmen and engineers were not followers of Vitruvius (Book II Chapter IX) in their practice of spring felling, as he writes that trees 'should be felled over the winter season and that in spring they are not sound, like a pregnant woman who has to nourish a foetus!'

Tree-ring dates and provincial political leadership

There is evidence of limited short term stockpiling of a few weeks highlighted in the tree-ring reports by Hillam (1993) and Tyers (see below) and shown by evidence of slight drying of some timbers before use. It was also noted that pile [551] from the recent excavations was felled in the spring of AD 293 rather than AD 294 as were nearly all the others, this was also indicated by the recorded beetle damage between the bark and sapwood (see above). Hillam also noted a possible damaged bark edge on one pile of AD 292 but was uncertain (Hillam 1993, 98). This suggests that there was some very limited stock piling of some of the round timber piles, probably a rather small proportion. So whilst the erection of the building clearly took place

at foundation level in AD 294 under the rule of Allectus it may be that some initial work such as the first felling of timber for the structure actually took place under the rule of Carausius.

Reconstructing the making of the 'Period II' piles and associated logistical considerations

The range of foundation pile types known from the Roman London region

It might be thought that the range of timber foundation piles known from the northwest empire would be limited to pointed round logs with branches removed but recording over many years in London has shown there were many types of foundation piles used in the Roman period. These were all exclusively of uncharred oak in the London region rather the 'charred alder, olive or oak wood' recommended by Vitruvius (Book III). Roman London piles were frequently of cleft oak ½ logs or more commonly split radially into 1/8th or smaller sections. These triangular section timbers were sometimes also subdivided by tangential cleaving round the rings as at Northgate House (Goodburn 2005). These are mainly found under the sill beams of timber and earth buildings. Piles made of logs hewn square are also often found as in many of the 'Period I' examples found on this site. Piles used in the round with the bark left on are relatively uncommon in Roman London civil engineering or more domestic works. Hewing the bark and much of the sapwood off reduces the amount of decay-prone material present, potentially increasing the life of the timber. Therefore, we might tentatively suggest that, incongruously, some money was being saved in the production of the piles for the 'Period II' works. Whilst iron shoes for pile tips have been recorded for firmly dated Roman structures such as the Roman Maas bridge (Goudswaard Undated) their use in London seems to have been rare.

Essential processes required to produce the vast numbers of 'Period II' piles

Having located the trees and decided on the extraction and delivery route the overseers of the work had to ensure that the following stages of work were carried out. The trees had to be felled, lopped and marked for cross-cutting or 'bucking'. No clear indication of close specifications for length and diameter were found in the piles, unlike much other Roman woodwork. Thus, they were probably just cut where they were straightest avoiding bends in the stems. This contrasts with the apparently regular 1 foot (or *pes monetalis*) square cribbing beams recorded as peaty voids on earlier excavations on the 'Period II' complex (Williams 1993, 101).

No traces of saw marks were found on the butt ends of any of the piles but faint traces of axe marks were (Fig. 48c), as well as on branch scars. Next the fairly long

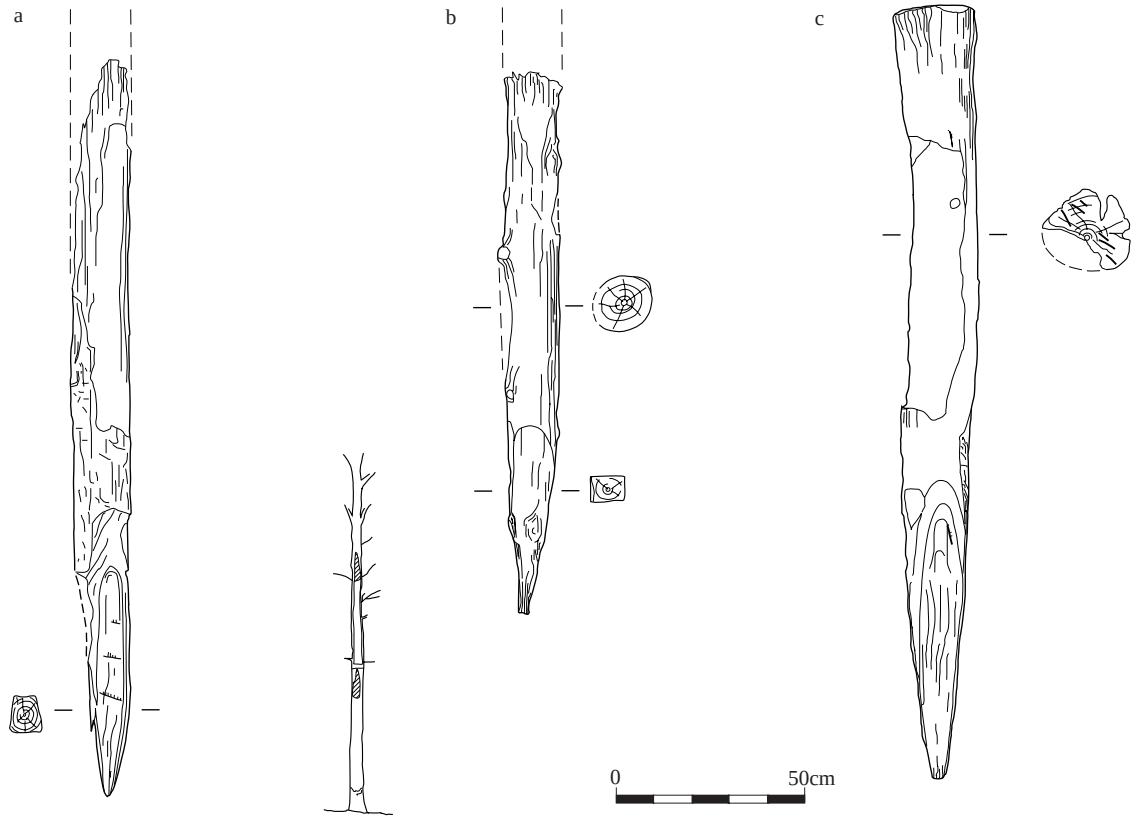


Fig. 48 Round log piles from the 'Period II' foundations of AD 294 showing their form and tool marks (scale 1:20)
a) Pile [542] an example taken from the bottom of a tall slender oak.
b) Pile [549] a knotty pile from the upper part of a slender oak.
c) Pile [547] complete with its original axe cut battered top.

tapering square section points were hewn (Fig. 48). The piles were then ready for loading and moving to the site or a holding yard. The freshly cut oak log piles would have weighed between *c*. 42 and 60kg (94 and 144lbs). The foot square cribbing timbers would have been hewn from larger trees but as there is little evidence for them their production cannot be pursued further here.

Moving the log piles

Moving timber for building operations raises considerable logistical questions. It is sometimes thought that oak timbers could simply be rafted down river to the port of London (see the Roman Port model in the Museum of London) but in fact that would not have been possible except for dry second hand timber. Although the density of freshly felled oak varies it very rarely floats in freshwater and sometimes even sinks in salt water. The fresh heartwood has an average density of *c*. 1.073 tonnes/m³ (Millet & McGrail 1987, 106), heavier than water. When manhandling was required during production and delivery or about the construction site the smaller piles could have been shouldered by two men, but it may well have been the case that the larger piles were carried by four using simple rope slings as shown on Trajan's column.

The complexity and costs of the supply of piles for large building operations can be glimpsed by reference to some medieval building accounts such as those for London Bridge (Watson *et al* 2001, 124).

Tool kits used, small peasant axes?

It seems very unlikely that the piles were made from full length debranched ('lopped') logs on-site as that would have involved the labour of moving longer heavier timbers and some waste. Also no quantity of wood chips from such work, which would have had much bark and sapwood, were found. Here we are assuming that the axe marks recorded on the tips of the piles were left by the general purpose 'felling axes' used for all the stages of work done on the piles. The angle of the marks suggested axes rather than adzes were used for forming the points. Not more than one size and form of axe mark was found on individual piles as is sometimes found on post-Roman examples. The axe marks found were rather small compared to most found on other Roman London woodwork where the most complete marks vary from *c*. 75mm to *c*. 120mm wide with a small number left by broader bladed tools up to 200mm wide (Goodburn 1991a, 196; 2001b). Nearly all the near-complete marks were *c*. 60–68mm wide (e.g. [565], [188], [374], [549]). But in one case slightly curved axe marks up to 90mm wide were recorded. Although some signature mark striations from individual axes survived they could not be matched between any lifted examples. It may be that the axes used were the general-purpose tools of local natives derived from small Iron Age axes rather than the larger, varied Roman tools.

Variation in the axe marks showed that there were several work gangs producing the piles, further exemplified by the bevelling of some of the tip arrises (such as [523] and [547]) but not others. Other 'tools' used for making the piles would have probably included levers, wooden skids, and possibly ropes to sling the logs.

Driving the 'Period II' piles

It is well known that the Romans were great engineers and had devised cranes, water lifting and military machines. Although the piles used on this site were not very large by Roman standards they were beyond what one man with a large mallet ('maul') could drive. It seems most likely that a relatively light mobile piling rig would have been used so it could be moved quickly after driving the piles, particularly the smaller examples.

A limited parallel: experimental driving of round oak piles similar to those of the 'Period II' foundations

In 2001 this writer was asked to explore how round oak log piles might have been driven in the Bronze Age as a cameo for the Time Team (Channel 4 television) investigations of the possible Bronze Age bridge or jetty at Vauxhall, London. Although of a period before the use of Roman carpentry, engineering and the use of iron there are likely similarities with the work that the engineers faced in the 'Period II' works under consideration here. The oak piles to be driven were of simple round log form with long tapering points and branches removed. Although the cameo examples were at the short end of the 'Period II' size range they were at the larger end of the diameter range at *c*. 250mm diameter. In the absence of evidence simple Bronze Age woodworking techniques were used to produce a pole tripod rig and a carved sheaveless block ('dumb sheave') through which a greased natural fibre rope could slide easily. A ram was carved from a freshly cut oak log 340mm in diameter and 0.96m long in total. The ram log was weighed in largely seasoned but wet condition and was just under 60kg (9½ stone), when used for the trials; in greener condition it might have weighed around 80kg. The poles were 5m long and an average of 110mm diameter at the butt end. Depending on the spread of the feet the tripod was *c*. 4m high at the apex. If we take out the length of the dumb sheave block of about 0.45m and that of the ram and binding of *c*. 1.10m the length of drop to the ground was *c*. 2.45m. With a 1.2m long pile set in a starting hole of 0.5m the drop was reduced to *c*. 1.75m. This proved adequate.

Unfortunately only two piles have been driven in moist but not totally saturated ground in London and Kent, but in each case the rig worked well and was easily positioned. Far more experimentation should be done on a range of subsoil types before any definitive statements can be made about the efficacy of the rig. However, it has given this writer a brief glimpse of some of the variables involved and some idea of the potential work team required for such an operation. In the two examples three solid adults could raise and move the tripod, and raise and drop the ram, however for day-long operation with piles up to *c*. 3.6m long a taller heavier rig would have been required.

The possible nature of a simple Roman piling ram as used for the 'Period II' piles?

As the piles driven were sometimes over 3m long it seems likely that the height from which the ram was to be dropped would have to have been set at around 6m or so allowing for the length of the ram and suspension block. Thus, a larger tripod or possibly some form of gibbet would have to have been used and moved around the site. In the Roman period the use of iron for reinforcing and binding the ram would have helped to make it more durable. Another technological advantage would probably have been the use of a single sheave pulley block which could have reduced friction and wear on the ram hoisting rope. Pulley blocks were clearly known in Roman London, as the late 3rd- to early 4th-century double sheave block from the County Hall ship indicates (Marsden 1994, 128). A crude estimate of the size of the workforce required to operate and move such a relatively simple ram might be between 5 and 10.

Phase 8 discussion

The woodwork found in adjacent areas prior to 1986

Very brief outline summaries of the general character of many of the Roman foundation timbers found during earlier excavations were drawn together by Williams (Williams 1993) and that information and the detailed tree-ring study by Hillam (Hillam 1993) has been reviewed before compiling this analysis.

A key feature of Hillam's extensive tree-ring study was the precise dating of groups of piles for the 'Period II' masonry showing that the piles in the east were felled in the winter of AD 293–294 and those to the west a few weeks or months later in the spring of AD 294.

The precise archaeological dating and historical correlation of the 'Period II' foundation piles

The dating precision obtained through Hillam's tree-ring study, backed up by more recent work by Tyers (see below), allows us to allocate the construction of the massive 'Period II' masonry structure to the period of the rule of Allectus. This lay in a short epoch of independence from direct imperial rule. As Allectus had a key role in the establishment of the short lived independent *Britannia* as provincial naval fleet commander the position of what must have been one of his most massive building projects on the banks of the Thames may have been significant. Perhaps he instigated the building of the massive structure where he would have been able to overlook shallow draft naval vessels, such as the County Hall ship, in the Thames (Marsden 1994, 109).

Strangely some doubt was expressed in the dating of the massive 'Period II' constructions recently by de la Bédoyère who suggested that 'there is little evidence' for the dating and that the 'wood may have been allowed to season for years before it was used' (de la Bédoyère 2003, 24). However, this structure is arguably the best-dated Roman construction in *Britannia*. We have no evidence in general for the long term seasoning of constructional timber in the Roman period; indeed we have good evidence to the contrary from many sites (Goodburn 1991a, 195) where soft easily worked 'green oak' was the clear preference of the woodworkers as we would expect in an era of hand, rather than machine, work. There are a number of criteria, other than the ease of working, which we can use to positively identify the use of fresh green timber in constructional work which are listed below:

1) The tool marks created by axes and adzes are seen to be smooth with little grain tearing (except in the reworking of second hand timber).

2) Drying 'shakes' (splits) in building timbers are normally not found to have daub in them, showing seasoning took place after construction. In the cases of the 'Period II' piles here there were no large drying shakes full of clay indicating long term drying over years. The drying splits took place on exposure on site. Below the surface the vast majority of the timber had the appearance of fresh unseasoned modern oak and could even be split and bent into flexible laths as per new green oak.

3) The lack of woodworm or decay in the sapwood of timbers used underground indicates that any storage after felling was limited as oak sapwood, especially with the bark on, will normally suffer insect attack within 2 years or so if stored outside. No trace of the typical furniture beetle type exit holes were found in any of the timbers recovered from the Salvation Army Headquarters excavations except in what were clearly second hand building timbers with relict joints and one timber felled a year earlier than the others (see above).

4) The closeness of felling dates in well-dated structures for timbers of different sizes shows that there generally was little stock piling for seasoning, during which larger timbers would have to have been dried for longer. In the case of the piling for 'Periods I and II' works at this site this was overwhelmingly the case, even the progress of work from east to west through the year was detectable.

5) Anybody funding large construction works would see little return on their investment for many years if they waited for seasoning by air drying for 1 year per inch of thickness as is the rule of thumb for oak in the British climate. To be totally seasoned the typical pile would have to have been stored for *c*. 6 years the larger examples for 10 years.

In sum, the tree-ring dating of the 'Period I' and even more so the 'Period II' constructions is consistent and entirely reliable. The 'Period II' construction must have been erected during the rule of Allectus.

Dating the 'lattice work' from Peter's Hill

The unusual timber 'lattice work' layer with split oak timbers (including some that were clearly second hand) from Peter's Hill has been considered contemporary with the building of the large 'Period II' masonry structures. Plan relationships and photographs have been interpreted as showing the timber and earth layers 'respecting' the later piled foundations (Williams 1993, 43). However,

there are several reasons why we might possibly doubt this interpretation of the evidence, which are listed below for brevity:

1) The published tree-ring final ring dates for timbers of the layer of after 8 BC and after AD 35 (Hillam 1993, 96–97, fig. 65) suggest a date in the mid 1st century is most likely. The sketch cross sections of the timbers concerned do not seem to indicate that a very large number of tree-rings would have been removed. In the photographs some sapwood appears to have survived on some of the timbers.

2) The rough working of the timbers in many cases by splitting is atypical of urban Roman woodwork known from London.

3) There are some parallels with simply worked, small, cleft oak piles and revetting timbers, including some that were second hand, which were found in the first river side revetment at Regis House in the centre of the City (Goodburn forthcoming). That structure was tree-ring dated using the freshest timbers with no signs of secondary use, to the early AD 50s.

It thus seems that the 'timber lattice' may well have been largely made up of the pushed over and partially dismantled remains of the first riverside revetment(s) on the site. This may well have been similar to the small pile and plank example found at Regis House (Goodburn forthcoming).

Dendrochronology

Ian Tyers

A total of 41 samples from timbers excavated on site were submitted for spot-dating, twelve at evaluation stage (Tyers 2001a) and a further 29 for subsequent analysis. A preliminary assessment of the samples concluded that nineteen of the new samples had some dendrochronological potential, with ten containing insufficient rings for tree-ring analysis. Standard dendrochronological methods (see e.g. English Heritage 1998) were applied to the nineteen suitable new samples (Table 4). The tree-ring sequences from ten of these samples were found to cross-match with each other and with reference chronologies, previous evaluation work had dated nine other samples (Fig. 49). The other measured samples were not found to cross-match reference chronologies and are undated by the analysis reported here. It is important to appreciate that although the dendrochronological dates will not change in the future, any interpretations of these results may change. The following text presents the dates as found, and their interpreted dating (as outlined above, in Chapter 2) based on stratigraphic evidence.

Three types of dating result are usually obtained by dendrochronological analysis. Firstly, where a sample is complete to bark-edge a precise year of felling is obtained directly from the date of the last ring on the sample, where there is good survival of this outer ring it is sometimes possible to assign seasons to the felling period, the principal distinctions are between early spring, early summer and winter. Where a sample has some sapwood, but is not complete to the bark-edge a felling date range is obtained by applying the maximum and minimum numbers of rings of sapwood normally seen in oaks for the relevant areas, to the relevant samples. The range 10–46 has been used in this report. Finally, where no sapwood survives a *terminus post quem* (*tpq*) date is obtained by adding the minimum number of sapwood rings likely to have been lost to the date of the latest surviving ring. This type of date is very much less useful than the other two types since a very great number of rings could have been lost either through ancient carpentry practise, or poor site preservation, and thus the felling date of such material may be considerably later than the tree-ring date.

A summary of the findings is presented in Table 4, and Fig. 49. All the material was identified as oak (*Quercus* spp) and as detailed above the dated samples were derived from four separate archaeological structures, along with two groups of material from the subsequent watching brief. The analysis of the samples from the evaluation dated nine timbers from a single structure. The results are summarised in the period and structure order also used in Fig. 49.

Phase 4

Quay

A single sample was taken from a timber baulk. This retained no sapwood and the result is thus relatively meaningless, it simply provides a *terminus post quem* of 2BC for the structure. The structure with which this timber was associated has been interpreted as a 1st-century quay. This quay baulk was apparently later incorporated into a structure with two north–south timbers with much later, 3rd century AD, felling dates and it remains possible that the timber was not *in situ* and that it had been reused at a much later date.

Baseplate

A single sample was dated from the structure interpreted as a warehouse, associated with the 1st-century quay. This retained no sapwood and the result is thus relatively meaningless, it simply provides a *terminus post quem* of AD 40 for the structure.

Phase 6

Phase 6A piles

Three timbers were dated from the assemblage of piles from the watching brief in Area B, which were foundation piles for the eastern apse, one of which probably includes complete sapwood and bark. This sample appears to have been felled in AD 165. The other two timbers have no sapwood and thus although they may be contemporary with this, they might be of a different date.

Phase 6B timber structure

Two samples were dated from two horizontally laid timbers. Both of the dated timbers include some sapwood

Sample	Phase	Species	Rings	Sapwood	Growth (mm/year)	Sequence date	Interpreted date
78 <52>	6C	Oak	84	6	1.72	Undated	-
80 <54>	6C	Oak	c. 45	-	-	not analysed	-
188	8	Oak	66	2	1.79	Undated	-
304	8	Oak	c. 30	-	-	not analysed	-
305	8	Oak	c. 40	-	-	not analysed	-
314	8	Oak	c. 30	-	-	not analysed	-
318	8	Oak	c. 30	-	-	not analysed	-
332	8	Oak	c. 40	-	-	not analysed	-
375	8	Oak	66	30+Bw	1.13	Undated	-
403	8	Oak	58	16+½Bs	1.29	AD236-AD293	AD294 spring
503	4	Oak	182	-	1.56	152BC-AD30	after AD40
549 <60>	8	Oak	c. 45	-	-	not analysed	-
551 <63>	8	Oak	62	21+½Bs	1.64	AD231-AD292	AD293 spring
552 <64>	8	Oak	62	31+½Bs	1.16	Undated	-
833	4	Oak	174	-	1.81	185BC-12BC	after 2BC
834	6B	Oak	99	18	1.90	AD106-AD204	AD204-32
890	2	Oak	-	-	-	not analysed	-
891	2	Oak	-	-	-	not analysed	-
892	2	Oak	-	-	-	not analysed	-
914	6B	Oak	103	18	1.80	AD103-AD205	AD205-33
2030 <98>	6B	Oak	59	7	2.47	AD142-AD200	AD203-39
2032 <99>	6B	Oak	98	14+½Bs	2.54	Undated	-
2055 <88>	6	Oak	84	H/S	1.59	Undated	-
2056 <89>	6	Oak	120	-	2.36	Undated	-
2060 <91>	6	Oak	105	-	1.78	Undated	-
2061	6A	Oak	80	-	2.54	AD1-AD80	after AD90
2062 <93>	6A	Oak	176	-	1.46	73BC-AD103	after AD113
2064 <94>	6A	Oak	78	10+?B	3.52	AD88-AD165	AD165?
2065 <95>	6	Oak	70	4	2.09	Undated	-

Table 4 Details of dendrochronological samples of Roman timbers
KEY: + ½Bs = includes additional partial ring indicating felled in the following spring, +Bw = ends at a surface which indicates the timber was felled in the winter, +?B = ends at surface that is the possible bark edge, H/S ends at surface that is the heartwood/sapwood boundary

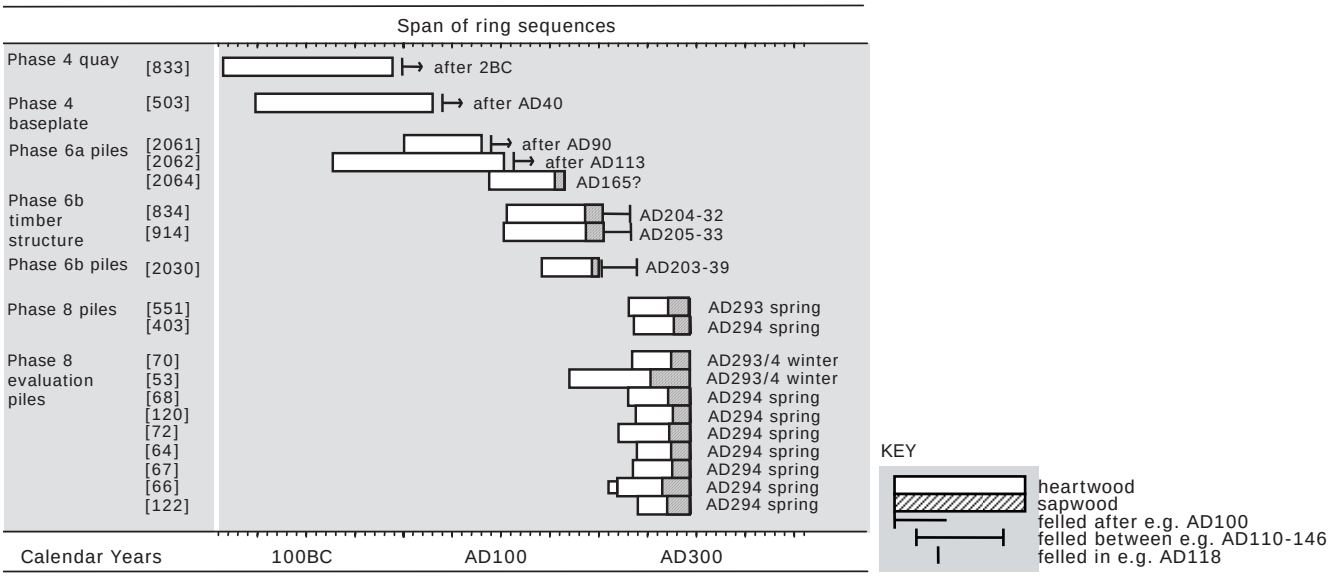


Fig. 49 Bar diagram showing the relative and absolute positions of all the dated samples from the excavations
Each bar is annotated with an interpretation based on the date of the ring sequence and the presence or absence of sapwood and bark

although neither is complete to bark-edge. Adding an appropriate allowance for missing sapwood rings indicates these timbers were felled between AD 205 and AD 232.

Phase 6B piles

One sample was dated from a linear group of piles to the west of the eastern apse in watching brief Area B. This timber retains some sapwood and was felled in the period AD 203–239. This result suggests pile group [2001] is a relict of an earlier structure, which is broadly similar in date to the horizontally laid timbers discussed above. It is, however, considered possible that this timber was reused.

Phase 8

Piles

Two samples were datable from this group. One was felled in the spring of AD 293 the other in the spring of AD 294 implying this material is a further part of the structure recovered during the evaluation work, and previously at a number of adjacent sites.

A further nine piles felled in the winter of AD 293 and spring of AD 294 were recovered from the evaluation of the site (Tyers 2001a). It is thus of some interest that the excavations proper have also revealed an example of a pile felled in the spring of AD 293.

	QUV_T19
City of London AUT01 Arthur Street (Tyers 2002)	10.79
City of London BUC87 Bucklersbury (Nayling 1990)	11.13
City of London GAG87 Guildhall (Tyers 2001b)	11.07
City of London GHT00 Gresham Street (Tyers and Crone unpubl.)	11.84
City of London GYE92 Guildhall (Tyers 2001b)	11.41
City of London KWS94 Regis House (Boswijk and Tyers 1996)	12.62
City of London ONE94 Poultry (Tyers 2000)	15.46
City of London PDN81 Pudding Lane (Hillam 1986)	12.95
City of London THY01 Tokenhouse Yard (Tyers 2003)	12.22
City of London VAL88 Fleet Valley (Tyers and Hibberd 1993)	10.53

Table 5 Correlation t-values (Baillie and Pilcher 1973) for the combined sequence of all 19 dated dendrochronological samples from the site (QUV_T19) dated to 185BC-AD293 inclusive against a series of independently dated chronologies from London

Animal Bone

Robin Bendrey

The excavation produced a hand-recovered animal bone assemblage of 1,458 bone fragments from phased deposits of which 243 fragments were recovered from the Roman phases together with a further 33 fragments of Roman date which were recovered from bulk-sieved samples (Tables 6 and 7). The sample sizes of animal bones from individual phases are, however, rather limited. This report will consider the general characteristics of the phased assemblages.

Methodology

Mammal bone was recorded following Dobney and Reilly (1988) and bird bone following Cohen and Serjeantson (1996). If it was not possible to identify a fragment to species an animal-size category was awarded, for example cattle-sized, otherwise it was labelled indeterminate.

The assemblage has been identified with the aid of a comparative osteological reference collection and a number of publications (Amorosi 1989; Boessneck 1969; Cohen & Serjeantson 1996; MacDonald 1992; Payne 1985). Cattle, sheep and pig mandibular toothwear data have been recorded following Grant (1982) and placed into the age stages of Halstead (1985), Payne (1973) and Hambleton (1999). The sheep/goat pelves have been sexed on the morphological criteria of Prummel and Frisch (1986, 574–576) and Boessneck (1969, 344–348) and the cattle pelves have been sexed following Grigson (1982, 8). Pig material was sexed on the morphology of the canines (Mayer & Brisbin, 1988). Measurements have been taken following von den Driesch (1976), except where indicated.

TAXONOMIC REPRESENTATION

Pig is the most common taxon in both Phases 5 and 7, by number of fragments, followed by cattle and then sheep/goat (Table 6). In Phase 9 cattle is the most numerous taxon, followed by pig. Although the mainstay of the diet and economy was the common domestic animals, hunting also made a contribution (red deer, roe deer and hare). Other animals identified represent food waste (the birds) and non-food waste (horse and dog).

The two fallow deer fragments from Phase 9 dumped deposits consist of the proximal and distal ends of a radius. Although a Roman date would make this an important find, as finds of fallow deer do not become common until the medieval period (Sykes 2004), the dump which contained this fallow deer is stratigraphically placed in Phase 9 but contains no dating evidence; it overlies Roman deposits and is sealed by medieval deposits and thus cannot definitely be assigned to the Roman period.

SKELETAL ELEMENT REPRESENTATION AND BUTCHERY

A mixture of material is recorded from the Roman deposits, including good and poor quality meat-yielding bones. Sample sizes are small. The evidence for carnivore gnawing on the Roman bones (on 7.3% of fragments in total) may reflect delayed burial following disposal on site.

There is some evidence for small-scale craft activity from the deposits. Horn-working is represented by a small

Phase	5	7	8	9	Total
mammal					
cattle	15	12	-	24	51
sheep/goat†	6	3	1	4	14
(sheep)	(3)	-	(1)	(1)	(5)
pig	18	29	-	4	51
horse	2	1	-	1	4
dog	-	1	-	1	2
red deer	-	2	-	-	2
fallow deer	-	-	-	2	2
roe deer	-	3	-	-	3
hare	-	1	-	-	1
cattle-sized	40	16	-	12	68
sheep-sized	16	8	-	-	24
indeterminate	1	-	-	-	1
bird					
galliform†	1	6	-	1	8
(chicken)	(1)	(2)	-	-	(3)
goose	-	2	-	-	2
Total	**99**	**84**	**1**	**49**	**233**

Table 6 Distribution of hand-recovered animal bone in Roman contexts, by number of fragments (NISP)
† - sheep/goat and galliform include specimens identified at species level

	Phase 5	Phase 7	
	context 478	*context 323*	*context 544*
	sample 46	*sample 18*	*sample 56*
pig	4	-	-
red deer/fallow deer	-	1	-
cattle-sized	2	-	1
sheep-sized	6	-	-
indeterminate mammal	2	-	1
indeterminate small mammal	1	-	2
galliform	4	-	1
Anas sp.	1	-	-
indeterminate bird	5	-	2
Total	**25**	**1**	**7**

Table 7 Distribution of animal bone from bulk-sieved samples of Roman contexts, by number of fragments (NISP)

number of cattle horn cores from Phase 5, one of which has direct evidence for chopping at its base. Other butchery evidence from Phase 7 largely relates to disarticulation of joints (subdivision of carcasses) and there is some evidence for meat removal. There are also small collections of cattle and goat horn cores from Phase 9, with cutting marks at the base of one goat specimen. A sawn articulating horse radius and ulna from Phase 5 and a sawn fragment of red deer antler (still attached to the skull) from Phase 9 are probably waste from bone and antler working.

AGE AND SEX DATA

One sheep/goat mandible of Roman date provide an age estimate of 4–6 years; epiphyseal fusion data indicate a number of animals being culled in the first two years.

Mandibular age data indicates pigs being culled at 14–21 months, a situation typical of pigs from archaeological sites where the animals are generally culled before reaching maturity.

PATHOLOGY

A Phase 5 cattle occipital fragment possesses multiple clustered perforations as described in Brothwell *et al* (1996). This condition is thought to be either a congenital abnormality or associated with yoking.

A cattle tibia has an extensive new bone formation (involucrum) around its shaft and shows signs of infection within the medullary cavity. This is probably a case of osteomyelitis, an infection caused by either hematogenous dissemination from an existing focus or by bacterial infection through a wound or compound fracture (Aufderheide & Rodríguez-Martín 1998, 172). Osteomyelitis is an infection caused by pus-producing bacteria (Aufderheide & Rodríguez-Martín 1998, 172) and it is notable that this specimen has been butchered (chopped through the diaphysis) and therefore may have provided food for consumption.

A sheep mandible from Phase 5 has lost the lower first molar (M_1) ante-mortem, and there is alveolar bone recession around the M_1 alveolus and the alveolus is filled with new bone growth.

A Phase 6 dog mandible has lost the fourth premolar ante-mortem and the alveolus is full of new bone growth.

DISCUSSION

Sample sizes are often too small to accurately judge the relative contributions of the different taxa, but the data does indicate that cattle, sheep and pig made the major contribution. Much of the Roman material is from deposits deliberately dumped on site and the composition of this material indicates that this is deriving from a number of activities, including consumption, secondary butchery of carcasses and craft activity.

Environmental Analysis

Nick Branch, Alys Vaughan-Williams, Chris Green, David Keen, Scott Elias, Phil Austin & Gemma Swindle

The environmental archaeological investigations undertaken by Archaeoscape were aimed at enhancing our knowledge and understanding of the local human environment, in particular the hydrological context of human activities, the composition of the vegetation cover, and nature of the economy and diet of the local inhabitants during the Roman and later periods. The archaeological excavations permitted targeted environmental archaeological analysis of four phases of human occupation. The following three phases are discussed here whilst the fourth, post-medieval, phase is discussed below (see Chapter 6):

Laboratory Code	Material and Location	Height (m OD)	Un-calibrated*	Calibrated age**	δ13C / 12C (‰)
Wk-12124	Top of peat unit in Trench P31/32	1.32–1.27	1965 ±61	120BC–220AD	-30.2
Wk-12125	Base of peat unit in Trench P31/32	0.86–0.81	1970 ±63	120BC-180AD	-30.5

Table 8 Results of the radiocarbon dating of the peat in Trench P31/32
* Radiocarbon Years Before Present (yrs BP)
** 2-sigma, 95.4% probability

1) Early Roman period (Phase 3: dumping/foreshore reclamation)

2) Late 1st to early 2nd century AD (Phase 5: dumping and ground consolidation)

3) Late 3rd century AD (Phase 7: 'Period I' demolition and ground consolidation)

The results of the geoarchaeological (geology and sedimentology), zooarchaeological (Mollusca and insects) and archaeobotanical (pollen, plant macrofossils and charcoal) analyses are presented below, followed by a general discussion of the results.

Methodology

For the charred plant macrofossils the bulk samples were processed using the method of flotation; with 1mm and 300 micron mesh sieves, the dried residues were sorted 'by eye', and the flots were sorted using a low-power zoom-stereo microscope. For the waterlogged plant macrofossils the bulk samples were processed by wet sieving. All identifications were made with reference to Berggren (1981) and Anderberg (1994), plus the modern seed collections at Royal Holloway University London and University College London; plant nomenclature follows Stace (1997).

For the molluscan analysis a 10 litre sample was disaggregated using 5% H_2O_2 (Hydrogen peroxide) for one hour, before being sieved through a 500µm mesh and finally dried again at 100ºC; the retained sediments were sorted under a 10-60x power binocular microscope; the molluscan counting conventions follow Sparks (1961) in which each complete shell or gastropod apex counts as a single individual; the taxonomic nomenclature follows Kerney (1999) for the land and freshwater species, and Tebble (1966) for the single marine species.

The large size (4 litres) of sample <86> selected for charcoal analysis necessitated sub-sampling; from a preliminary examination, with a X10 hand lens, it was estimated that as much as 75% of this sample was composed of Oak (*Quercus* sp.) charcoal; in an attempt to recover more information regarding the presence of taxa other than Oak, 100 fragments were selected for microscopic examination, purposefully avoiding the inclusion of Oak charcoal; it was hoped that this would provide a clearer indication of the full range of taxa exploited.

For the insect analysis each sample was prepared following the methodology outlined in Atkinson *et al* (1987); samples were then picked for specimens using fine metal forceps under a binocular microscope at magnifications between x12.5 and x36; specimens for identification were removed to a glass vial (1cm^3 sealed container); coleoptera specimens were identified using dichotomous keys based on modern coleoptera (Halstead 1963; Hansen 1987), and comparison with modern specimens at the Department of Archaeology and Prehistory, Sheffield University and the Doncaster Museum; separated body parts, for example elytra, pronota and heads, were identified using modern reference specimens; ecological information was obtained from the BUGS database (Buckland and Buckland, 2003).

GEOARCHAEOLOGICAL INVESTIGATIONS

Geoarchaeological field investigations included taking two borehole core samples, and a column sample, from P31/32 and P33/34 using an Eijkelkamp Gouge Set and Atlas Copco 2-stroke percussion engine. The lithostratigraphic descriptions indicate the surface of the London Clay in P31/32 to be between 0.52m and 0.73m OD. Overlying the London Clay, fine-grained mineral sediments are present with a bone fragment. These sediments may represent either *in situ* alluvium with discarded domestic waste, or more likely redeposited alluvium containing domestic waste. A well-humified wood peat containing fragments of oyster shell replaces these sediments between 0.73m and 1.32m OD. Overlying the peat is redeposited organic sandy clay containing gravel, to 2.22m OD (all these deposits above the London Clay represent Phase 5, dumping and ground consolidation, of late 1st- to early 2nd-century AD date). Radiocarbon dating of the base (0.81–0.86m OD) and top (1.27–1.32m OD) of the peat has provided ages of 120BC–AD180 and 120BC–AD220 respectively (Table 8[1]). It is highly likely that the wood peat is redeposited, because well-humified peat forms very slowly and over a long period due to high rates of organic matter decomposition and increased microbial activity. If the peat had formed *in situ*, the radiocarbon dates should have been statistically different at two standard deviations. These deposits are entirely consistent with the evidence presented above for dumping of waste materials, both domestic and industrial, during successive phases of building work and embankment. Borehole samples recovered from P33/34 (Phase 5, dumping and ground consolidation, late 1st to early 2nd century AD) record alternating layers of mainly gravel and sandy gravelly clay above the London Clay (-0.12m OD).

[1] The samples were wrapped in aluminium foil, dispatched to Waikato University Radiocarbon Dating Laboratory, New Zealand and calibrated to the INTCAL '98 curve (Stuiver *et al*. 1998) using OXCAL v 3.5 (Bronk-Ramsey 1995 and 2001).

At a depth of 1.37 to 0.93m OD, organic sediments are present. However, both within and below this organic-rich unit, the sediments contain traces of building debris. This suggests that the entire sequence has probably been mixed and/or redeposited. Column samples from P10, Section 26, comprise a mixture of sand and building debris throughout the sequence. Column samples from P8, Section 41, also consist largely of this mixture but include a 0.25m layer of charcoal fragments overlying sandy gravel and consistent with evidence for dumping of waste materials associated with human activities above natural London Clay.

POLLEN ANALYSIS

Phase 5: Dumping and ground consolidation, late 1st to early 2nd century AD

Pollen analysis of the sediment and peat deposits in P31/32 has revealed the presence of moderately well-preserved pollen grains and spores in the upper part of the sequence (above 1.26m OD), providing a reasonably accurate reconstruction of the former vegetation cover (see Appendix 1). In the lower part of the sequence, poor preservation of pollen grains and spores may be due to oxidation or physical destruction during the deposition of coarse mineral sediments. Therefore, the results must be treated with caution and any interpretation should be regarded as tentative. Poor pollen preservation in the peat is surprising, due to its formation within anaerobic, waterlogged and acidic conditions, which are often optimal conditions for good preservation; this is attributed to post-depositional oxidation of the peat, probably because of re-deposition during human activities. For these reasons, the pollen count has been limited to a maximum of 100 grains and spores, which nevertheless provides a statistically accurate representation of the content of the samples, and a useful insight into changes in the local vegetation cover. Based upon the results of the radiocarbon dating (Table 8), these changes are thought to be broadly contemporaneous with phases of human occupation at the site during the late 1st to early 2nd century AD (Phase 5). The pollen diagram has been divided into three local pollen assemblage zones according to major changes in pollen stratigraphy.

During zone 1, non-arboreal pollen dominates the assemblage, notably Poaceae (grass family). Arboreal pollen is present in low concentrations and includes *Pinus* (pine), *Betula* (birch) and *Quercus* (oak). Spores include *Pteridium* (bracken fern) and Filicales (e.g. male fern). During zone 2, Poaceae dominates the assemblage with *Chenopodium* type (e.g. fat hen), *Plantago lanceolata* (ribwort plantain), Asteroideae/Cardueae (daisy family) and *Cereale* type (cereals). Arboreal pollen includes *Quercus* and *Pinus*, whilst spores are absent. During zone 3, Poaceae, Apiaceae (carrot family), Asteroideae/Cardueae, Caryophyllaceae (campion family), *Centaurea nigra* (black knapweed), *Cereale* type, *Chenopodium* type, Cyperaceae (sedge family), *Filipendula* (meadowsweet), Lactuceae (e.g. dandelion), *Plantago lanceolata*, *Polygonum aviculare* (knotgrass) and *Trifolium* type (e.g. clover) dominate the non-arboreal pollen. Tree and shrub taxa include *Pinus, Quercus*, *Corylus* type (e.g. hazel) and *Salix* (willow). Spores include *Pteridium*, *Polypodium* (polypody fern) and Filicales.

During local pollen assemblage zone 1, the local vegetation cover may have consisted of open grassland with some isolated woodland. During zone 2, the period of peat deposition, the assemblage indicates that grassland continued to dominate the vegetation cover but with taxa commonly found on disturbed ground, such as fat hen and ribwort plantain. These disturbance indicators are recorded with the first occurrence of cereal pollen, which may indicate localised cultivation. During zone 3, there is a significant increase in the diversity of taxa, which is concomitant with improved preservation of pollen. The assemblage indicates the presence of herb-rich grassland, mainly consisting of tall herbs often associated with either rough, abandoned ground or meadow. The increase in tree and shrub taxa, notably pine, indicates that open woodland may have become a more important component of the vegetation cover. This may be due to a change in land-use, perhaps associated with a decline in cereal cultivation, indicated by a reduction in cereal pollen, and the expansion of tall herb grassland, such as alluvial meadows. Alternatively, the pollen stratigraphic changes may simply be indicative of improvements in preservation in the uppermost part of the sedimentary sequence.

PLANT MACROFOSSIL ANALYSIS

Features sampled for analysis consisted of several dumps and reclamation deposits dated to Phases 5, 6A and 7. Preservation of charred and waterlogged plant remains was moderate to good.

Phase 5: Dumping and ground consolidation, late 1st to early 2nd century AD

Charred material

Reclamation dump [478] in P2 provided the only charred evidence from Phase 5. The assemblage was very small, producing just six seeds of *Silene vulgaris* (bladder campion), a plant of open grassland (Table 9). Dumped deposit [399], in P31/32, contained just three wheat (*Triticum* sp.) glume bases, two of which were of spelt wheat (*Triticum spelta*).

Waterlogged material

Reclamation dump [478] in P2 provided a rich waterlogged assemblage, with moderate species diversity composed largely of ruderal plants including *Chenopodium album* (fat hen) *Urtica dioica*, (common nettle), *Atriplex* sp (orache) and bladder campion. Another group of seeds were those belonging to plants that prefer damp habitats such as ditches, ponds or riverbanks. These included *Eleocharis palustris* (common spike-rush), *Carex* sp. (sedge), *Polygonum lapathifolium* (pale persicaria) and *Montia fontana* (blinks). Dump [399], in P31/32 contained an abundance of

waterlogged seeds, of a diverse nature. These ranged from damp habitat and grassland species such as *Rumex acetosella* (sheep's sorrel), *Ranunculus repens* (creeping buttercup) and fat hen. Two damaged acorns of *Quercus petraea* (sessile oak) were also present. Context [410], from an organic silt deposit, included an abundance of sedges, and creeping buttercup, a plant that inhabits damp meadows (Table 10).

Layer [409], in P31/32, produced an abundance of sedges and spike-rush, with creeping buttercup, all of which inhabit damp meadows. Other species that inhabit grassland and meadows include *Urtica dioica* (common nettle), *Stellaria gramineae* (lesser stitchwort), *Rumex acetosa* (common sorrel) and sheep's sorrel (Table 10).

Phase 7: 'Period I' demolition and ground consolidation, late 3rd century AD

Charred material

Ground consolidation deposit [425], in P10, contained just a single seed of bladder campion. A similar deposit [544], in P1, contained an assemblage of moderate diversity with a low overall concentration (Table 9). The species represent an agricultural and grassland setting. A number of potential arable weeds occurred including *Galium aparine* (cleavers) and *Polygonum convolvulus* (black bindweed). This was in addition to *Brassica/Sinapis* sp (cabbage/mustard), *Lens culinaris* (lentil), *Borago officinalis* (borage) and *Euphorbia helioscopia* (sun spurge), which can all be cultivated, either as a large-scale enterprise or in gardens. Species preferring damp habitats included *Brassica nigra* (black mustard) and *Ranunculus tripartitus* (three-lobed crowfoot).

Waterlogged material

Deposit [425] contained an abundance of waterlogged seeds, including rough grassland and damp habitat species, such as *Rumex acetosella* (sheep's sorrel), *Ranunculus repens* (creeping buttercup) and fat hen, whilst context [544] presented only occasional waterlogged seeds of bladder campion (Table 10).

Family	**Genus**	**Species**	**English Name**	**Habitat**	**Sample**	**31**	**46**	**45**	**56**
					Context	399	478	425	544
					Sample vol. (l)	20	30	30	30
					Flot vol. (ml)	1000	3.5	3.5	15
					Feature	dump	dump	dump	dump
					Century	1st – 2nd	1st – 2nd	2nd - 3rd	2nd – 3rd
Ranunculaceae	*Ranunculus*	*tripartitus*	Three-lobed crowfoot	w					1
Caryophyllaceae	*Silene*	*vulgaris*	Bladder campion	g			6	1	21
Polygonaceae	*Polygonum*	*convolvulus*	Black bindweed	wa, c					5
Polygonaceae	*Polygonum*	*dumetorum*	Copse bindweed	h					2
Malvaceae	*Malva*	*alcea*	Greater musk mallow	g, wa					2
Brassicaceae	*Brassica / Sinapsis*	*sp.*	Cabbage/mustard	c					27
Cruciferae	*Brassica*	*nigra*	Black mustard	w, wa					1
Fabaceae	*Indet*		Pea family						5
Fabaceae	*Lens*	*culinaris*	Lentil	c, wa					2
Fabaceae	*Ononis*	*sp.*	Restharrow	g					2
Euphorbiaceae	*Euphorbia*	*helioscopia*	Sun spurge	c, wa					1
Boraginaceae	*Borago*	*officinalis*	Borage	herb, wa					3
Rubiaceae	*Galium*	*aparine*	Cleavers	c, h, wa					32
Asteraceae	*Centaurea*	*sp.*	Knapweed	g, wa					1
Poaceae	*Avena*	*sativa*	Glume bit	c					5
Poaceae	*Triticum*	*sp.*	Wheat glume base	c		1			
Poaceae	*Triticum*	*spelta*	Spelt wheat glume	c		2			
Poaceae	*Avena*	*sativa gr*	Oat	c					2

Key:
w = wet wo = woodland h = hedgerows
wa = waste land c = cultivated land (incl weeds) g = gardens

Table 9 Charred plant macrofossils from Roman contexts

Family	Genus	Species	English Name	Habitat	Sample	31	46	35	34	45	56
					Context	399	478	410	409	425	544
					Sample vol (l)	20	30	10	10	30	30
					Flot vol (ml)	1000	3.5	50	50	3.5	15
					Feature	dump	dump	dump	dump	dump	dump
					Century	1st-2nd	1st- 2nd	1st-2nd	1st-2nd	2nd-3rd	2nd-3rd
Ranunculaceae	*Ranunculus*	*repens*	Creeping buttercup	w		11		9	8	4	
Ranunculaceae	*Ranunculus*	*cf. acris*	Meadow buttercup	g, w		1					
Ranunculaceae	*Ranunculus*	*sceleratus*	Celery-leaved buttercup	g					2		
Ranunculaceae	*Ranunculus*	*sp.*	Buttercup	g		12	3				
Berberidaceae	*Berberis*	*vulgaris*	Barberry	h, wa		1					
Fumariaceae	*Fumaria*	*sp.*	Fumitories							1	
Moraceae	*Ficus*	*carica*	Fig	c			4			1	
Cannabaceae	*Humulus*	*lupulus*	Hop	h, c		6	1				
Urticaceae	*Urtica*	*dioica*	Common nettle	wo, c, wa			5	6	1	22	
Fabaceae	*Quercus*	*petraea*	Sessile oak	wo		2					
Solanaceae	*Atropa*	*bella-donna*	Deadly nightshade	c, wo, wa						4	
Chenopodiaceae	*Chenopodium*	*album / rubrum*	Fat hen/red goosefoot	c			120				
Chenopodiaceae	*Chenopodium*	*album*	Fat hen	c						2	
Chenopodiaceae	*Atriplex*	*sp.1*	Orache	c, wa		2	56			6	
Portulaceae	*Montia*	*fontana*	Blinks	w			7			2	
Caryophyllaceae	*Stellaria*	*sp.*	Stitchwort			1		1		1	
Caryophyllaceae	*Stellaria*	*gramineae*	Lesser stitchwort	g		4	3	3	1	1	
Caryophyllaceae	*Lychnis*	*flos-cuculi*	Catchflies					2	2		
Caryophyllaceae	*Silene*	*vulgaris*	Bladder campion	g, wa			6			1	21
Polygonaceae	*Polygonum*	*sp.*	Knotweeds	g		3					
Polygonaceae	*Polygonum*	*lapathifolium*	Pale persicaria	wa, c, w		1	4				
Polygonaceae	*Polygonum*	*persicaria*	Redshank	wa, c					1		
Polygonaceae	*Rumex*	*acetosa*	Common sorrel	g					4		
Polygonaceae	*Rumex*	*acetosella*	Sheep's Sorrel	c, g, wa		34			3		
Polygonaceae	*Rumex*	*crispus*	Curled dock	c, wa, w		5		4	1	4	
Malvaceae	*Malva*	*sp.*	Mallow	wa, g		1				2	
Violaceae	*Viola*	*sp.*	Violet	wo, h		2					
Cucumbitaceae	*Bryonia*	*cretica-dioica*	White bryony	h						2	
Brassicaceae	*Thlaspi*	*arvevse*	Field pennycress	wa, c				1			
Rosaceae	*Rubus*	*sp.*	Bramble	wa			1			2	
Rosaceae	*Potentilla*	*sp.*	Cinquefoil	w, wa						1	
Rosaceae	*Alchemilla*	*vulgaris*	Lady's-mantle	w, g, wo		2					
Rosaceae	*Prunus*	*sp.*	Plum	c		1					
Fabaceae	*Vicia / Lathyrus*	*sp.*	Vetch / pea	c				1			
Cornaceae	*Cornus*	*suecica*	Dward cornel			1					
Rosaceae	*Geranium*	*sp. 1*	Crane's bill	g				4			
Rosaceae	*Geranium*	*sp.2*	Crane's bill	g				5			
Balsaminaceae	*Impatiens*	*parviflora*	Small balsam	wo						10	
Solanaceae	*Solanum*	*nigrum*	Black nightshade	wa, c, w		6	3				
Lamiaceae	*Ballota*	*nigrum*	Black whorehound	h, w		2				2	
Lamiaceae	*Prunella*	*vulgaris*	Selfheal	g, wa		4		2			
Lamiaceae	*Lycopus*	*europaens*	Gypsywort	w					2		
Caprifoliaceae	*Sambucus*	*nigra*	Elder	h, wo, wa			8			5	
Asteraceae	*Picris*	*echinoides*	Bristly ox-tongue	wa				3	2		
Cyperaceae	*Eleocharis*	*palustris*	Common spike-rush	w		28	6		18	1	
Cyperaceae	*Carex*	*sp. 1*	Sedge	w		21	18	140	30	5	
Cyperaceae	*Carex*	*sp. 2*	Sedge	w		1					
Cyperaceae	*Cyperus*	*sp.*		w		14					

Key:
w = wet
wa = waste land
wo = woodland
c = cultivated land (incl weeds)
h = hedgerows
g = gardens

Table 10 Waterlogged plant macrofossils from Roman contexts

MOLLUSCA ANALYSIS

Phase 7: 'Period I' demolition and ground consolidation, late 3rd century AD

The fauna consists of eight species (Table 11), two of these are from freshwater habitats, so the assemblage must have been formed in a pond or stream. Both freshwater species, *Lymnaea palustris* and *Lymnaea peregra*, are inhabitants of small water bodies from pools to small streams. Both show a preference for water with high vegetation content. The land snails include *Oxyloma pfeifferi*, which is a species of swamp and wetland, and *Cochlicopa lubrica*, which is usually found in damp meadows. The slug genus, *Limax* would also be a likely inhabitant of such conditions. The most numerous species, *Trichia hispida*, is found in grassy areas, but particularly in conditions of disturbed soil such as places where animals gather to drink along riverbanks. The single marine shell, *Mytilus edulis* (common mussel) is a species of sheltered bays and estuaries with salinities between 15 and 40‰ (Tebble 1966).

Freshwater snails	
Lymnaea palustris (Müller 1774)	3
Lymnaea peregra (Müller 1774)	5
Land snails	
Oxyloma pfeifferi (Rossmässler 1835)	1
Cochlicopa lubrica (Müller 1774)	1
Limax spp.	1
Trichia hispida (Linné 1758)	8
Arianta arbustorum (Linné 1758)	1
Marine bivalve	
Mytilus edulis (Linné 1758)	1
Total (5 land, 2 freshwater, 1 marine species)	15

Table 11 Mollusca from 'Period I' demolition and ground consolidation deposits (sample <19>)

CHARCOAL ANALYSIS

Phase 3: Early Roman dumping and foreshore reclamation

Nine taxa were identified in reclamation dump [794], in P8, of which oak was by far the most abundant in terms of number of fragments present (Table 12). Members of the Maloideae sub-family (*Crataegus*, *Malus*, *Pyrus*, and *Sorbus*) cannot be differentiated anatomically and it is not known which of the two fragments identified represent. Differentiating between *Salix* (willow) and *Populus* (poplar) is also difficult to achieve and no distinction was possible here. A single fragment of *Prunus* was identified but this determination is not certain. The condition of the charcoal varied though in general preservation of all taxa was good to excellent. The relatively large size, >25mm along the longest axis, of the majority of individual fragments suggests that post-fire/post-burial disturbance was low. Bark remained attached to at least three of the fragments identified as *Alnus glutinosa* (Alder). Detached charred bark was also present. Charred fungal hyphae were occasionally present indicating that the process of decay had begun to occur in at least some (though not all) of the wood. All the fragments of *Quercus* sp. (Oak) and *Fraxinus* (Ash) examined derived from mature stem-wood or large round wood. In some instances, tyloses were present in the vessels of oak indicating the presence of heartwood. Where it could be determined, fragments derived from smaller round wood mostly represented the other seven taxa present, in some instances it was possible to estimate the original diameters. These estimates varied between approximately 35–40mm and 15mm. No overall size pattern was evident. There is no evidence to suggest purposeful management/silviculture.

Taxon	Frag count	Comments
Alnus glutinosa	46	Round-wood
Fraxinus excelsior	3	Mature stem-/round-wood
Acer campestre	14	Round-wood, some mature stem/round-wood
Quercus sp.	10	Mature stem/round-wood
Maloideae	2	Round-wood
Betula sp.	1	Round-wood
Salix/Populus	18	Round-wood, some mature stem/round-wood
Corylus avellana	5	Round-wood
c.f. Prunus	1	Round-wood
Total	**100**	

Table 12 Wood charcoal from Phase 3, early Roman dumping and foreshore reclamation deposits (Context [794] Sample <86>)

INSECT ANALYSIS

Phase 5: Dumping and ground consolidation, late 1st to early 2nd century AD

Silty deposit [410], in P31/32, included the weevil, *Apion*, the minute mould beetle, *Corticaria*, and the water scavenger beetle, *Cercyon*. This small assemblage appears to represent swamps, swampy meadows, and other wetlands, but it is lacking in anthropogenic elements, such as stored-product pests. However, this may simply be due to the small sample size (Table 13).

The beetle remains from overlying context [409] are suggestive of a damp, mouldering, anthropogenic site in close proximity to stagnant or running water (Table 13). The latter condition is suggested by the presence of *Cercyon marinus* (the water scavenger beetle), which lives at the edge of fresh, both stagnant and running water (Backlund 1945; Hansen 1987). It is usually found in very wet mud or wet mosses, but sometimes is found among decomposing plant debris or other kinds of decaying organic matter (Koch 1989a). Another indicator of swamps, swampy meadows, and other wetlands is *Corylophus cassidioides* (the minute fungus beetle). Murray (1977) collected this species from grass tussocks by the Test

estuary in Hertfordshire. In central Europe Koch (1989a) found it in swamps and swampy meadows, in the litter of reeds, sedges, and grasses. Bowestead (1999) collected it in wetlands, in flood debris, at the roots of plants in fens and swamps, and in mouldy plant debris by streams and rivers. Indications of stored grain come from the presence of *Oryzaephilus surinamensis* (the stored-product pest). This is one of the most destructive pests of stored grain (Koch 1989b). It is very mobile and able to overwinter in unheated buildings. It only attacks damaged kernels of grain (Jones & Jones 1974), and may also feed on the larvae of other stored product pests (Halstead 1993). It has been documented as a stored product pest since Roman times in Europe. Further indications of anthropogenic environments come from the presence of *Corticaria serrata* (the minute mould beetle). This species is associated with mouldy plant debris in stables, barns, sheds and gardens (Böcher 1988; Koch 1989a). It is also known today from woods, parks, copses, woodland margins and river meadows. It is especially tied to mildewed and rotting vegetation. In addition to the above, the faunal assemblage also contained the remains of dung beetles in the genus *Aphodius*. These were not found in great abundance, but may be indicative of the proximity of livestock to the site.

Sample Number	Context Number	Fauna
<35>	410	Hydrophilidae (Water Scavenger Beetles) *Cercyon* sp.
		Staphylinidae Aleocharinae sp. indet.
		Lathridiidae (Minute Mould Beetles) *Corticaria* sp.
		Curculionidae (Weevils) *Apion* sp.
<34>	409	Hydrophilidae (Water Scavenger Beetles) *Cercyon marinus* Thom.
		Staphylinidae (Rove Beetles) *Lathrobium* sp.
		Scarabaeidae (Dung Beetles and Chafers) *Aphodius* sp.
		Corylophidae (Minute Fungus Beetles) *Corylophus cassidioides* (Marsh.)
		Lathridiidae (Minute Mould Beetles) *Corticaria serrata* (Payk.)
		Silvanidae (Flat Grain Beetles) *Oryzaephilus surinamensis* (L.)

Table 13 Insects from Phase 5, late 1st- to early 2nd-century AD dumping and ground consolidation

DISCUSSION

The geoarchaeological investigations in P31/32 indicate the surface of the London Clay between 0.52m and 0.73m OD. It is not possible to establish whether these are natural levels but, if they are, they probably lie towards the bottom of the natural slope between the Taplow Terrace and the historic floodplain (Phase 1, natural). Overlying the London Clay, fine-grained mineral sediments and peat are present across the site containing a mixture of anthropogenic materials (e.g. P31/32, P33/34, P10 and P8). During the early Roman period (Phase 3, dumping/foreshore reclamation), it is unclear whether charcoal recovered from context [794] in P8 was purposefully gathered for fuel, and is therefore waste from an unknown number of 'domestic' hearths or, alternatively, derives from some other activity such as the burning of wood debris or perhaps from vegetation clearance. Despite the conspicuous presence of the oak fragments that dominate this context, the range of taxa identified suggests that, if the charcoal does represent fuel-wood, selection was seemingly more opportunistic than purposefully selective. Strengthening this interpretation is the presence of alder, generally regarded as a poor fuel wood. However, it may be significant that the majority of the taxa identified are typically associated with damp/wet woodland or riverine habitats. Alder, the willows and poplars (*Salix/Populus*), ash and birch (*Betula*) being the most notable. Given the proximity of the site to the River Thames, it is plausible that the charcoal represents the debris from the clearance of local scrub and trees. This is the interpretation favoured here. The presence of field maple (*Acer*), a shade intolerant taxon, suggests that the vegetation was more likely to be open rather than closed during this period.

During the late 1st to early 2nd century AD (Phase 5, dumping and ground consolidation), mineral-rich dump deposits are present and in some places these are overlain by well-humified wood peat. Both types of contexts contain anthropogenic waste materials, including bone and oyster shell. Ground consolidation dump [478], in P2, and layer [399], in P31, indicate the presence of plants commonly found in damp habitats such as riverbanks, as well as grassland. The presence of two acorns of sessile oak may indicate the local growth of isolated woodland. The insect and pollen data supports these results, with evidence for isolated woodland consisting of oak, pine and birch, shrubland containing hazel and willow, and grassland, in particular swamps and swampy meadows. There is only limited information on the diet and economy of the local inhabitants during this phase, with evidence for the utilisation of wheat, including spelt wheat, which is supported by the pollen-stratigraphic record. During this phase of activity the data indicate the continued presence of damp meadowland and waste ground, with damp, mouldering, anthropogenic deposits in close proximity to stagnant or running water (Table 13). A range of insect species suggests this, including those found in stored grain, such as *Oryzaephilus surinamensis*, a pest since Roman times, dung and mouldy plant debris found in stables, barns, sheds and gardens.

During the late 3rd century AD, Phase 7, 'Period I' demolition and ground consolidation deposit [544], in P1, produced an unusually diverse assemblage of arable weed seeds, without any cereal grain. This assemblage was even more surprising because of the presence of occasional cereal chaff, which is usually highly prone to destruction. The weed seeds are of a larger variety, and, with chaff, could represent the final hand sorting (cleaning) of grain, immediately prior to food preparation (see Hillman 1981). This practice is commonly associated with sites cultivating their own cereals ('producers'). However, it seems unlikely that during this phase, the inhabitants of Roman London

were cultivating cereals. Indeed, the evidence from London indicates that cereals were transported to the City for consumption ('consumers') in a semi-clean or clean state e.g. Copthall Avenue (Maloney with de Moulins 1990) and 5–27 Long Lane (Carruthers forthcoming), and this seems to be the case at 99–101 Queen Victoria Street. Although no wheat grains were recovered, the glumes of spelt wheat provide clear evidence for its cultivation, an interpretation supported by evidence from similar sites (Straker 1987; de Moulins 1990; Carruthers 2001). Some of the weed seeds, however, may indicate plants growing within meadows or cultivated fields, having been burnt following the harvesting of hay or straw and its subsequent disposal as domestic waste, perhaps being used as tinder to light fires. This plant assemblage could be linked to a variety of possible human activities, including animal fodder, which may have been stored over the winter months, as well as bedding, flooring and thatch for domestic dwellings. In addition to the evidence for human activities, the records indicate an environment continuing to be dominated by plants found in damp habitats and rough grassland. This interpretation is consistent with the Mollusca, which suggest the presence of marsh or small brook with damp, grassy and disturbed areas on the banks.

CONCLUSIONS

The environmental archaeological investigations indicate that throughout the Roman period, dumping, foreshore reclamation and ground consolidation occurred across the site. The multi-proxy evidence suggests that ground conditions were continually damp, with areas of standing and/or running water, and with a vegetation cover consisting of grassland (e.g. meadowland) and disturbed ground, as well as isolated woodland and shrubland. The economy and diet of the local inhabitants consisted of woodland and grassland exploitation, probably for firewood, structures, bedding and animal fodder, animal husbandry and the utilisation and storage of cereals (wheat and oats).

Chapter 4: Discussion of Roman Activity

THE PRE-ROMAN WATERFRONT

The dramatic modifications made to the area of the site during and after the later Roman period meant that little evidence of the natural landscape was observed during the archaeological investigations. However, observations in the disparate deeper excavations of piles towards the south of the site enable a tentative picture of the pre-Roman landscape in the area to be developed.

Where the natural slope of the hillside survived towards the south of the site, it was found to have a gradient of approximately 1 in 2, a similar gradient to that found by Grimes to the east of the site (Grimes 1968, 57–58, fig. 12) becoming even steeper at the extreme south of the site, where the gradient was recorded as up to 1 in 1. This relatively steep slope is likely to represent the gradient at the base of the hillside, very close to the northern bank of the river. Indeed, probable foreshore deposits were recorded in the southernmost pile locations, which suggest that the area at the very south of the site was situated on the foreshore of the pre-Roman landscape. The steep slope in this area fits in with current understanding of the form of the pre-Roman river. Evidence from excavations on both the north and south banks of the river suggest that the pre-Roman river, which was tidal in London (Milne *et al* 1983), had been cutting into the north bank in the vicinity of the site and depositing silts on the south bank (Yule 2005, 83), thus creating the steep bank/cliff recorded at the extreme south of the site. Furthermore, a natural spring line was located to the north of the site at the interface between the terrace gravels and the London Clay (Bentley 1987; Williams 1993, 6), which would have discharged a significant volume of water off the hillside into the Walbrook to the east, the Fleet to the west, as well as into the Thames. As a result, a number of natural run-off channels are likely to have crossed the area, examples of which were recorded during the excavation of P2 and OP202. In these instances the channel was filled with natural gravel washed down from the terrace to the north, suggesting that this channel was dynamic and fast flowing. Evidence of similar stream channels was found to the west at Baynard's Castle (Hill *et al* 1980, 13).

The presence of the natural channels running down the hill from the spring line to the north is perhaps best attested by the provision that the Romans had to make within the foundations of their masonry structures in the area. A small culvert, only 0.29m wide, was incorporated within the collapsed 'Period I' wall. Three culverts constructed on a much larger scale, up to 0.65m wide by at least 1.28m high, were also found: two on the Salvation Army Headquarters site and a third to the east at Sunlight Wharf (Williams 1993, 60–61, fig. 51 & 52), within the massive foundations of Building 4 of the 'Period II' complex. Previously, to the north of the site, along the northern side of Knightrider Street, two culverts both *c*. 3ft (0.92m) high by 2ft (0.61m) wide were observed within two stretches of Roman wall (RCHME 1928, 125; Merrifield 1965, 216; Williams 1993, 80–81, fig. 59 & 60). Provision for these stream channels was also found to the west of the site at Baynard's Castle where a culvert, measuring *c*. 0.20m wide by 0.20m high was observed within the riverside wall (see 'Period II' development below; Hill *et al* 1990, 32–33 & plate 6). To the east of the site in Old Fish Street Hill (on the line of present day Lambeth Hill) another possible culvert, 3ft (0.92m) wide by 3½ft (1.07m) high was also revealed (RCHME 1928, 119, fig. 39; Merrifield 1965, 223–224; Williams 1993, 76). To the northeast a system of culverts and pipes both provided water for the needs of the Huggin Hill bathhouse and channelled off the excess (Wilmott 1982, 238–239). The large number of culverts found within Roman masonry in the area suggest that control of water running off the spring line was a continual problem. The great size of the culverts within the 'Period II' complex would suggest that previous attempts to control the flow had been inadequate and that more robust methods were required. The large size of these culverts may be seen as a direct response to the inadequacy of dealing with the problem in the past, which may have contributed to the catastrophic collapse of the last phase of the 'Period I' complex.

A picture is therefore developing of an area situated on marginal land at the base of the hillside along the steep northern bank of the River Thames. The area is likely to have been prone to tidal flooding as well as inundation from rain and spring water, at least on a seasonal basis. Despite this, no evidence of standing water or marshy conditions was recorded during the excavations, with an isolated sequence of peat identified towards the west of the site, which has been interpreted as redeposited. Environmental sampling and analysis was by necessity confined to the dumped deposits along the southern slope of the site. The sampling of dumped deposits can of course be fraught with problems as there is no knowing from where the material has been transported and how much of it may be local or *in situ*. However, with these provisos, evidence from the environmental analysis would seem to suggest that, at least in the early Roman period, the ground conditions were wet with damp meadows containing

species such as sheep's sorrel, creeping butterfly and fat hen which are at home in a damp environment (see Branch *et al*, Chapter 3). The presence of the water scavenger beetle is also suggestive of a muddy wet environment with stagnant and running water on site. The mollusca recovered were also consistent with a habitat containing both small pools of water and streams. The area may also have been covered by isolated patches of woodland prior to the concentrated exploitation of this part of the City, with tree species such as alder, willow, poplar, ash and birch, which are typically associated with riverine habitats.

THE EARLY ROMAN WATERFRONT

The limited nature of the archaeological investigations, dictated by a policy of preservation *in situ*, resulted in only limited excavations in a number of pile locations and made definitive interpretations of the earliest phases of Roman activity difficult, if not impossible (see Chapter 1, Circumstances of the Fieldwork). Where features or structures were encountered they were often seen in isolation and without the accompaniment of dating material, which made putting them into a site-wide context difficult. The truncation of the northern and central parts of the site by late Roman terracing and 20th-century basements meant that only deposits along the southern part of the site survived. Unsurprisingly most of the activity that was revealed here was associated with the waterfront.

During the mid 1st century AD the area of the site is likely to have lain outside the main Roman town, with most of the settlement activity being situated to the east of the Walbrook and to the north, along the line of the main Roman road leading westwards through Newgate (Perring & Roskams 1991). The environs of the site are likely to have remained as relatively undeveloped marginal land until slightly later in the century.

This was broadly borne out by the archaeological investigations, with the earliest direct evidence of activity in the area of the site being a shattered oak plank supported by two off-cut oak planks, lying on the probable foreshore at the base of the hillside at a height of 0.55m OD. The timbers lay below the high tide levels for the 1st century AD, which were in the region of 2.00m OD (Brigham 1990, 133), and as such were unlikely to have formed part of a significant structure. London's mid 1st-century waterfront consisted of a series of simple post and plank revetments, which were constructed generally along the line of the natural riverbank: such examples have been recorded at Billingsgate Buildings, Peninsular House and Dominant House (Brigham 1990, 134), so these timbers may represent collapsed elements of the earliest 1st-century waterfront structure. It is possible that elements of the 'timber lattice' foundation of the 'Period II' complex found at Peter's Hill (Williams 1993, 41–43, fig. 30, plate 6) may have originated as parts of structures of this type which have been pushed over, lifted and reused as horizontal timber foundations within the consolidation dumps (see Goodburn, Chapter 3). If the planks at the Salvation Army Headquarters site were deliberately laid, however, they may have formed part of a temporary platform laid out on the foreshore to provide a firm working surface or walkway. Alternatively they may simply represent incidental dumping of off-cut timbers associated with small-scale waterfront industry in the early Roman period. It is possible that the early Roman waterfront was not represented by large-scale timber revetments in this area. To the west at Baynard's Castle a plank laid on edge at a similar height of 0.57m OD was interpreted as a possible shallow barrier to the Thames, which pre-dated the riverside wall (Hill *et al* 1980, 35–36).

The presence of charcoal and woodchips within the deposits covering the timbers has been taken to suggest woodworking activity in the immediate vicinity (see Goodburn, Chapter 3). The woodchips are typical of mid 1st-century debris from waterfront sites such as Regis House (Goodburn forthcoming) where imported central European wine casks were being opened and then recycled on the quayside. The fact that at least two of the timbers on the foreshore may have come from barrels supports the interpretation of these deposits. Such residues certainly indicate an increase in waterfront activity and possibly trade in the vicinity, perhaps contemporary with the rapid growth of the Roman waterfront further to the east in the aftermath of the Boudiccan revolt in AD 60 (Brigham 1998, 25).

The large horizontal oak beam in P8, used in a 3rd-century structure, may in fact have been retained *in situ* from an earlier 1st-century quay. Whilst only a little of this structure was recorded, this beam was commensurate with similarly large oak beams used in quayside structures recorded in other elements of the waterfronts of Roman London during the later 1st century AD (Brigham 1998, 25), where squared oak beams formed a frontage which was retained by tiebacks running to a rear wall. Whilst the limited size of the area of investigation precluded a definitive interpretation of this structure, the timber was thought most likely to have originally formed part of a later 1st-century quay structure. Indeed, models for the predicted line of the 1st-century waterfront place it close to this area of the site (Brigham 1990, 136–137), and tree-ring dating suggests a 1st-century felling date for the timber. The main elements of the Roman Port located to the east of the site but upriver of the bridge were constructed between AD 70–90 (Milne 1985; Perring 1991, 28), and it is likely that the element of quay structure recorded in P8 is broadly contemporary with this waterfront development.

The large timber threshold beam set back from, parallel to and presumably associated with, this quay is likely to have formed the doorway to a substantial riverside building (Building 1), possibly a warehouse. Similar warehouse structures have been recorded at Regis House and later examples (after AD 95) at Pudding Lane and Peninsula House (Brigham 1998, 27). The collapse (which was also evident in several of the later structures) which resulted in this beam lying at an angle of 45° to the south is likely to have been caused by subsidence of the ground on the steep slope, but it was unclear whether this collapse had taken place in antiquity or not. The presence of the stored-

product pest, *Oryzaephilus surinamensis*, which attacks the kernels of stored grain (see Branch *et al*, Chapter 3) is also indicative that the timber threshold may have been part of a warehouse storing grain transported up the Thames. Further tentative evidence of waterfront activity is provided by the timber luggage label (*see* Goodburn, Chapter 3) retrieved from later dumping, which may provide evidence of the unloading of goods on the quay. A similar item was found on the early Roman waterfront site to the west at Regis House (Brigham & Watson forthcoming).

Although piecemeal, these findings suggest development of this area of the western waterfront in the later 1st century AD, as well as the gradual expansion of the town to the west at this time. One might tentatively suggest the existence of a substantial quay of horizontal baulk construction with large, probable warehouse, buildings a few metres behind the frontage occupying the area of the site.

THE 'PERIOD I' DEVELOPMENT

Preparation of the ground

The demise of the 1st-century waterfront structures was marked archaeologically by a period of significant and sustained ground reclamation in the area of the site, with Building 1 being demolished (if indeed it had not already partially collapsed), and the river side of the quay being infilled. This major period of dumping, towards the base of the hillside, appears to have been undertaken in order to raise and level the ground, especially the steep slope across the south of the site, in preparation for significant development of the site in the 2nd century AD, and whilst the precise date and duration of this groundwork could not be established, pottery recovered from this material dated to between AD 50–150, whilst ceramic building material suggested a mid 2nd-century date (see Sudds, Chapter 3). Moreover, a well-humified wood peat layer recorded towards the west of the site, interpreted as redeposited, was likely to form part of this ground reclamation process. Radiocarbon dates taken from this material suggested a deposition date of between 120 BC and AD 220 (see Branch *et al*, Chapter 3), and therefore broadly contemporary with the activity further to the east.

Problems of correlating new records with previous observations

A number of substantial masonry walls were recorded constructed partially on the consolidated ground discussed above. Some of these walls appear to form additional elements of the 'Period I' activity previously recorded by Peter Marsden during the construction of the Salvation Army Headquarters in 1961 and 1962 and several of the masonry elements, both 'Period I' and 'Period II', revealed in 2002–2003 would appear to be identical to those observed by Marsden in the 1961–1962 investigations. His observations were recorded during an intermittent watching brief and, based on his records, would appear to be limited to deeper areas of excavation, such as pile caps, dug by the 1960s' contractors. It is not known how he located his observations, they may well have been located from contractors' plans, but even today without the use of a total station theodolite it is difficult to locate accurately watching brief records. In the early 1990s attempts were made to locate Marsden's observations onto a present day plan incorporating the evidence from Peter's Hill, Sunlight Wharf and earlier archaeological investigations dating back to the early Victorian period (Williams 1993). However, it is apparent from the comparison of the locations of identical pieces of masonry between the two archaeological investigations 40 years apart that there are some slight errors and discrepancies in the location of features.

There is no easy fix, most of Marsden's observations appear too far to the east, the factor varying, but always being less than 2m, and some are slightly too far south. The alignment of many of the features, especially the 'zig-zagging' walls observed by Marsden, appears to be at variance to those observed by PCA. However, as discussed below, it is considered that Marsden's recording of the alignment of such features was accurate. Where it is obvious through descriptions or near location that the same walls are being seen, the earlier observations have been moved to form a 'best-fit' figure for the conjectured layout of both the 'Period I' and 'Period II' complexes. The evidence as recorded is presented here, in an attempt to demonstrate how Marsden's records can be best matched with PCA's findings, although other interpretations also remain possible (Fig. 50).

Although some of the walls recorded by Marsden might be moved slightly to fit with PCA's recent findings, no evidence of the 'zig-zagging' foundations recorded by Marsden to the east of the site and interpreted by Williams (1993, 7–8 and fig. 5) as possibly forming part of an ambulatory or portico were found during the recent excavations by PCA. However, the walls which formed the riverside ambulatory or portico were located immediately adjacent to the southern limits of the area investigated by Marsden and this indicates that their alignment and orientation, if not their exact position, is likely to have been accurately recorded.

During the previous observations, Marsden had been unable to phase the disparate elements of masonry recorded below the 'Period II' chalk raft, and as such had labelled all earlier monumental foundations as 'Period I'. Moreover, no evidence was recovered to suggest the date of their construction (other than that it preceded the firmly-dated later development of AD 294), and the relatively limited areas of exposed foundations allowed only the most tentative interpretations of both layout and function. However, the recent observations have revealed important new aspects of the 'Period I' complex, which help to develop our understanding of this quarter of the Roman city in the 2nd and 3rd centuries.

The eastern apse, Building 2

The earliest surviving part of the 'Period I' remains found during the recent Salvation Army Headquarters excavation

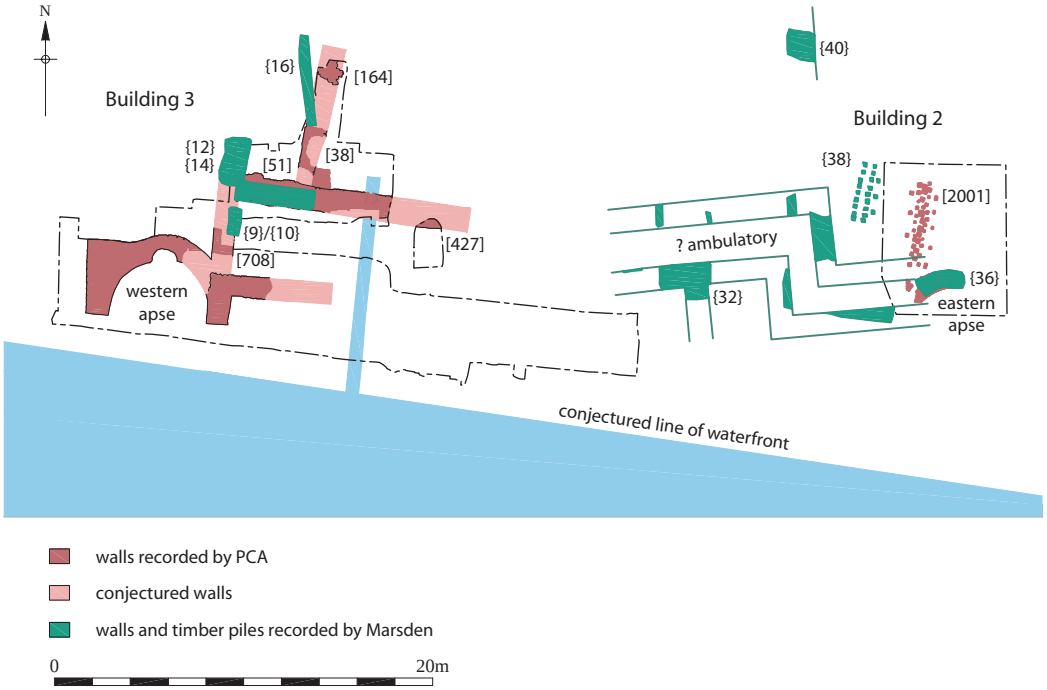


Fig. 50 'Period I' walls as recorded by PCA at the Salvation Army International Headquarters, in relation to those observed by Marsden, with some locations adjusted (scale 1:400)
In the east Marsden's apse {36} has been moved 1.76m west and 0.43m north to coincide with the apse foundations [2050] found by PCA, as have the 'zig-zagging' walls {32} etc, piled foundation {38} and wall {40}. To the west slightly different adjustments were made: Marsden's walls {12} and {14} have been moved 1.98m west to coincide with walls [51] as found by PCA, and wall {16} has been moved by the same factor. Walls {9} and {10} coincide well with PCA's wall [708] and have been left as originally recorded

would appear to be the element of curving masonry [2050], interpreted as an apse, found in the southeast corner of the site. This masonry was found in very close proximity to an element of masonry, Feature {36}, recorded by Marsden during the previous observations. Marsden observed that 'there was some indication that it (Feature {36}) might have been curved as part of an apse' (Williams 1993, 67), and it therefore seems likely that these two observations are of parts of the same feature, Marsden having recorded part of the superstructure. Although only revealed at foundation level in the present investigations interesting differences were apparent. There was evidence of interior masonry, which was probably the foundation of the floor of the apse. Also it appeared that the apse terminated at its western side before the whole of its curve was completed, as the surviving foundation was cut into the London Clay and founded on piles, which did not continue to the west. It is possible that there was a break in the masonry or the foundation at that point was raised up and did not rest on piles, at the point where it might have met the enigmatic 'zig-zagging' possible ambulatory walls observed by Marsden to the west.

The nature of the development in this area of the site allowed for the squared foundation piles of this possible apse to be removed for sampling, and from these a probable felling date of AD 165 was obtained for one of the timbers. Although it was not possible in either the 1960s or recent observations to define the relationship of this feature to the other 'Period I' structures on the site, Marsden was clear that this curved wall 'underlay the lower chalk terrace, and clearly pre-dated the terrace'. This foundation timber provides the earliest date for the construction of at least part of the 'Period I' complex. Unfortunately although several samples were taken only one provided a date and it is of course possible that the timber may have been reused and therefore that the apse may have been constructed significantly later.

Modifications to the complex c. AD 230

If the timber pile gives a true reflection of the date of the eastern apse it would appear that this element of the 'Period I' complex was initially laid out just after the middle of the 2nd century AD. Thereafter there is evidence that there were modifications to the complex in the AD 230s with the construction of a north–south wall [2001] leading off from the west side of the eastern apse and the enigmatic timber lattice work with packing behind to the west of the site. Despite the limited size of the trench it would appear that this timber structure was definitely earlier than the western apse and other walls making up Building 3, but what was its function? It has the appearance of a much-truncated quay with large baulks at the south and smaller timbers apparently driven into the sloping London Clay with packing around them. The timbers could only have been driven horizontally into the slope if there was sufficient space to the south. This would suggest that in the AD 230s this was still the location of the foreshore or else that it was possibly some sort of inlet or docking point. It is possible that this may have formed the foundation of some form of structure or temporary works during the modifications of the site, although it would still have required a large space

on the southern side from which to drive in the timbers. However, as it has been suggested that it would not be possible to drive the timbers horizontally into the London Clay (D. Goodburn, pers comm) it is possible that the timbers represent the remains of terracing of the site with redeposited London Clay being packed around them.

The western apse, Building 3

The western apse appears to be later than this timber structure, which would place its construction sometime between the AD 240s and AD 293. Although it is difficult to be definite about the relationship of the western apse to the walls in its immediate vicinity, it is probable that the apse was keyed into the masonry immediately to the east, based on the scarring on the exposed face of the wall. The north–south wall and the apse abutted each other although this could only be seen in elevation. However, the relationship between the north–south wall and the east–west wall to the north could not be established because of later truncation. The construction techniques, including use of timber shuttering, and the fabric of the wall were similar and suggest contemporary builds. It would therefore appear that all the western 'Period I' walls (Building 3) were built at the same time during the latest modifications of the complex.

Form of the 'Period I' complex

There are, therefore, at least two modifications to the original 'Period I' complex. Is it possible to identify the form of the complex at any of the times of its initial construction or rebuilding? The only definite evidence for the first phase of the complex identified by PCA is the apparent eastern apse. But even then the form of its construction is strange with the apparent real edge at the west.

The 'zig-zagging' walls observed by Marsden which may form a riverside ambulatory or portico (Williams 1993, 8) could be part of this phase of construction meeting the apse in a similar way to those in the west, though this relationship was not established. We can be reasonably confident that Marsden recorded the alignment of the putative ambulatory walls, if not their exact location, accurately due to their proximity to the southern limit of excavation. Their alignment might argue that Marsden's north–south walls, Features {16} and {40}, are also part of this phase of construction. Of these the ragstone foundation, Feature {16}, is perhaps more enigmatic; its alignment clearly parallels that of the 'zig-zagging' walls to the east, so it may well be part of that phase of construction. However, its location suggests it may be part of the north-south wall [164], [38], a possibility that cannot be discounted. With the exception of Feature {40}, all these walls were recorded below the chalk terrace; the relationship of {40} to the chalk could not be established. Thus Marsden appears to have recorded a phase of construction pre-dating 'Period II' and on a completely different alignment. However, during the recent excavations by PCA there was no evidence for any walls on this alignment, although walls were found similarly sealed beneath the chalk terrace (see Fig. 50) and it thus seems likely that many of the 'Period I' walls found by Marsden form elements of a Phase of construction not identified by PCA.

The piled north–south foundation [2001] is on a different alignment to the 'ambulatory' walls, it respects the western side of the eastern apse and parallels the alignments of the wall elements to the west. The squared-pile foundation {38} as drawn by Marsden is less complex and more regular than that recorded during the current investigation, which could be explained by lack of time during Marsden's watching brief to make detailed records. The posts clearly formed the foundation piles for a masonry wall, and they were not characteristic of the timber piles utilised in any element of the 'Period II' construction, which appeared to have been randomly laid (rather than adhering to the exact dimensions of individual walls) and be whole boles rather than boxed hearts. Whilst Marsden originally placed this feature in the 'Period II' phase of development on the basis of its close alignment to a 'Period II' feature to the north, he makes no reference to it having a direct stratigraphic relationship with any 'Period II' features. It therefore seems possible that these squared oak piles recorded by Marsden represent a previously unrecorded intermediary phase of development of the 'Period I' complex in the area of the site in the early 3rd century AD.

It is thus possible that there were two parallel north–south walls in very close proximity to each other, the western one {38} recorded by Marsden and the eastern one [2001] revealed on the current investigation, although the difference in location is so small to suggest that they could represent the same wall. The fact that Marsden's wall is apparently at some distance from the apse might be explained by his visiting the site to make observations at different times with no general points of reference surviving to locate the features accurately against each other. However, the one striking thing about the two walls is that they have identical alignments. Fig. 50 thus shows Marsden's apse {36} moved to coincide with that found by PCA and wall {38} moved by the same degree, slightly to the west and north.

To the west of the site Marsden's recording of the alignments of Features {9}, {10}, {12} and {14}, elements of which were revealed again during the recent investigations, albeit at a reduced level, again appears accurate. Walls {9} and {10}, unphased by Williams (1993, fig. 54) correspond closely with the projected northern extension of wall [708] and thus on Fig. 50 they are shown exactly where originally recorded. Wall {12} is probably an extension of this further north. Although its original location (Williams 1993, fig. 5, 6) places it mid-way between wall [38] and the projected northern extension of [708], this area was examined in some detail during the recent investigations and the northern edge of [51] was seen to continue uninterrupted. Wall {12} cannot be moved eastwards to coincide with wall [38] as it would then overlie the late medieval well truncating this wall, thus

walls {12} and {14} have been moved 1.98m to the west to coincide with the end of wall [51], as a northern extension of wall [708].

It can be argued that the northern wall observed in Brook's Yard during sewer work in 1924 (RCHME 1928, 93; Merrifield 1965, 222–223; Williams 1993, 74–75) is an eastern continuation of wall [51]/[427] rather than the eastern walls. The strange battering of the wall may reflect the collapse of the wall to the river side as with wall [51] and the puddled clay along its southern face is suggestive of the puddled clay along the northern face of [51].

Although the eastern and western portions of the 'Period I' masonry appear to be on different alignments (based on Marsden's location), the similarity of several of the components at first sight appears compelling. In particular, the two parallel walls extending from the apses, whilst not identical, would seem to broadly mirror each other. As discussed above (see Sudds, Chapter 3), similar general construction techniques were used in both, though the masonry coursing differs in detail with a greater proportion of Kentish rag coursing to tile used in the western apse than observed in Marsden's Feature {36} as described by Williams (1993, 63). There is one striking difference between the eastern and western apses. If the internal masonry of the eastern apse were indeed the foundation of a floor, the finished floor level would have been at a height in excess of 2.20m OD, whereas any floor of the western apse would have lain at a level below 0.79m OD. The apses would not therefore have been at the same ground level, though this might have merely been a reflection of the natural topography of the site and as pointed out above (see Sudds, Chapter 3) their common features in terms of ground plan and morphology, suggest that even though they were not apparently built as part of the same phase of construction, one appears to have heavily influenced the other. The western walls would at first sight appear to be very similar in layout to the eastern walls as observed by Marsden: both appear to form parallel walls associated with apses. However, the internal gap between the parallel walls at the west was *c*. 4.60m (removing the listing effect of the wall), whilst that at the east was much narrower being only between 1.4m and 2.0m. The alignments of the two sets of walls would also appear to be at sharp variance.

It is of course tempting to blame all the problems of alignment and differences in locations of walls on problems caused by Marsden's near-impossible task of locating his observations accurately. Following this course it would be possible to reconstruct the 'Period I' complex in its final form as a large structure with an apse facing the river at either end with a possible colonnaded ambulatory between them (Fig. 51). The building continued north up the hill with the foundations stepping up to reflect the original slope of the London Clay and it was on this higher ground that the main part of the complex lay. However, as established above, the alignments of the eastern walls appear to be accurate based on their proximity to the southern limit of excavation, even if their location needs to be shifted by a metre or so, and thus it is suggested that there were at least two major phases of construction of the complex, indicated by the dating of the different foundations and their differing alignments.

The eastern apse may originally have been a freestanding structure constructed after AD 165 facing the river or may, from the outset have been associated with an ambulatory along the river, with the main part of the associated building extending up the hill to the north; the alignment may have reflected the line of the river at this point. In the AD 230s the complex was modified with a wall or walls at the east on a different alignment and possible terracing at the west. The western apse and associated walls were constructed after the AD 230s, reflecting the form and method of construction of those in the east. Unfortunately the area between the eastern and western elements was not available for investigation and thus what lay between the two structures remains unknown and can only be conjectured.

It does, however, seem likely that the 'Period I' complex as identified by Marsden lay on a completely different alignment to that identified by PCA and that the features indicated in Fig. 50 represent several phases of development with a complex on one alignment superseded by another on a very different alignment. Whether it is still useful to group together all masonry structures found on the site beneath the later chalk raft and thus dated to pre-AD 294 as 'Period I' is a matter of debate. The recent excavations have demonstrated evidence of at least three different phases of building activity, Marsden recorded building evidence on an alignment not observed during the recent excavations, and it is not possible to determine on the available evidence if any structures of earlier date survived later rebuilding and were retained. However, the nomenclature has been kept here, partly for ease of reference to earlier publications, partly because it never was envisaged that 'Period I' was a simple single phase of construction (Williams 1993, 12) and also because if the eastern apse were originally associated with Marsden's possible ambulatory walls it is possible to envisage two phases of building with similar features, apses facing the river and possible ambulatories along the riverfront, and it thus seems reasonable to conclude that all the structures are part of one large complex of buildings, remodelled or extended over time.

In summary therefore, no elements of PCA's Phase 6 walls coincide with Marsden's 'Period 1' features in the east of the site as defined by Williams (1993); Marsden's eastern apse {36} is unphased and foundation {38} assigned to 'Period II'. It thus appears that there were two phases of development: one including Marsden's ambulatory walls and walls {40} and {16}, and a second on a different alignment. Whether the eastern apse was associated with the former or not could not be established, but it did appear to be associated with foundation [2001] and by implication Marsden's similar foundation {38}. PCA's Phase 6 features thus appear to represent a phase of development only glimpsed during Marsden's watching brief, which might be reconstructed as a complex, with two apses facing the river and buildings, with possible ambulatories between, extending back and up the terraced hillside, away from the river. Dating evidence suggests this was initially constructed to the east of

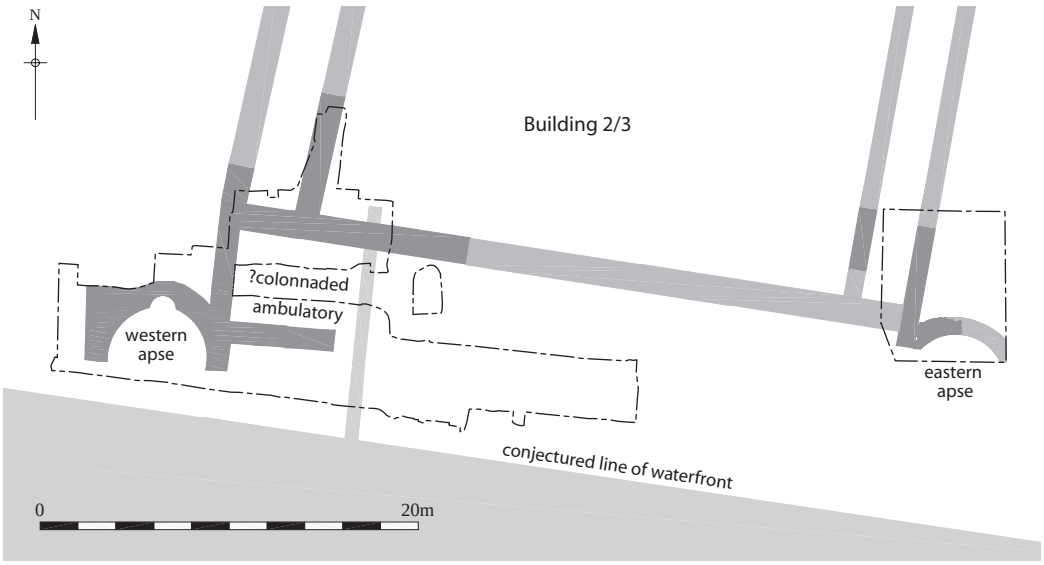


Fig. 51 Possible layout of the 'Period I' complex in its latest phase (scale 1:400)
The east–west wall [51]/[427] has been moved to the north to reflect its assumed original location

the site and extended west over time.

Evidence recorded in the vicinity of the site has previously hinted at a possible period of intermediary development in the southwest quarter of the town, which had not been directly observed. Many of the reused tiles and marble inlays recorded within the 'Period II' complex at Peter's Hill included late 2nd- or 3rd-century forms which are likely to have originated in a structure which was, at the very least, refurbished at this time (Williams 1993, 10). It is therefore possible that some of the reused elements recorded at Peter's Hill may have originated from this 3rd-century development.

Function of the 'Period I' complex

The function of the 'Period I' complex is in many ways as difficult to determine as its layout. The substantial, well-built walls are suggestive of large public buildings. Analysis of the demolition debris of the 'Period I' complex together with the reuse of monumental pieces of stone within the 'Period II' complex provide some idea of the scale and opulence of the earlier complex as discussed above (see Sudds, Chapter 3). The presence of box flue tile, reused as ordinary building material rather than for its previous specific use in heated rooms, and *voussoirs*, reused within the western apse, together with tufa which is generally linked to use in 1st-century buildings (Betts 2003, 105), suggests reuse of material which derived from heated buildings, which might suggest that it had been robbed from the nearby Huggin Hill baths (see Sudds, Chapter 3). The high status of the buildings was suggested by the enormous blocks of limestone reused in the 'Period II' foundations together with polished marble veneers, whilst the public nature of the building might be hinted at by the recovery of a procuratorial stamped tile from the demolition debris. The internal walls were covered in painted plaster and would most probably have had high-quality mosaic floors constructed partly from clunch and siltstone *tesserae*.

An important collection of monumental masonry recovered from the riverside wall at Baynard's Castle includes sculptured fragments of a monumental arch, a screen of gods, a relief of four mother goddesses and two altars (Hill *et al* 1980) which may have originated as parts of the 'Period I' complex. The monumental sculptured blocks were only recovered from the western part of the wall, which has led the authors to suggest that they may have originally come from a source to the west of the site although they may equally have come from the 'Period I' complex. It has been suggested that the arch may have formed the entrance to a temple enclosure (Blagg 1980, 179). Indeed the two altars bear inscriptions that have been interpreted as recording the restoration of temples of Jupiter and Isis both of which 'had fallen down through old age' (Hassall 1980, 195–198). If the sculptured stones came from a phase of the 'Period I' complex at the Salvation Army Headquarters site it would suggest that the buildings were part of a large area dedicated to religion, with perhaps statues of the Roman gods set within the apses facing the river. The secular and the religious were not always completely separated in the Roman world and the complex may also have included governmental institutions (Williams 1993, 12).

One of the inscriptions mentions that the work was carried out at the time of two emperors: interpreted as either being during the joint rule of Trebonianus Gallus and Valerian in AD 251–253 or of Valerian and Gallienus AD 253–259 (Hassall 1980, 198). The restoration of the temples during the AD 250s would fit perfectly with the chronology of the 'Period I' complex as revealed during the latest investigations. The complex may have been first constructed in the second half of the 2nd century (after AD 165), indeed it may have being built as the Huggin Hill baths were being closed down towards the end of the century. The two events may not have been a coincidence and may have been linked, with the baths providing much of the building material for the new complex (see Sudds, Chapter 3). New baths may have formed part of this new complex as attested by the presence of ornate marble veneers recovered from consolidation deposits overlying

the 'Period I' remains. During the AD 230s there may have been a need for remedial works and remodelling of the complex including a refashioning of the waterfront at the western side of the complex. However, by the AD 250s the complex was obviously in a state of disrepair, and judging by the later instability of the land could have actually been falling down. The time span of up to *c*. 90 years between the initial construction and the last reconstruction and rebuilding of the temples is long enough to accord with the buildings having 'fallen down through old age'.

Destruction of the 'Period I' complex

The 'Period I' complex did not survive for long in its final form and within *c*. 40 years had apparently fallen down and been replaced by the 'Period II' complex. Was the destruction of the final 'Period I' complex due to old age or one catastrophic event? The answer is probably a mixture of the two. As demonstrated above (see Chapter 2) several features showed evidence of a collapse or gradual subsidence of the land to the south towards the river: the timber threshold listed at a severe angle, as did the later wall [51] to the west and there were severe cracks in the interior face of the western apse. There is evidence of some movement indicated to the east of the site, although not as pronounced, with the gentle slope to the south of the timber piles [2001] of the 'Period I' additions. There is some evidence that attempts were made to halt the progress of a gradual collapse by bracing walls with timbers resting on angled chocks. However, although it is probable that the area was subject to gradual subsidence caused by a mixture of the streams running down the hill and riverine erosion of the shoreline, it is probable that the listing of all these structures may have been the result of a later catastrophic collapse of the land to the south. Wall [51] listed at an extreme angle of 45° and the presence of the puddled clay both in the void resulting from the collapse and against the wall observed beneath Brook's Yard (RCHME 1928, 93; Merrifield 1965, 222–223) is contributory evidence that the collapse might have caused by extreme weather leading to torrents of water cascading down the hill.

Thus the final collapse of the 'Period I' complex may have occurred very soon after the last phase of building. It is noteworthy that the riverside wall observed at Baynard's Castle to the west was found to have been subject to two different construction methods. To the west the foundations rested on the ground whereas to the east, where the wall was constructed on reclaimed possible unstable ground, the structure rested on timber piles and a chalk raft (Hill *et al* 1980, 57–59). Is it possible that this use in *c.* AD 270 of more substantial foundations for the riverside wall in the vicinity may have been a reaction to the catastrophic collapse of the 'Period I' complex along the riverfront? If so the buildings might have only stood for a matter of ten years or even less.

Nature and extent of the 'Period I' complex

If the monumental masonry recovered from the riverside wall, including fragments of a monumental arch, a screen of the gods, a relief of 'Mother Goddesses' and two altars did indeed come from the complex they might also point to changes to the complex over a period of time. It has been suggested that the Monumental Arch is at least late 2nd century AD in date and possibly Severan, but could be later, the screen 2nd or 3rd century, whilst the altars would appear to date to the mid 3rd century (Blagg 1980, 126; 1996, 46; Hassall 1980, 198).

But what is the nature of this complex? There have been a number of views over the years from this area of southwest London having a decorated arched entrance giving access to public buildings including a temple, theatre and baths (Merrifield 1983, 170), a bathhouse and religious area (Williams 1993, 12), a large temple complex in the classical style with an entrance to the precinct facing east (Bateman 1998, 49 & note 7), to the Governor's Palace (Yule 2005, 87). The evidence, such as it is, is based on several fragments of masonry revealed largely by Marsden and during the recent excavation and the reuse of monumental masonry in later structures at Baynard's Castle (Hill *et al* 1980), Peter's Hill (Williams 1993) and on the current site. It has been argued that the fragments of monumental arch, screen of gods and altars derive from a complex to the west of Baynard's Castle (Hill *et al* 1980, 62) or even possibly from the 'Period II' complex, as they are apparently from a later rebuild of the riverside wall (Williams 1993, 10), however if they do derive from the Salvation Army Headquarters site or its immediate environs, then it is probable that the complex had a religious element. The date of the altars would fit well with the proposed chronology for the 'Period I' phases of activity on the site.

Although it has been noted that the alignment of the parallel 'zig-zagging' walls observed by Marsden in the 1960s seems to be at variance with the riverfront and has been argued as rather suggesting an alignment facing the forum to the northeast (Bateman 1998, 49 note 7), this apparent strange alignment could be explained by the fact that the walls respect an unknown topographic feature. The later western apse and parallel walls, which may have formed part of a building that incorporated the earlier apse, certainly respect the natural topography and the riverfront, as well as being reflected in the alignment of later, 'Period II', features. It can be argued that everything is designed to face the river with the evidence of terracing up the hill also part of this process. The river view could be equally important for any major public building, be it a temple or a palace. In Cologne both the Capitoline temple and governor's palace (*praetorium*) are adjacent to the river as is one of the temples at Xanten, the harbour temple (Bridger 1984; Carroll 2001, 45–47 fig. 9, 48 fig. 13). Indeed the layout of the complex in its final form with possibly two apses facing the river bears a striking similarity to the northern part of the Period 1 *praetorium* at Cologne (Marsden 1975, 68 fig. 30).

The large pieces of reused monumental masonry found in later 'Period II' structures in the vicinity and the recovery of material such as marble veneers, painted wall plaster, *tesserae*, *voussoirs* and box flue tiles from demolition

debris associated with the end of the complex would certainly suggest that the complex was monumental in scale with opulent floors and walls. Some of the material, with the exception of the imported marble and painted plaster, may have originated from the Huggin Hill baths only to be reused in one or more of the phases of building of the 'Period I' complex (see Sudds, Chapter 3). The available evidence would thus seem to reinforce the view that the complex included religious buildings such as temples with other public buildings, including possibly a bathhouse.

No walls which could be assigned with certainty to 'Period I' were identified in the western area of the site, west of the apsidal structure, either during the observations made by Marsden, or during the recent investigation of the site. As has previously been postulated by Williams (1993), it is possible that this may be due to increased truncation in this area of the site, which had effectively removed any evidence of their existence. However, later 'Period II' foundation piles were recorded across the western portion of the site by both Marsden and PCA, and the timber piles were only employed as a foundation base where earlier walls could not be levelled and used in their stead. This would in turn suggest that earlier walls were absent from the area to the west of the western apse. The eastern possible apsidal structure was recorded at the extreme southeastern limit of the site, and as such, no observations were made to the east of this area. Indeed, whilst there is no record of 'Period I' structures being recorded further to the east, the level of archaeological investigation between the Salvation Army Headquarters and Huggin Hill (*c.*100m to the east) has been minimal. Whilst the eastern limit of the complex can therefore not be defined with any certainty, it is possible that the complex was defined by the two apses, and therefore had an east–west extent of *c.* 40m.

No evidence of 'Period I' structures was recorded to the south of the site at Sunlight Wharf, although given that this area is likely to have lain on the foreshore at this time, this is perhaps unsurprising. The southern limit of the complex is therefore likely to have been broadly delineated by the southern side of the apses. An element of Marsden's ambulatory walls, Feature {32}, is recorded extending down towards the river from this line, and it may be that this wall formed part of an access point to the complex from the river itself. Little evidence of the 'Period I' complex has been recorded to the north of the parallel east–west walls. This may be due to the later 'Period II' terracing of the hillside, but the construction of the 1960s' Salvation Army Headquarters building had removed any possibility of this area being investigated during the excavations by PCA. It is likely that the complex was terraced into and stepped up the hillside, thus providing a façade designed to be viewed from the river rather than from the land; this is augmented by the orientation of the apses, which are both open on the river side. The north–south walls recorded towards the west of the complex during the recent investigations and Marsden's Feature {12} provide evidence of the continuation of the complex further to the north. The fact that wall [51], Marsden's Feature {14}, had collapsed to the south might suggest that this wall was a major load-bearing wall for elements of the structure situated further up the hillside, and this added weight had forced its collapse down the slope to the south. In terms of function the narrow east to west walls and open apsidal features may form part of an ambulatory or colonnade. The additional presence of the north–south wall sections on both 'Period I' structures suggests they form part of a portico or entranceway, perhaps accessed from the riverside, to a larger platform or structure extending northwards and terraced up the hillside. The revised dating evidence established through the recent excavations also indicates that as the western wing of the Huggin Hill baths were probably demolished by the mid 2nd century AD, and the eastern wing by AD 180, Huggin Hill would have provided a potential source of quarry for construction of the 'Period I' complex (Rowsome 2000a, 270–271).

There are no obvious, ready parallels for the form of the 'Period I' complex in Britain and given the limited remains uncovered during the excavations, at foundation level, any reconstruction of the superstructure must be highly conjectural.

The width of the western apse, at around 5m, suggests a substantial superstructure. The height of the niche, based on excavation of the external face of the apse and auguring in the interior, is estimated at around 2.45m to 2.55m and the base of niche and apse, at a level of around 0.70m OD to 0.80m OD accords well with the established mid 3rd-century highest river levels at *c.* 0.50m OD (Brigham 1998, 33). Based on its width we might anticipate that the apse continued to a height of *c.* 8m, the niche at the rear may well have housed a statue, arguably of Jupiter or Isis, as discussed above. It can be inferred from the height of the niche, that any statue it housed is likely to have been around 2m to 2.2m in height, and this accords well with remains of contemporary statuary recovered from Roman London (K. Hayward, pers comm). All upstanding walls of the structure are likely to have been rendered and the internal walls of the apse rendered and painted.

As established above it is possible that the two roughly parallel walls extending eastwards from the western apse formed part of an ambulatory although quite how far this may have extended and whether it met the eastern apse, or if other buildings stood between the two apses, could not be established. Given the difference in levels between the eastern and western apses a simple ambulatory connecting the two seems unlikely.

The 'Period I' complex and Londinium

Put into the wider context of the surrounding area, the challenging construction of a monumental complex stepping up the hillside in *c.* AD 165 is perhaps surprising given the general contraction of Roman London between AD 150 to 200. This general process of reduction is evidenced by the demolition of high status buildings with mosaic floors at Milk Street and Cheapside, the accumulation of dark earth deposits over tessellated floors and stone walls in the centre of the City (Perring 1991, 76) and perhaps most significantly of all, the abandonment of the Huggin Hill Baths in the

Fig. 52 Reconstruction of the final phase of the 'Period I' complex as it may have appeared from the river, with Building 3 in the foreground, by Jake Lunt

later 2nd century AD. It appears that as the expansion of the empire slowed in the second half of 2nd century, *Londinium* lost its significance as a major trading port and many of the specialised craftsmen and traders who had flourished with expansion withdrew.

However, there is some evidence to suggest that whilst the role of London as a major trading centre may have suffered with slowing of expansion across the empire, some development was still being undertaken across the town, in particular the reconstruction of the forum basilica in the mid 2nd century. A new temple also appears to have been built in *c*. AD 170 on the east bank of the River Fleet not far from Newgate, and more generally there appears to have been an increase in recorded votive deposits at this time (Perring 1991, 83). These changes appear to mark a general shift towards more religious and ritual concerns in the town, and it is within this context that the initial construction of the 'Period I' complex should be viewed. The small temple adjacent to the Forum had been cleared away by the mid 2nd century, and given the clear emphasis on sacred matters triggered by the contraction of the town, it is plausible that the 'Period I' development represented a larger temple complex, enclosed by the wall along Knightrider Street (Williams 1993, 78–82), reflecting the religious zeal being experienced within London in the later 2nd century.

THE 'PERIOD II' DEVELOPMENT

Significant alterations were made to the southwest quarter of the town in the late 3rd century AD instigated with the construction of the riverside wall in *c*. AD 270. This is thought to have passed close to the site, broadly along the line of modern Castle Baynard Street. During the excavations at Peter's Hill, a series of dumps were recorded deposited against the northern face of the riverside wall, and this process of dumping was also recorded during the excavations at Sunlight Wharf, to the south of the site (Williams 1993, 41). A sequence of dumped deposits recorded in the southern pile locations during the recent excavations may also have been laid down at this time, possibly to level up the ground behind the riverside wall. Deposits containing domestic waste, dumped following disuse of the western apse, contained pottery dated to between AD 170 and AD 270 (see Lyne, Chapter 3), and it may be that this dumping was being undertaken at the same time as material was being dumped behind the river wall.

Some elements of the 'Period I' complex appear not to have been demolished until immediately prior to the 'Period II' development: where 'Period I' walls were extant, they were reduced to the height of the 'Period II' chalk platform and used to support the platform instead of timber piles. By the very fact that the walls were incorporated

into the foundation of the new complex, it would seem likely that their final demolition would have taken place during the 'Period II' groundworks. A significant deposit of almost solid building material was also recorded capping the infilling of the western apse; clearly derived from an opulent building or buildings, this contained pottery dating its deposition to between AD 270 to AD 300. This comparatively tight dating framework suggests that this building material was laid down immediately prior to the construction of the 'Period II' complex, and it therefore seems likely that at least some of the material derived from the final demolition of the 'Period I' buildings.

If it is accepted that the 'Period I' structures formed part of a religious complex then the final demolition of the structure is unlikely to have taken place prior to its collapse and/or abandonment. Demolition of an active temple complex may have raised questions of impiety (Blagg 1996, 46) and it is therefore likely that the structure had begun to collapse prior to the ground preparation works.

Previously, evidence for the 'Period II' complex has been recorded during several archaeological investigations in and around the Salvation Army Headquarters, and the method of its construction appears to have been virtually identical across the area of the complex. Details of the disparate elements of the complex recorded previously have been discussed in detail by Williams (1993), and only specific detailed elements of this information will be revisited here. However, the evidence recorded prior to the recent investigations at the Salvation Army Headquarters suggested a large public building complex was constructed, dated with some precision by dendrochronological analysis to AD 294 (Hillam 1993; see Tyers, Chapter 3). The complex was constructed on at least two terraces cut into the hillside, extended over the reclaimed land to the north of the riverside wall, and stretched over more than 150m of the waterfront, from the City of London School in the west, to east of the Salvation Army Headquarters. A timber pile and chalk platform supported massive masonry foundations, which suggested that a significant superstructure was intended, although little evidence remained of the above-ground elements of the complex. Most of the structural evidence for the complex has previously been recorded on the lowest terrace, close to the Roman waterfront.

Problems of correlating new records with previous observations

In common with the findings from 'Period I' there were some areas of conflict between the locations of Marsden's recorded observations and PCA's records (Fig. 53). To the west Marsden's walls {18}/{17} fall close to the projected northern extension of wall [428]. Although Marsden's wall follows a slightly different alignment their proximity and similar construction techniques suggests that they are in fact the same and the errors in accurately locating {17}/{18} might be explained by the circumstances of Marsden's observations. Assuming Features {17}/{18} correlate with wall [428] it might be reasonable to realign nearby features {19} and {53}, interpreted as some form of plinth, accordingly. Assuming Marsden's possible apse is the same structure as the eastern apse identified by PCA then a short length of masonry, {37} identified by Marsden within the area confined by his 'Period I' eastern apse, should be moved to accord with the apse identified by PCA (see Fig. 50). Moving all of Marsden's features by the same factor, to accord with the movement of the eastern apse (see Fig. 50) to the north and west, results in correlation between the location of walls {17}/{18} and the projected northern extension of wall [428]. Masonry elements {43–45}, which appear to represent steps rising from the west up to a raised platform in the east, might also be relocated accordingly.

Construction of the 'Period II' complex

Previous observations made in the vicinity of the site, particularly those at Peter's Hill, revealed the structural complexity of the timber pile and chalk raft preparation. However, due to the significantly truncated nature of the majority of the Salvation Army Headquarters site and the disparate and restricted nature of much of the PCA investigations, little of this detail was recorded. However, the identification of the timber piles across the entire east–west length of the southern portion of the site does suggest that the complex precinct, if not the buildings within it, spread uninterrupted at least as far as the Peter's Hill site.

All previous observations of the 'Period II' complex have revealed the basal course of the masonry to consist of massive stone blocks laid on a bedding of *opus signinum*. At Peter's Hill the blocks consisted almost exclusively of Lincolnshire Limestone, whereas at Sunlight Wharf, a number of sandstone blocks were also incorporated into the foundation course (Betts, 1993), whilst the foundation course of masonry recorded at the Salvation Army Headquarters consisted of oolitic and shelly limestone. Although visually similar the stone types identified at the Salvation Army Headquarters are different from those identified at Peter's Hill or Sunlight Wharf (see Sudds, Chapter 3). This difference could be due to the piecemeal nature of building, however the blocks appear very similar to each other and probably did originate from the same building. The different stone types identified may just be down to the fact that so few samples were taken or survive for identification (B. Sudds, pers comm).

The use of consistent construction techniques across the complex continued above the massive stone foundation courses, with squared, regularly coursed, predominantly ragstone, facing blocks with double tile lacing courses. As described above (see Sudds, Chapter 3) the Salvation Army Headquarters structure also incorporated small blocks of both tufa and Upper Greensand. Again, similar materials were recorded during the detailed observations of the Sunlight Wharf walls, the identification of the Upper Greensand being particularly unusual but common to both areas of foundation. The foundations of the 'Period II' complex were on a massive scale, with maximum thicknesses of 3.75m at Peter's Hill and up to 6m at

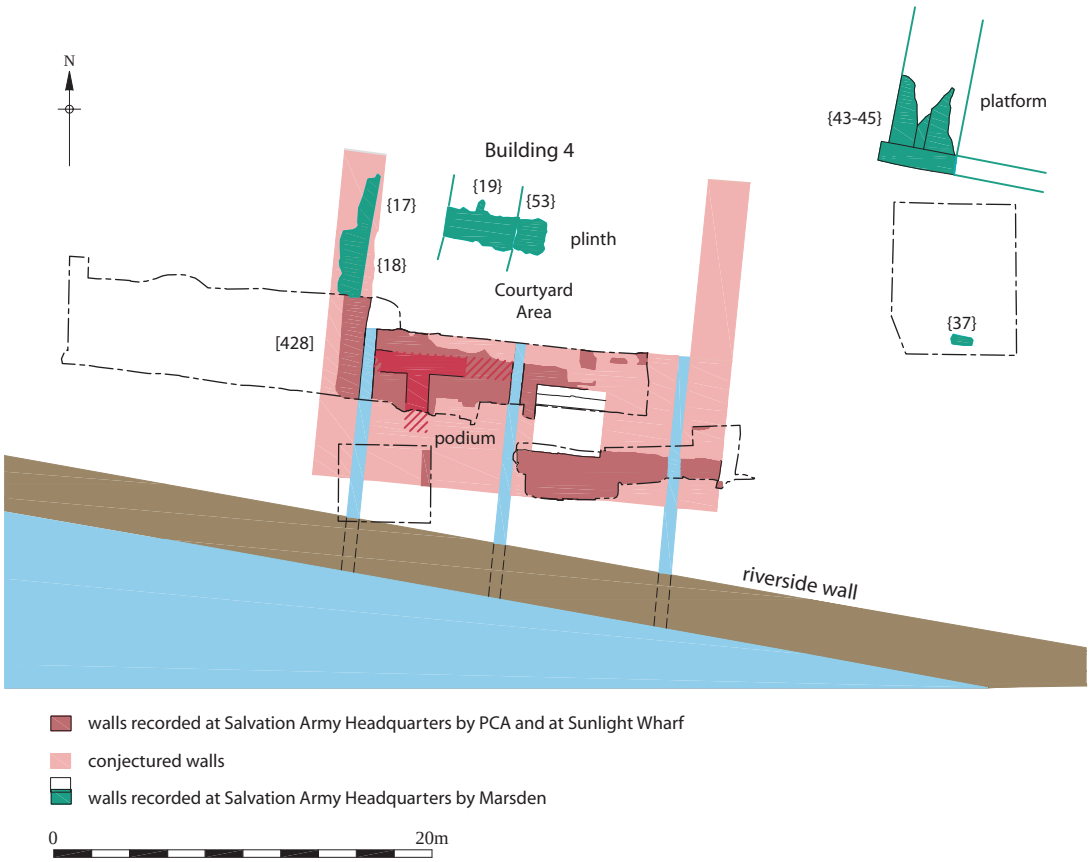


Fig. 53 'Period II' walls as recorded by PCA at Salvation Army International Headquarters, in relation to those observed by Marsden, and at Sunlight Wharf, with locations adjusted (scale 1:400)
All Marsden's walls have been moved by the same factor as apse {36}, in Fig. 50, ie 1.76m west and 0.43m north

Sunlight Wharf. The Salvation Army Headquarters masonry fits well within the dimensions of the previously recorded elements of the complex, with the east–west extent of the masonry having a thickness in excess of 4.50m. No superstructural elements of the 'Period II' complex have previously been recorded, although a portion of the foundations recorded at Peter's Hill had been capped with a layer of *opus signinum* at a height of 4.09m OD. It is possible that this layer may have formed the break between the foundations and superstructure of the building, although this layer was not recorded at the Salvation Army Headquarters where foundations survived to 4.80m OD in height.

The Sunlight Wharf excavations previously recorded two tile-built culverts incorporated into the foundations and similarly during the recent excavations at the Salvation Army Headquarters, two culverts were identified, the eastern of which formed a northern extension to the western Sunlight Wharf culvert. Thus in this area three culverts, located approximately 7m apart, intersected the foundations. The prevalence of these culverts clearly reflects the necessity of incorporating drainage for the significant volume of water, which would have been produced through natural run-off, into the engineering requirements of the complex. Indeed, the clear problems with ground subsidence that have been recorded in the earlier development of the area may have been due, at least in part, to the previous failure to make necessary allowance for this natural water fluxion. The presence of the culverts may also have been aesthetic; it may be that these large and well-constructed water channels were designed to be viewed from the river, the discharging of water through the riverside wall at what at times must have been a rapid rate, creating an impressive feature along the river frontage.

The total absence of either intact upstanding elements of the complex, or indeed demolition material associated with its demise, at Salvation Army Headquarters, whilst unusual, is entirely consistent with both the excavations at Sunlight Wharf and Peter's Hill. It has previously been argued this absence may suggest that the complex was never completed (Williams 1993, 32) and the results of the recent Salvation Army Headquarters investigations would seem to enhance this theory. Moreover, two postholes cut into the masonry and some 4th-century AD rubbish pits were recorded immediately to the west of the 'Period II' masonry, suggesting that the later Roman occupation of the site was domestic in nature, further indicate that the public function of the building ceased during the 4th century. Again, this possible cessation in the public function of the complex by the 4th century has previously been postulated by Williams (1993), with the Peter's Hill site recording a 4th-century timber framed domestic structure with associated earth floors and hearths.

That the 'Period II' development was both large-scale and clearly designed for rapid construction fits in with the historical context of the time. Although the exact dates

are uncertain and depend on whether coin evidence or the documentary sources are to be believed, the probability is that Carausius rebelled in AD 286 declaring himself Emperor in Britain and part of Gaul (Frere 1974, 376–380; Casey 1994, 39–45; Salway 1998, 288–289; de la Bédoyère 1999, 32). He was succeeded by Allectus as Emperor in Britain in AD 293 after the murder of Carausius, possibly following the loss of Boulogne to Constantius (Frere 1974, 380–382; Casey 1994, 39–45; Salway 1998, 305; de la Bédoyère 1999, 39). In creating an independent Britannia, he would have viewed establishing authority and credence of paramount importance. The construction of the 'Period II' complex would have represented a powerful tool in this process. There is some evidence to suggest that at least some of the timber piles used to construct the foundations of 'Period II' had been stockpiled, possibly since AD 293 (see Goodburn, Chapter 3), which would suggest that the timbers were being gathered for construction under the rule of Carausius, and that potentially it was he who instigated the 'Period II' development. Within such a context, it is possible that Allectus forged on with the development with a view to both establishing his own authority, but also to generating a feeling of continuity and stability, however his death in AD 296 may have put an end to the work, resulting in the complex never being completed.

The masonry forming Building 4 as found at the Salvation Army Headquarters site represents the largest portion of continuous building of the 'Period II' complex found to date. Together with the elements from Sunlight Wharf to the south they form a podium *c.* 20.5m long by *c*. 8m wide (Fig. 53). Fragments of the western and central parts of this podium were previously revealed in 1841 during sewer construction (RCHME 1928, 92–93) and it is probable that the southern wall found in Brook's Yard in 1924 (RCHME 1928, 93) was part of the northeast element of it. The only other parts of the building revealed were part of a north–south wall proceeding northwards from the northwest corner of the main mass of masonry. Parts of this wall, including its outer face, were revealed by both Roach Smith in 1841 (RCHME 1928, 92–93) and Marsden in the 1960s indicating it was *c.* 2m in width originally. Marsden's notes and plans would seem to suggest that the wall narrows to just 1ft 6in (0.46m) wide (Williams 1993, 67) and suggests that a real face was seen. This may just have been a localised thinning of the wall perhaps to accommodate an opening. No evidence of an eastern or northern wall to the building has been found to date and it is probable that any such walls have been removed by later modern terracing of the hillside. One large fragment of masonry seemed to occupy part of the central 'courtyard area' of the building. Observed by Marsden as Feature {19} (Williams 1993, 67 & fig. 54) it was recorded as having faces to the east and west, and probably to the south, comprising a piece of masonry 12ft (3.66m) wide. It may represent the foundation of a free-standing structure within the courtyard or perhaps the plinth of a large statue. It is possible a similar feature once stood to the east. The enigmatic masonry observed by Marsden immediately to the east is difficult to interpret but may be part of the structure/plinth. If the retaining wall, Feature {3}, observed by Marsden (Williams 1993, 66 & fig. 54) were to be extended on a similar alignment to the east it would suggest a space of *c.* 32m between the southern part of the building and the next terrace up the hillside. The northern extent of the building as revealed is at least 17m in length and could therefore be expected to be in the order of *c.* 20–30m in length. From the remains of the southern part of the masonry it is therefore possible to postulate a classical temple building with a podium to the south and a sanctuary or strong room within, probably with steps leading from the north upwards to the podium. Two side walls would have enclosed a courtyard which included small structures or statues on raised plinths. The courtyard would have been crossed by three channels, possibly culverted, two adjacent to the side walls and one across the centre, conveying a gushing stream of water from the north down to the river. The water would have exited through the riverside wall via culverts, presumably forming an impressive water feature when the flow was at its greatest.

Comparison of the Peter's Hill and Salvation Army Headquarters buildings and function of the structures

When comparing the two 'Period II' structures at Peter's Hill and the Salvation Army Headquarters site one is struck by the similarities (Fig. 54). Although the eastern end of the Peter's Hill building was not found it would appear to be of similar, though not identical dimensions, to the structure found at the Salvation Army Headquarters site. Both have a large mass of masonry at the south, possibly representing a podium. The added width of the Peter's Hill podium foundation may be to accommodate a series of steps leading to the podium, no evidence of which was found in the eastern building. Both structures would appear to be classical temples in form. This may not be surprising as they may be direct replacements for the postulated 'Period I' temples dedicated to Jupiter and Isis.

However, the fact that they appear to be classical temples in form makes them almost unique buildings in late 3rd-century AD Roman Britain. The majority of temple structures in Britain throughout the Roman period conform to a type known as Romano-Celtic, which usually consisted of two square or rectangular plans, the inner being the sanctuary (*cella*) and the outer interpreted as an ambulatory (Lewis 1966, 1–56; Wilson 1980, 5–30; de la Bédoyère 2001, 177–192). There are very few classical temples known in Britain; those that are, such as Colchester and Bath, are generally dated to the early Roman period (Lewis 1966, 57–72; de la Bédoyère 2001, 170–177; Crummy 1980, 243–248; Cunliffe 2000, 39–71). In London a 1st-century AD classical temple was situated adjacent to the forum (Marsden 1980, 50–52) and it is of course probable that the temples to Isis and Jupiter that were most likely part of the 'Period I' complex were classical in design. However, as yet, other classical temples have not been found, and other forms such as the famous temple of Mithras by the Walbrook (Grimes 1968, 98–117; Shepherd 1998a) and two recently identified Romano-Celtic temples,

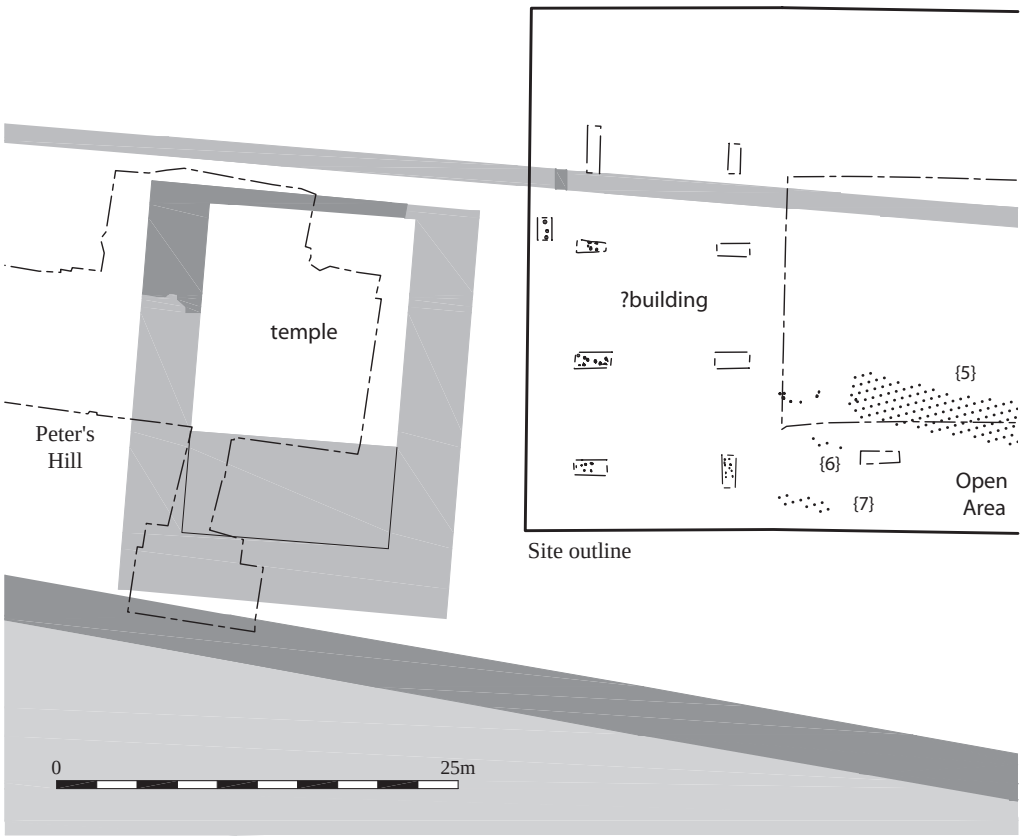


Fig. 54 Suggested 'Period II' layout from Peter's Hill to Old Fish Street Hill in relation to pile locations found during PCA's and Marsden's excavations at the Salvation Army International Headquarters (scale 1:500)

in the City at 54–56 Gresham Street (Watson 2007, 10) and in Southwark at Tabard Square (Brown & Killock 2004), testify to the variety of temple structures in London.

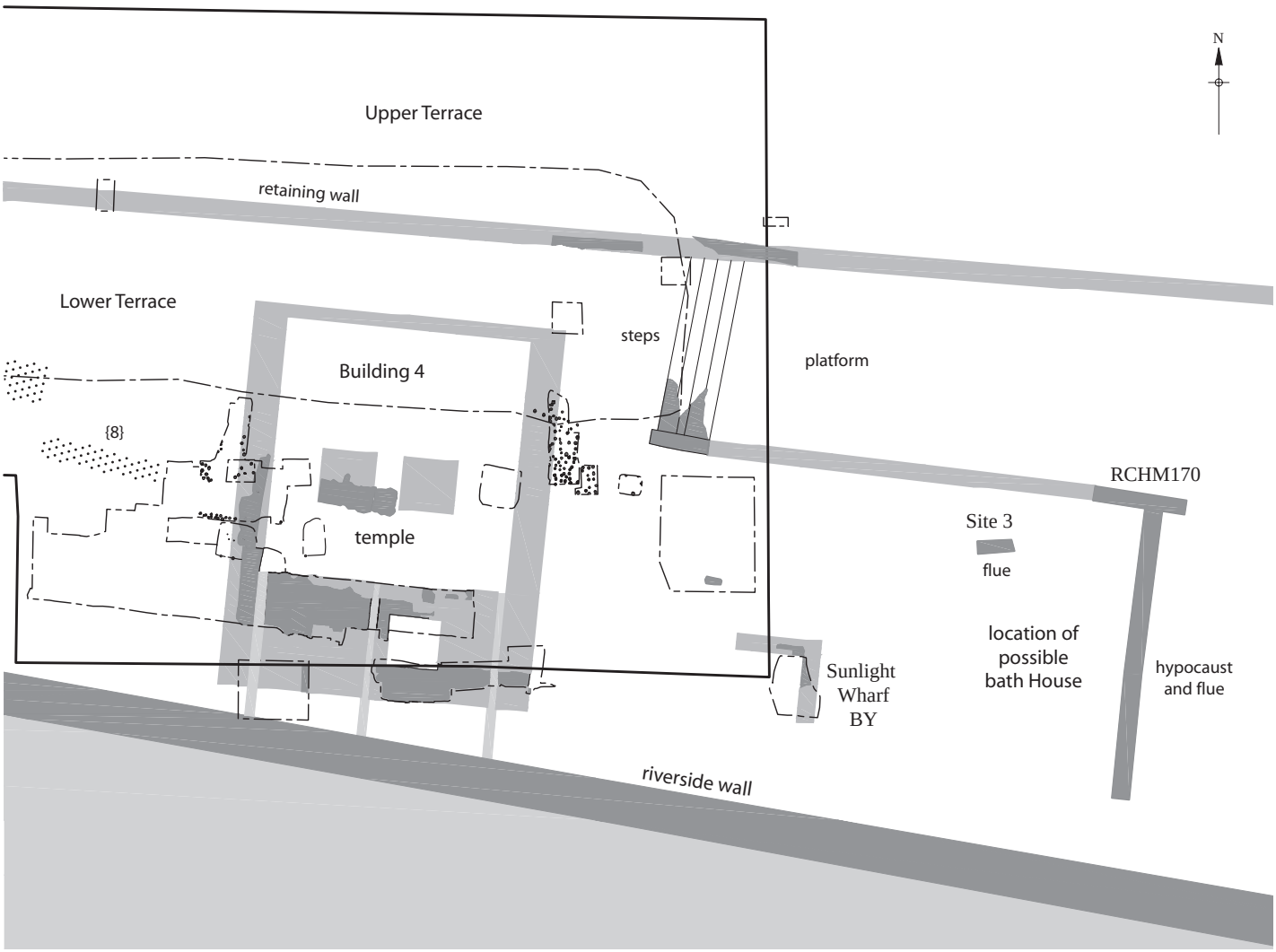
Several of the classical temples discovered in Britain appear linked to, or constructed in the vicinity of, other public buildings. In Bath the temple is part of the baths and sacred spring complex (Cunliffe 2000, 39–71) and in both *Verulamium* and London they are associated with the forum (Rodwell 1980, 559; Marsden 1980, 50–52). The fact that the two 'Period II' temples are most likely part of a much larger complex therefore continues a tradition of linking public buildings into an area of the Roman town.

The construction of large classical temples at the end of the 3rd century AD might have been the continuation of a policy initiated in the mid 3rd century when such emperors as Trajan Decius (AD 249–251) and Valerian (AD 253–260) attempted to revive religious orthodoxy by promoting the worship of deified emperors and the pagan gods whilst at the same time persecuting Christianity (Casey 1994, 20). The restoration of the temples to Isis and Jupiter may have been part of this policy and the construction of the two large classical temples in the 'Period II' complex was most probably a continuation of the same process. Evidence of this revival may be seen in the restoration and alterations to other temples in late 3rd-century Britain such as Colchester and *Verulamium* (Lewis 1966, 124; Drury 1984, 8; Williams 1993, 29).

Layout of the complex as a whole

With the exception of the two temple buildings the rest of the 'Period II' complex can only really be a matter of conjecture (see Fig. 54). Although there is only definite proof that the terracing and chalk raft with timber piles extended to the north of the Salvation Army Headquarters site adjacent to the south side of Queen Victoria Street (Feature {1}, Williams 1993, 17 fig. 11d), it is possible that the complex extended from the riverside wall at the south to possible precinct walls at Knightrider Street to the north (Williams 1993, 78–82), although it is not possible to date the latter walls or determine if they are part of either complex definitively. No evidence of structures has been found to the west of the Peter's Hill temple, but evidence of metalling suggests the precinct continues a little way to the west. To the east fragments of masonry have been found as far as Old Fish Street Hill (see below). This has led Williams to suggest a complex *c.*100m north–south by *c.*145m east–west enclosing an area of some 1.5 hectares (Williams 1993, 26–27).

The evidence for structures between the two temples is extremely sketchy but the space between the two is in the region of 52m and one would expect the area to be utilised. The area was heavily truncated prior to the 1960s and even more so by the construction of the 1960s' Salvation Army Headquarters building. Observations by



Marsden and on the current site would suggest that the chalk raft and timber piles continued in this area. Areas of piles were seen in trenches opened up during both investigations and there are suggestions that the pile layout may represent hints of where foundations may have stood above. Marsden's Feature {8} is in the rough location of a large concrete foundation for the 1960s' development and this would explain why he was able to record it in the first place. However, it by no means occupies the whole width of the foundation and his description of the feature: 'four parallel rows of timber piles forming a zone 5ft (1.52m) wide were traced for a distance of 27ft 6in (8.38m) and presumably formed the foundation for a wall' (Williams 1993, 66) would suggest more than random piling beneath the chalk raft. The alignments of this and Feature {5} to the west differ from those of the projected temple structures to either side. Interpretation of these foundations is difficult, however they do run parallel to the riverside wall. PCA's excavations demonstrated evidence for gaps in the piling, for example in P29/30, in the area of P8, around the western apse and across the central part of the site, in P2 and the watching brief area of the eastern apse (see Fig. 28, Chapter 2, Fig. 54). Whilst the lack of piles in the central part of the site, which was subject to a watching brief, may have largely been caused by later truncation this cannot be true for the other areas. Lack of piles in other areas might suggest that there were no structures above. Certainly in the immediate area of the western apse the ground had been proved to be unstable and to have required strong foundations. The areas of concentrations of piles in OP201 and in OP202 and P6 are in the immediate location of the west and east walls of the temple respectively, although extending beyond the projected superstructure of its walls. The evidence of Marsden's Feature {8} and the piles to the west of it would suggest that structures were present in this area, although the nature of any such structures remains unknown.

The concentration of piles along the extreme west of the site is in the immediate vicinity of the eastern wall of the Peter's Hill temple. Although very little of this area was available for excavation the presence of piles and/or chalk raft was noted in some locations (OP103, P23/24, P27/28, P31/32, P33/34) and absence in others (P29/30 and P25/26) provides tentative evidence of another building (see Fig. 28, 54).

To the east of the Salvation Army Headquarters site the remains are also rather patchy. The rather strange fragment of masonry to the northeast, Marsden's Features {43–45}, consist of an east–west wall constructed from two rows of limestone blocks laid on a foundation of chalk, flint

and ragstone with three 'steps' of masonry apparently aligned north–south extending to the north (Williams 1993, 68). The plan of the masonry reproduced by Williams (1993, fig. 54) is rather confusing and was probably not helped originally by the presence of a later ragstone drain. Williams suggests that the 'steps' are offset courses and that they form a north–south foundation. However, Marsden suggests a more compelling interpretation: that they form an east–west terrace wall and a north–south stepped terraced wall (Marsden 1967a, 152–154, fig. 3). If correct this would suggest a raised platform to the northeast on which presumably more structures stood, and which may have provided access to the upper terrace to the north.

There is a suggestion of further buildings to the south of the raised platform, most probably on the same level as the temples. Fragments of masonry found at the northern part of the Sunlight Wharf site form a north–south aligned wall with an east–west return at the north and suggest the presence of another building forming part of the 'Period II' complex (Williams 1993, 60–61, fig. 48). Further to the east there is tentative evidence of heated rooms, which may be part of a bathhouse. A north–south wall with an east–west wall forming a 'T' to the north in which was 'an arch 3ft (0.92m) wide and 3½ft (1.09m) high. Associated with the walls were several tiers of tiles each 2ft (0.61m) by 1½ft (0.46m) placed upon massive hewn stones' (RCHME 1928, 119), a description that suggests a hypocaust with a flue. To the west (see Fig. 54, Site 3) was tentative evidence of a continuation of the heated rooms, with the observation of a Roman structure consisting of 'a brick floor with brick walls on either side, and the floor was laid on rammed chalk' (Marsden 1967b, 194); described as a drain, this could well be another flue. This suggests a series of heated rooms in this location, which are most probably part of a bathhouse. The site would have been favourable for such a structure using the water from the natural spring line much as the Huggin Hill baths would have done previously.

Obviously there are large parts of the complex about which nothing is known; all the evidence to date has been found on the lower terrace. Virtually nothing survives from the terrace above and if the precinct did continue to the north up to the walls on Knightrider Street there may have been further terraces about which nothing at all is known. However, the available evidence would suggest the intention was to construct a mixed complex of temples and a large building with heated rooms, possibly a bathhouse; Williams' interpretation of a palatial complex with mixed functions including administrative and religious together with public amenities is attractive (Williams 1993, 32).

With the construction of the riverside wall in *c*. AD 270 it is probable that the orientation and focus of the 'Period II' complex changed from that of 'Period I'. Previously the focus may have been on the river with the apses opening up to it and walkways along the waterfront, however that view would have been restricted after the construction of the 5–6m high riverside wall. The temples and many of the structures may have presented their face up the hill to the north instead.

Who built the 'Period II' complex?

As discussed above (Goodburn and Tyers, Chapter 3) the construction of the complex apparently began in AD 294, with the piling operation working from the east to the west. At Sunlight Wharf a consistent date of winter AD 293/294 was produced from the piling timbers. A slightly wider range was found at the Salvation Army Headquarters site with one timber dated to spring AD 293, two to winter AD 293/294 and the rest to spring AD 294. There is some limited evidence of stockpiling of timber with the pile dated to spring AD 293 showing evidence of beetle damage between bark and sapwood and others showing some drying of the timber before use. Although it has been suggested that the wood may have been stored for years before use (de la Bédoyère 1999, 40) the evidence from site does not support such a suggestion; at most a few of the timbers may have been stockpiled for a very short period of time, probably less than a year, before use.

The dating of one of the timbers to spring AD 293 is perhaps evidence that the project was initiated at least on the drawing board in the reign of Carausius and then brought to fruition in the reign of his successor Allectus, who probably took over in autumn AD 293 after the murder of the former (Frere 1974, 380–381; Casey 1994, 39–45; Salway 1998, 305). Both would have the same reasons for building such a complex, both were rebels against Rome trying to set up an independent Britain and needed to promote their authority and prestige by making a bold statement in their capital city. As it is probable that Allectus was a finance minister under Carausius (Frere 1974, 380; Casey 1994, 127–129) it would be natural for him to continue previous policies.

How far did construction proceed before abandonment?

The evidence of dating of the timber piles would suggest that the complex was built from east to west. It is likely that once areas of the site had been piled and the chalk raft laid, construction of the structures would have proceeded immediately, whilst piling continued further to the west. As Allectus was killed following an invasion of Britain by Constantius in AD 296 (Frere 1974, 381; Casey 1994, 39–45) it is probable that the construction programme only had two years to run. It is debatable how much could have been achieved in this time. As the complex would appear to be so inextricably linked to the rebel regime of Allectus (and possibly Carausius) it is unlikely that Constantius would have wished to waste resources continuing the project. As it is probable that the province of Britannia, previously divided into two parts, Superior and Inferior, was at this time further subdivided into four as attested by AD 312–314 in the Verona List (Frere 1974, 382), the importance of London would have been diminished and the need for a large palatial complex made redundant. It would also appear that large Roman public buildings in London were not required at this time; the end of the 3rd century and beginning of the 4th century AD represents a

period when many such structures were going out of use. The basilica was systematically demolished to ground level around AD 300 (Milne 1992, 29), the octagonal temple to the west of the city outside Newgate had been replaced after AD 270 by a probable inn or mansio (Milne 1995, 82), the large Roman complex in Southwark on the site of Winchester Palace only continued into the 4th century in a much reduced state, its bathhouse having been demolished towards the end of the 3rd century (Yule 2005, xiii) and the 'Governor's Palace' beneath Cannon Street Station was reduced to rubble some time after AD 270 (Marsden 1975, 78). It is therefore probable that even without Constantius's likely antipathy for the project, the construction could not survive the loss of its instigator.

Obviously large parts of the foundations and substructure of at least three buildings were completed by this time, the two temples and the probable hypocausted structure, and it is possible that buildings at the east of the complex were far more advanced than those elsewhere. The evidence for the temple at the Salvation Army Headquarters site is problematical; there is a hint of superstructure with the wall lines visible on the massive podium and dumps of mortar with small stone fragments in the culverts and against the north face of the podium suggest that some walls were robbed, which would suggest that the masonry did originally stand at a higher level. There is tentative evidence that the masonry was reused in the 4th century with postholes and rubbish pits immediately adjacent to the west. However, there was no surviving evidence of use of the temple as a finished structure, which may of course be because any such remains have been lost by later truncation. On the whole however it seems more probable that the majority of the buildings within the complex were never finished, some perhaps not even begun. The area may have remained as semi-deserted half finished ruins until the end of the Roman period, with some buildings within, constructed largely from timber with beaten earth floors (Williams 1993, 32).

Chapter 5: The Medieval and Post-Medieval Archaeological Sequence

As outlined above (see Chapter 1, Archaeological and historical background) *Londinium* was generally abandoned in the immediate post-Roman period and a new focus of settlement, *Lundenwic*, established approximately a mile upstream. Documentary evidence suggests that a religious enclave was established in the vicinity of St. Paul's in the early 7th century. However, only slight evidence of Middle Saxon activity has been found in the vicinity of the site at Baynard's Castle (Hill *et al* 1980, 14) and Peter's Hill (Williams 1982, 28). No remains that could be dated with certainty to the period from the 4th to the 11th centuries were found at the Salvation Army Headquarters site, although this may be partly a factor of survival and subsequent truncation of features, which are likely to have been ephemeral in nature, at best.

ROADS AND ROADSIDE DITCHES, LAND USE AND BUILDINGS

Phase 10: 1050–1150 development

The earliest direct evidence of post-Roman occupation on the site was dated to the mid to late 11th century by the early medieval sandy ware and sand and shell tempered ware recovered (see Sudds, Chapter 6). An east–west linear feature [776] was recorded at the western end of the excavation area, which measured 0.86m by 2.28m with a maximum depth of 0.42m (Fig. 55). Whilst this feature had been heavily truncated, its form was most analogous with that of a ditch. A similarly truncated linear feature [877] was also identified further to the east. This was orientated north–south, measured 3.22m by 1.03m, and had a maximum excavated depth of 0.51m, although the feature was not fully excavated because it extended beneath the formation level of the modern development. Again, this feature was interpreted as the remains of a ditch. These ditches were probably associated, having similar dimensions and dating to the same period, although there was a large discrepancy in their basal levels, with the north–south ditch being at least 0.70m deeper than the east–west one. This would suggest that the latter conducted water into the former, which presumably continued to the south.

The most likely interpretation of their function is as early medieval roadside ditches, forming the earliest direct evidence of the routes of Lambeth Hill running north–south and Thames Street running east–west. This corroborates the evidence recorded at Peter's Hill to the east, where the earliest remains of Thames Street and Peter's Hill (running parallel to Lambeth Hill) also dated to the 11th or 12th century (Williams 1982, 28–29). Moreover, the development of Thames Street, Lambeth Hill and Peter's Hill fits in with a larger model for the development of post-Roman London, which has previously postulated that whilst the core street plan of the city was laid out by Alfred in the late 9th century to the east in the Queenhithe area (Dyson 1978; Wroe-Brown 1999), the area of the site lay outside this nucleus of development, and as such was not formally laid out or intensively occupied until the 11th or 12th centuries (Milne 1990, 206). The great depth of the north–south ditch compared to the later road surfaces would suggest that it conveyed water either across the line of the road later known as Thames Street or beneath it, by means of a timber or stone culvert. Presumably the flow of natural streams from the spring line to the north continued to be a problem into the medieval period and contingency would have had to be made for the passage of water during periods of heavy rainfall.

No evidence of surfaces associated with either an east–

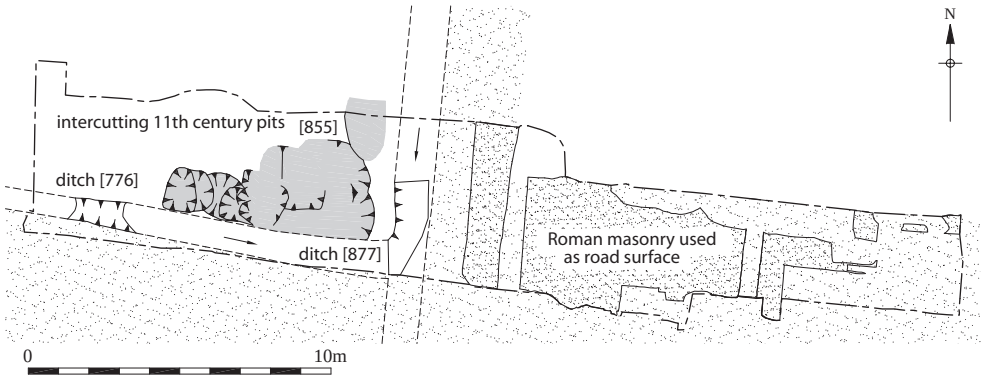


Fig. 55 Phase 10: 1050–1150 roadside ditches and pitting with extrapolated line of Thames Street and Lambeth Hill (scale 1:250)

west (later Thames Street) or north–south (later Lambeth Hill) road were revealed on site that could be dated to the 11th century. However, the earlier Roman masonry of the 'Period II' podium exhibited signs of a worn and smooth appearance suggesting the possibility that it may have been used as the first road surface.

Further evidence of 11th-century activity predominantly took the form of pits. A sequence of eleven inter-cutting pits was recorded towards the west of the excavation area. These were generally sub-circular in plan, less than a metre in diameter, and between 0.20m and 0.70m deep. They contained a range of typically domestic waste, including pottery (of which jars represented the only feature forms present), bone and CBM, suggesting that they were utilised for the disposal of domestic refuse. A slightly larger truncated pit was situated slightly to the east, containing frequent cultural material suggesting that this was another rubbish pit. One much larger pit [855], measuring up to 3.20m by 3.30m, recorded to the east of this area of activity was located over the earlier Roman walls associated with the western apse of the 'Period I' complex suggesting that its primary function was as a robber cut.

The presence of the pits would suggest settled activity in the area of the site in the 11th century, whilst the stratigraphic complexity of the sequence indicates that this activity was relatively concentrated. There was no evidence of activity to the east of later Lambeth Hill in the area of the 'Period II' podium, which was later used as the foundation of the main east–west aligned road, subsequently known as Thames Street. Indeed the presence of the Roman masonry may have resulted in the road being slightly wider at this point than it was slightly further west. The pitting appeared to be demarcated to the south by the extrapolated northern roadside ditch of Thames Street, suggesting settlement was expanding rapidly beyond the previous Alfredian core in the post-Conquest years, as this quarter of the city was opened up for occupation and development with newly laid out routes.

Phase 11: Mid 12th–13th century

The earliest surviving elements of road were dated by a small assemblage of South Hertfordshire greyware and London-type ware to the mid 12th to 13th century (see Sudds, Chapter 6), recovered from dumped deposits laid in preparation for road construction. Towards the east of the excavation area a very dark brown clayey silty gravel with a maximum thickness of 0.40m was dumped within the earlier 'Period II' culvert [913], which traversed the podium masonry, presumably in order to level the area. This was sealed by further deposits of rubble and oyster shell, before a final road make-up deposit of clayey sandy silt was laid down. A similar sequence of dumped deposits including oyster shells overlain by a make-up layer of yellowish brown mortar and sand was recorded further to the west. The partially backfilled room within the Roman podium was levelled and consolidated by the dumping of a deposit of chalk.

These consolidation layers were capped by a metalled surface, recorded across the eastern area of the excavation (Fig. 56). As with all later road and associated make-up surfaces, it was truncated at its western end by the north–south branch of a 19th-century sewer that bisected the Area of Excavation, to the north by the previous Salvation Army Headquarters building basement and to the south by the main element of the 19th-century east–west sewer (see Fig. 3, Chapter 1). The metalled surface consisted of rammed sub-rounded pebbles and occasional cobbles with a highest level of 4.70m OD towards the east and 4.35m OD towards the west. It measured a maximum of 2.40m north–south by 16m east–west by 0.10m thick. A very small section of metalling [611] survived to the west of the projected line of Lambeth Hill between the 19th-century sewer and later building activity. This area of road surface represented the only evidence of a continuation of the road in the western area of the site. These truncated elements of metalled road represent the earliest recorded surface of medieval Thames Street. A rectangular cut through the make-up deposits but apparently sealed by the gravel road surface may be evidence of a later repair to the road. A narrow east–west aligned linear slot through the road surface may represent a wheel rut, however, they seemed to stop rather abruptly and may be the remains of organic material, decayed *in situ*. This might suggest a length of wood may have been inserted to repair the rut.

The method of road construction outlined above was utilised repeatedly as the roads were re-surfaced throughout the medieval and post-medieval periods. Much of the

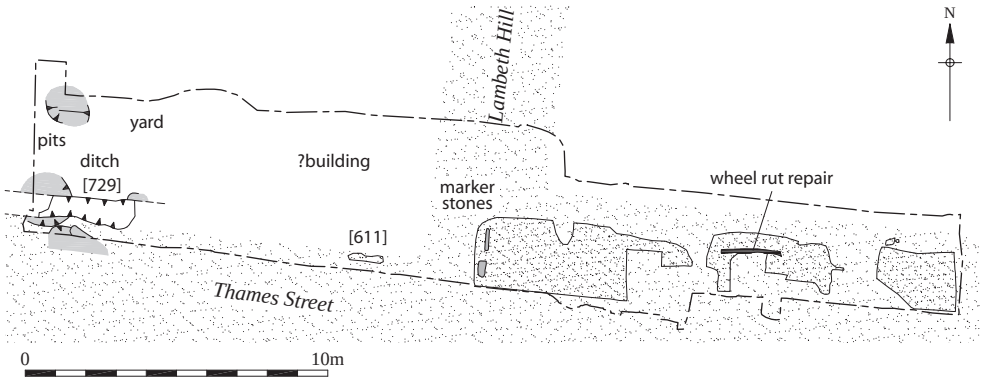


Fig. 56 Phase 11: 13th-century roads and pitting (scale 1:250)

Fig. 57 13th-century road at junction of Thames Street with Lambeth Hill with 'kerb stones' visible towards top, looking west (scales 1m, 2m)

material used comprised sand and oyster shell layers, which appear to have originated from the foreshore. That the foreshore provided much of the make-up material for the roads is further augmented by the animal bone recovered from these layers, which was predominantly abraded, and consistent with being worn by fluvial action (see Bendrey, Chapter 6). Central to the selection of the material used in the bedding construction of the roads, however, appears to have been the need for free-draining and compacted deposits.

Two large 'marker stones' were set end-to-end in a north–south orientation into the road surface at its western end (Fig. 57). They had the appearance of kerbstones, which might suggest that they were delineating the edge of a north–south road. Given the absence of further kerbstones to the east, they might have marked the eastern side of Lambeth Hill at its junction with Thames Street. However, if the western side of the road were delineated by the earlier north–south ditch it would give the road a width of a mere 1.60m. Rather it would appear that these large stones are in the centre of the road, perhaps fulfilling some form of traffic control, although it is not possible to establish this with any certainty due to later truncation by the large, north–south aligned Phase 19 sewer.

Recognisable occupation activity associated with the road was confined to the western part of the Area of Excavation, where a series of small rubbish pits was revealed, together with a posthole, which encroached onto the line of earlier roadside ditch, although there was evidence of an attempt to reinstate the roadside ditch (as [729]) after the pitting activity in the vicinity of the ditch had ceased. The absence of pitting of this date further to the east on the corner of Lambeth Hill and Thames Street has been taken as an indication that a building or buildings may have occupied this area by this period.

The concentrated nature of the activity in this period in the western part of the area may in part reflect later truncation, but it would also suggest that this small patch of land was an open area, perhaps a yard where rubbish was disposed of outside the buildings fronting onto Thames Street. Attempts to encroach onto the road and utilise the area of the roadside ditch for pitting indicate that space was at a premium.

Phase 12: Mid 13th–14th century, Building 5

Only limited evidence of road surfaces dating to the mid 13th to 14th centuries was observed (Fig. 58). A thin section of metalling was recorded to the east of the excavation area with a further fragment in the central area at the junction of Lambeth Hill and Thames Street. The patchy survival of the gravel surfaces was perhaps to be expected, as roads tend to be subject to wear and need constant repairs and resurfacings. Thames Street was one of the main thoroughfares along the river in the medieval and early post-medieval period and the constant traffic,

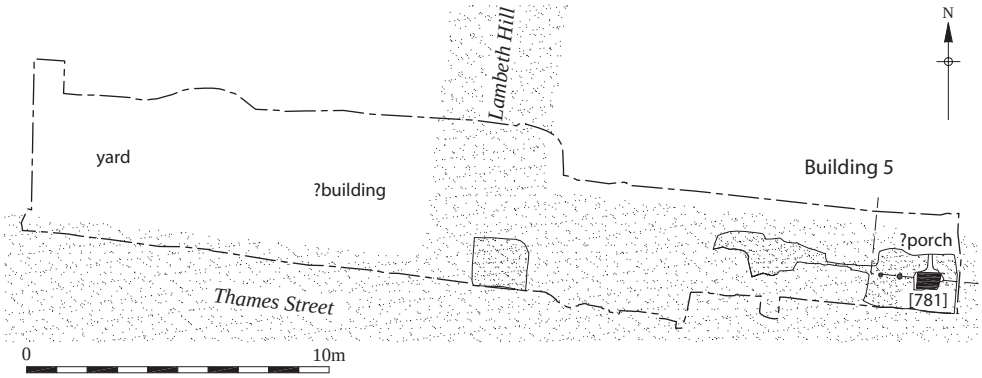


Fig. 58 Phase 12: 14th-century road and porch, Building 5 (scale 1:250)

together with the water streaming off the hill, must have had a damaging effect on the road surface.

During this period further evidence of encroachment onto the north side of Thames Street was revealed towards the eastern end of the Area of Excavation. A small rectangular cut [781] with a flat base may represent the robbed out remains of the foundation for a large timber post which may have been part of a timber framed building, possibly a porch. Two postholes immediately to the west may have been associated with the structure. The presence of this porch indicates an associated building, Building 5, further north and beyond limits of excavation. No contemporary activity was found to the west and it is assumed that the Phase 11 yard area and possible associated building remained unchanged.

Phase 13: 14th–15th century

Although only a small (6m) length of the 14th- to 15th-century road surface [677] survived it was particularly notable as in this instance the east–west portion of road was recorded returning to the north, suggesting that this point represented the exact position of the northeastern corner of the Thames Street/Lambeth Hill junction, although a sandy gravel preparatory layer [684] for this surface continued further to the north (Fig. 59). The extent of the metalling suggests that Thames Street had been further encroached upon from the north, as indicated by the construction of the Phase 12 porch and the road had contracted to the south, further narrowing the roadway. Although no new contemporary building remains were found in this location, the northern extent of the road would have allowed for the porch and associated building to remain in use, dictating the extent of road resurfacing.

Phase 14: Late 15th century

Gravel road surfaces dating to the late 15th century were again observed in the eastern half of the excavation area (Fig. 60). The surfaces extended further to the north than during the previous phase, suggesting that there had been a conscious attempt, perhaps by the City authorities, to widen the road.

During this period an isolated posthole near the northeast junction of Thames Street and Lambeth Hill may have been evidence of further structures encroaching onto Thames Street, suggesting that buildings remained to the north beyond the limits of excavation.

To the extreme west of the area a circular cut with remnants of wood lining represents the probable remains of a barrel well [830]. Immediately to the south a circular pattern of seven stakeholes and a larger posthole may be associated with this well. These features would suggest that this area was still a yard during this period. A chalk-lined well [30], observed during the evaluation, appears to have been backfilled rapidly during the late 15th or 16th century (see Sudds, Chapter 6) and it therefore seems probable that it was in use by the late 15th century, if not earlier. The chalk-lined well rested on a timber frame which was made of three sections of fast grown, sawn oak planking *c*. 450mm wide by 85mm thick. About a third of it survived with one of the timbers having a complete edge-halved scarf joining it to the next piece with two 15mm diameter oak pegs.

Phase 15: Late 15th–16th century, Building 6

To the west of the junction of Thames Street and Lambeth Hill a number of features of 16th-century date were observed associated with a building (Building 6) fronting the road (see Fig. 60). A rectangular cut [761], filled with a compact deposit consisting mainly of chalk with occasional tile and brick fragments, appeared to form a foundation platform for a small structure, or perhaps a compacted floor or heavily-used passageway within a larger timber-framed building. A posthole to the south may be a further part of such a structure. To the east a clay-lined cesspit [758] was encountered, although this may have been just outside the footprint of the building, its location suggests it was more likely to have been internal. To the north the well [30] was backfilled, the infilling deposits contained food waste including cattle, sheep, pig, rabbit, chicken and duck bones together with an interesting small assemblage of fish bones, including cod, plaice and a large pike, which is likely to have derived from a high status household (see Armitage, Chapter 6).

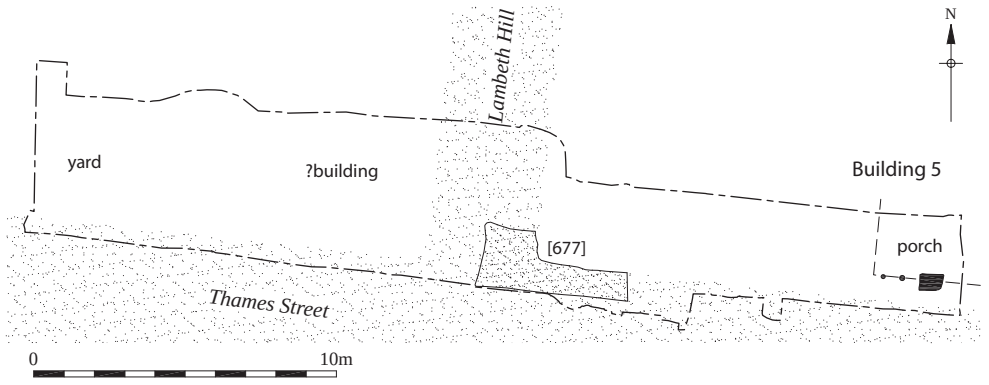


Fig. 59 Phase 13: the corner of Lambeth Hill and the contracted Thames Street as indicated by the 15th-century surface [677] (scale 1:250)

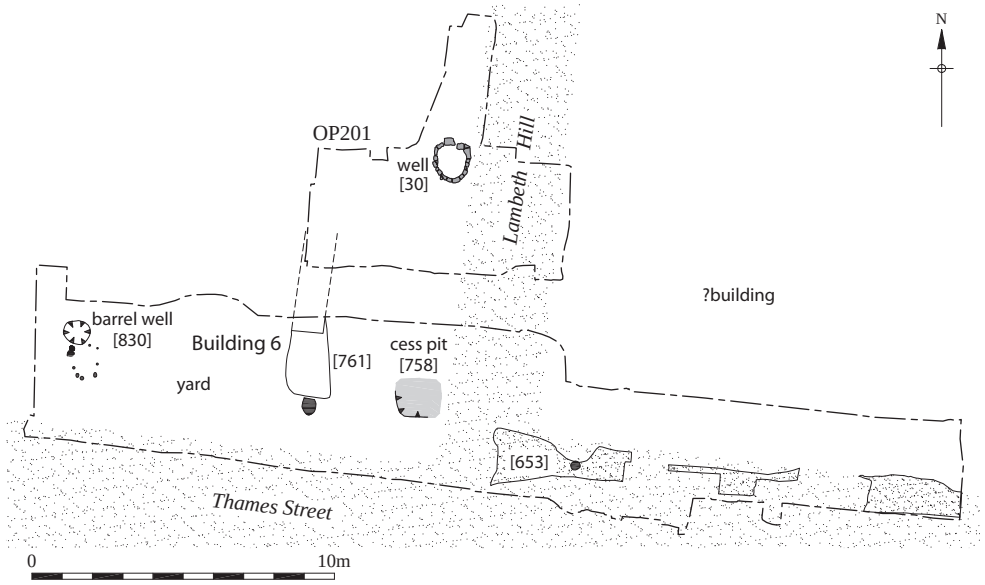


Fig. 60 Phases 14–15: late 15th-century road surfaces and wells in relation to 16th-century Building 6 (scale 1:250)

PRE-FIRE ROADS AND BRICK BUILDINGS

Phase 16A: 16th–17th century, Buildings 7 and 8

The latest elements of road surface only survived in the eastern part of the excavation area on that part of Thames Street east of Lambeth Hill. The substantial remains of a masonry building, Building 7, apparently associated with this road, occupying the western corner of Thames Street and Lambeth Hill and probably constructed in the 16th century, were identified at the western end of the Area of Excavation (Fig. 61, 62). An east–west orientated wall [567], laid on a possibly reused chalk, ragstone and brick foundation, was recorded adjacent to the southern limit of excavation. The wall was formed of unfrogged English bonded bricks dated to the period 1450–1700 (see Brown, Chapter 6) and survived to a maximum height of 1.50m. Although truncated at its eastern end, its eastern wall removed by a north–south branch of a large Victorian sewer (see Fig. 3, Chapter 1), this wall represented nearly the entire southern extent of a building of approximately 10m in width. A doorway at the western end of the wall would have afforded access to Thames Street.

The western limit of Building 7 was defined by a north–south wall [631], which had been heavily truncated by a later pit and associated pipe. A central north–south wall [648], partially overlying the Phase 15 chalk foundation platform, contained two postholes and was probably constructed from lath and plaster on a timber frame resting on a brick-built dwarf wall. This divided the building into two rooms, each having an internal width of 4m, and both floored with predominantly east–west aligned stretcher-laid bricks at a height of 3.96m OD. A doorway in the partition wall was observed at its southern end. A rectangular gap in the brick floor was recorded abutting southern wall [567] in the eastern room of the building. This was lined with stretcher-laid bricks and filled with a sandy silt material with a high charcoal content, suggesting that the area had been subject to burning and formed the hearth of a fireplace. Evidence of a further possible brick fireplace at the northern end of the western room [170] was recorded mainly in section during the evaluation in OP107.

On the eastern side of Lambeth Hill survival of a pre-Fire brick building, Building 8, fronting Thames Street was much more fragmentary and consisted of a stretch of wall measuring *c.* 2.50m east–west by 0.70m wide, and representing the outer wall of a building fronting Thames

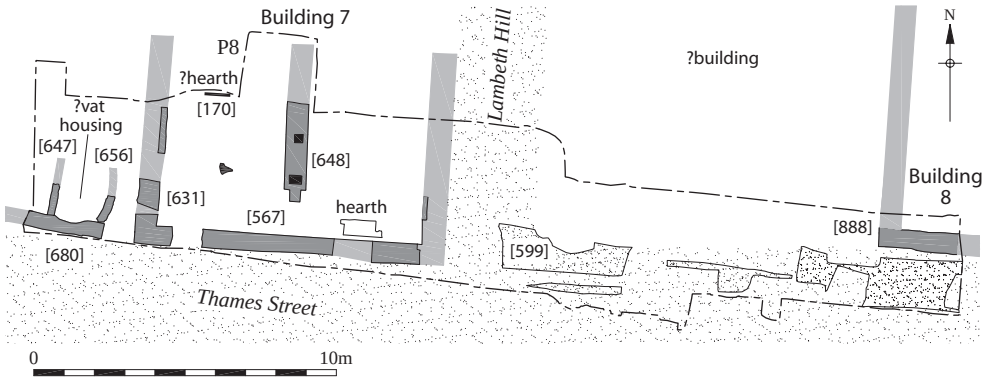


Fig. 61 Phase 16: pre-Fire buildings and road surfaces, showing 17th-century extension to Building 7 (scale 1:250)

Fig. 62 Building 7, during excavation, looking southwest

Street. During this period Thames Street was still wider to the east of Lambeth Hill than to the west, presumably due to the presence of the large Roman masonry podium beneath, which continued to influence the topography of the area well into the medieval period. It is probable that the foundations of buildings fronting Thames Street at this point would have rested on and reused the Roman masonry, although no evidence of this was observed on site because of truncation caused by late Victorian basementing. It is considered likely that a further building occupied the corner plot between Building 8 and Lambeth Hill, although again no evidence for such a structure was found.

Phase 16B: 17th-century additions to Building 7

A later addition was made to the west of Building 7 in the early–mid 17th century (see Fig. 61). An east–west wall [680], with a slight semi-circular recess in its northern face and a doorway fronting onto Thames Street, with a stone threshold at its eastern end, formed an extension to the western end of wall [567]. It was laid on footings of coarse grey mortar overlaid with roughly hewn stone blocks. The wall itself was formed of unfrogged bricks, stretcher bonded on the southern face, header bonded on the northern face, with half bricks in the middle. It was truncated at its western end by the modern site perimeter wall, and survived to a maximum height of 1.21m, measuring 3.75m long by 0.60m wide.

A contemporary brick floor [640] of north–south aligned stretcher bonded bricks was laid to the north of this wall, which measured 2m north–south by 1.5m east –west, and was recorded at a height of 4.6m OD, some 0.65m higher than the floor of the main building to the east. Although truncated by a later wall to the north, this floor was bounded to both the east and west by two north–south walls recorded as [656] and [647] respectively. These were crudely constructed of randomly coursed bricks and stones and measured approximately 1m long by 0.26m wide. They both abutted wall [680] to the south which, with the slight semi-circular recess recorded in [680], suggests that this extension may have been built to house a large vat or barrel (Fig. 63).

Fig. 63 Extension to Building 7, probable vat-housing, looking south (scales 1m, 0.5m)

Phase 16C: Further alterations to Building 7

Deposits of silt and clay were recorded overlying floor [640] at the western end of the building. The process by which these deposits were laid down was unclear, but it is possible that they represent relatively prolonged flooding of the building. This may have been caused by occasional high tides flooding the area, or perhaps a more localised problem with drainage, especially given the position of the building down-slope of the spring lines discussed above. Possibly as a result of this inundation, a 0.38m thick layer of sand with a high ash content was deliberately laid down over the probable flood residues. It was deposited not only to raise the level of the area, but also to provide a bedding layer for a further floor formed predominantly of bricks, but also fragments of stone. Much of this later surface had been significantly robbed away, however, whilst the remaining elements were badly damaged by later fire (see below).

Evidence of a new raised floor was also recorded in the original main eastern portion of Building 7. A line of six recesses, approximately 1m apart, were cut into the northern internal face of wall [567] at a height of approximately 5.00m OD (0.90m above the original brick floor surface). These niches are likely to have been cut in order to house timber joists, supporting a planked floor. Although there was no evidence to precisely date this alteration, it may have been contemporary with the floor raising activity to the west as it would have raised the two floors to a comparable height.

Phase 17: 1666 Fire horizon

A layer of silty sand and charcoal overlay the walls and floors of Building 7. This deposit had a maximum thickness of 0.15m. Within this horizon a deposit [584] of burnt, hulled barley grains recovered from the doorway of the western extension (see Vaughan-Williams & Austin, Chapter 6, samples <68>, <69>) perhaps reflects its use. This charcoal layer appeared to represent a significant burning event, and the lack of additions, alterations or repairs to the building after its deposition suggested that the fire had damaged the building beyond repair. Numerous metal finds were retrieved from the fire debris lying on the floor of the building. These included two rod pivoted

strap hinges (<61> & <62>) part of a strap fitting (<65>), and an incomplete "Cockshead" hinge (<63>), all likely to have originated from doors burnt down during the fire (see Gaimster, Chapter 6, Fig. 75.2–75.5). A large proportion of the pottery recovered from this phase of activity also appeared to have been exposed to considerable heat, with much of the material being burnt, discoloured and fused together. Given the alteration to the pottery, precise dating of this phase of activity was difficult. However, a late 16th- to 17th-century date was suggested by the presence of red Border ware, post-medieval red earthenware, Border wares, Frechen stoneware and fine Essex-type post-medieval red earthenware. The date range was further narrowed to the mid 17th century by the presence of a tin-glazed dish with 'Orton type D' decoration, closely dated to 1630 to 1680 (see Sudds, Chapter 6).

The contemporary 17th-century road surface showed further evidence of this fire. The pebbles and cobbles forming the surface of the road were fused together and partially vitrified as a result of being exposed to exceptional heat. The intensity and ferocity of the fire, both fusing the surface of the road and damaging the building beyond repair, suggested that this burnt horizon had been caused by the Great Fire of 1666. During the Peter's Hill excavations to the west, the 17th-century surface of Thames Street was sealed by fire debris (Williams 1982, 29–30). There was no evidence of it having been exposed to such intense heat, however, as the surface of the road showed no signs of scorching or vitrification. This would suggest that the two areas of road surface had been subject to different processes. It may be that elements of a burning building had collapsed onto the surface of the road at the Salvation Army Headquarters site, subjecting a localised area to particularly intense heat.

POST-FIRE CLEARANCE, ROAD LAYOUT AND DEVELOPMENT

Phase 18A: Clearance and road layout

Following the destruction caused by the Great Fire, the first activity recorded on the site was related to the laying out of new roads (Fig. 64). Due to significant horizontal truncation by 20th-century road construction, no road surface of post-Fire date survived; however, evidence for the presence of both Thames Street and Lambeth Hill was recorded and make-up deposits suggested that the road level was raised by at least 0.50m. Two stakeholes recorded towards the east of the excavation area beneath the line of a drain may represent stakes for marking out the line of the post-Fire roads by the City's surveyors (Porter 1996, 112–113). A series of drainage ditches in the eastern part of the area and the line of the southern wall of Building 9 to the west (see below) apparently delineated the new northern extent of Thames Street. A north–south orientated drain [622], formed of large river cobbles laid within a linear cut, was interpreted as forming part of the eastern side of a roadside drainage system associated with Lambeth Hill. Elements of a narrow east–west clay-lined drainage gully [726]/[645] are likely to represent a roadside drain running along the northern side of Thames Street. At the junction of Thames Street and Lambeth Hill this drain appeared to turn slightly to the southwest, perhaps running beneath Thames Street. Whilst pottery from the make-up deposits and drainage ditches was sparse and could only give a general 17th-century date to the activity, clay tobacco pipe recovered from one of the drains refine this date to 1660–1680 (see Sudds, Jarrett, Chapter 6).

Contemporary activity consisted of the cleaning up of the area by disposing of fire debris either in pits or by spreading it across the ground and several pits were revealed in the western part of the Area of Excavation (Fig. 64). One pit, [580], was notable for its assemblage of fire debris including unglazed Flemish floor tiles, a glazed tile and a tin-glazed tile together with items of roof furniture and peg tiles vitrified by the heat. Although pottery from these deposits was fairly sparse, suggesting a general 17th-century date, clay tobacco pipes from one of the refine the dating for the clearance of the area to the period 1680–1710 (see Sudds, Jarrett, Chapter 6).

Phase 18B: Late 17th century, Building 9

Following the destruction of much of the City by fire a new building (Building 9) was constructed largely within the footprint of Building 7, but slightly further to the north along the Thames Street frontage. The full extent of the building could not be determined due to truncation; an east–west wall [566] measuring 12.75m by *c*. 0.60m survived abutted by the partial remains of an internal north–south wall (Fig. 65, 66). Both this internal wall and the

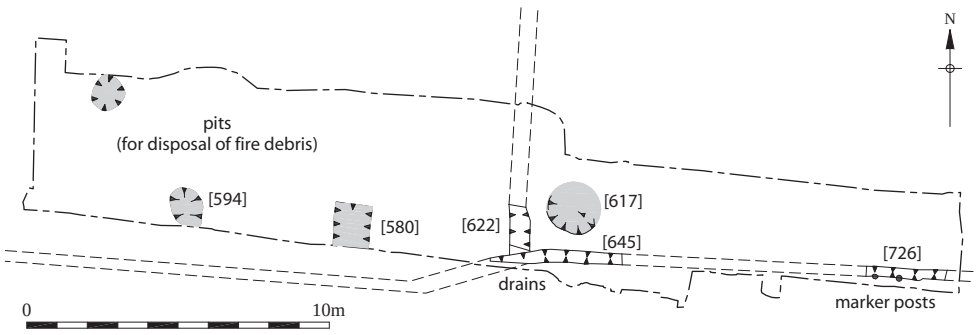


Fig. 64 Phase 18A: post-Fire pitting and roadside drains (scale 1:250)

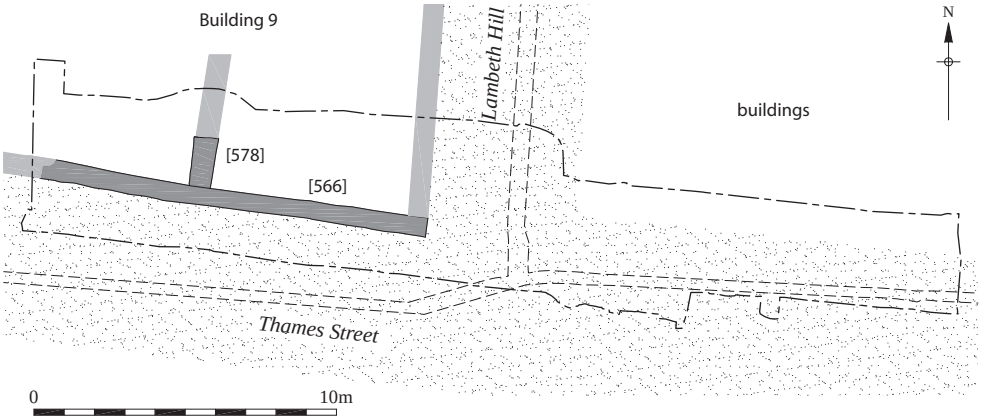


Fig. 65 Phase 18B: 18th-century Building 9 (scale 1:250)

western end of the main east–west wall were constructed on foundations consisting of reused pieces of masonry including moulded stones (see Fig. 72) exhibiting signs of burning, which suggests that they were the fragmentary remains of pre-Fire buildings. A small area of brick and stone was recorded immediately to the west of the internal wall, interpreted as the remains of a floor surface.

Documentary sources suggest that following the Great Fire the rebuilding of London commenced quickly, so that by the time Ogilby & Morgan's map was produced in 1676 much of the City is depicted as having been rebuilt. Although this was not the case with the plot to the west of Lambeth Hill, which documentary evidence would suggest was not redeveloped until the late 17th century (see Chapter 7), Ogilby and Morgan's map shows buildings to the east of Lambeth Hill had been rebuilt within ten years of the fire.

Phase 19: 19th-century activity, sewer construction

The remnants of a red brick foundation (Building 10, not illustrated) to the north of the southern wall of Building 9, were dated by pottery from within a mortar dump into which they were set to the first half of the 19th century. The fact that once again the buildings fronting historic Thames Street had moved to the north reflects the gradual widening of the road over time. The walls directly overlie the southern frontage of a building depicted on the 1st edition Ordnance Survey map of 1873 occupying the northwest corner of Upper Thames Street and Lambeth Hill, which is annotated as a public house. In the middle years of the 19th century the pub was called the White Hart although by 1882 it had been renamed the Old Grapes (Kelly's Directory 1841; 1855; 1857; 1882). Several 19th-century pits were also recorded across the area of excavation, and the remains of a vaulted basement constructed from yellow stock bricks was recorded which extended east–west across the excavation area, truncating the northern side of the 'Period II' Roman walls and later deposits and structures.

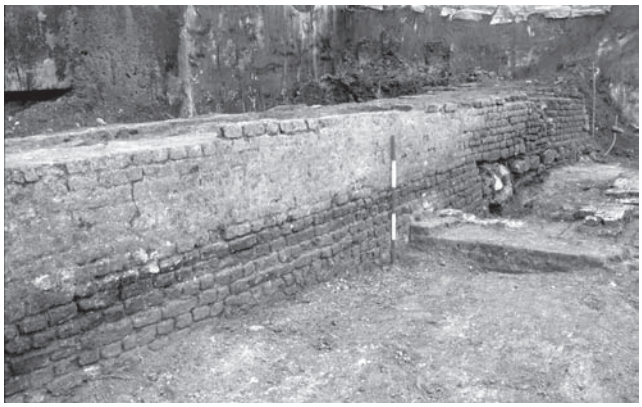


Fig. 66 Elevation of post-Fire Building 9, looking southeast (scale 1m)

The southern portion of the Area of Excavation had been entirely truncated by the construction cut for a large east–west orientated 19th century brick built sewer, which when constructed had presumably respected the line of Thames Street (see Fig. 24, Chapter 2). This was exposed across the length of the Area of Excavation (approximately 30m). A north–south branch of the sewer was identified in the centre of the excavation which was truncated by the basement wall of the Salvation Army Headquarters, but which would have originally been aligned with Lambeth Hill. The construction of this sewer was observed by Charles Roach Smith in 1841, when he recorded the first evidence of massive Roman foundations in the area.

A series of north–south orientated tunnelled pipes were recorded feeding into the main sewer and these truncated the deeper archaeological deposits. A large manhole was also recorded towards the west of the area, which would have been utilised for access to the sewer. A cut [590] to gain access to one of the sewers contained an interesting assemblage of mid Victorian pottery and clay pipes within its fill, which can be closely dated to 1855–1856 (see Sudds, Jarrett, Chapter 6) and provides evidence of opportunistic disposal of rubbish from the White Hart Tavern.

Chapter 6: Medieval and Post-medieval Specialist Reports

Pottery

Berni Sudds

A relatively small assemblage of 661 post-Roman sherds was recovered from the Salvation Army Headquarters, representing a minimum of 414 vessels. The Museum of London Specialist Service's (MoLSS) pottery type codes have been used to classify the ceramics. Examples of the fabrics can be found in the archives of PCA and/or the Museum of London. The material ranges in date from the 11th to 19th century. The pottery indicates that the site was continuously exploited and for more than one form of activity, but with relatively small phase assemblages it is sometimes difficult to characterise aspects of function. The first primary post-Roman groups are of 11th- to mid 12th-century date, accounting for 72% of the stratified medieval assemblage by sherd count (Table 14). Pottery dating to the 13th and 16th century is fairly poorly represented and it is not until the 17th century that larger, more diagnostic groups are once again evident.

The 11th- and 12th-century assemblage would indicate activity of a domestic nature was taking place in the immediate vicinity. Although scarce, the evidence would appear to suggest that this remained unchanged through to the 16th century. It is only in the 17th-century assemblages that it is possible to discern the presence of specific trades. Of particular interest are the burnt, slag-concreted deposits that capture a snapshot of a possible pre-Great Fire inn assemblage, probably that of the Green Dragon on the corner of Lambeth Hill and Upper Thames Street. The Green Dragon was rebuilt following the Great Fire and the victualling trade continues to feature quite prominently in the area, evidenced again in the assemblage with a mid 19th-century group from the White Hart. From the documentary evidence it is also clear that new trades came to the area after the Great Fire. These include sugar production, for which a small amount of evidence was also recovered.

The range and composition of all phase groups is well paralleled in the London area, and more particularly, in the vicinity (Blackmore 2002; Vince 1985; Orton 1982). The recovery of a few more unusual imports, forms and decorative motifs, particularly within the post-medieval assemblage, may also indicate a degree of affluence. The presence of this material, however, could also be explained by the proximity of the site to the Thames. The pottery is discussed below by Phase.

THE INTRUSIVE ASSEMBLAGE

Phases 5–9: Roman

A small assemblage of medieval and post-medieval pottery was recovered from Phase 5, 7 and 9 features. The medieval material is represented by 13th- to 14th-century South Hertfordshire-type greyware (SHER), Kingston-type ware (KING) and London-type ware (LOND). The post-medieval sherds consist of a creamware with a developed pale glaze (CREA DEV) and a relatively rare sherd of Andalusian coarseware (ANDCO).

MEDIEVAL

Phase 10: 11th to mid 12th century

Groups dated broadly to the 11th century contain early medieval sandy ware (EMS) in isolation, or in addition to early medieval sand and shell-tempered ware (EMSS). The combination of early medieval sandy ware with early medieval chalk-tempered ware (EMCH), early medieval shelly ware (EMSH), early Surrey ware (ESUR), London-area greyware (LOGR) or Stamford-type ware (STAM), however, suggests a date for many of the Phase 10 features from the mid to late 11th century. Where just Stamford-type ware is present, or both Stamford-type ware and early medieval sand and shell-tempered ware, a date from the mid 11th to mid 12th century is possible. Finally, a broad date from the 11th to mid 12th century is suggested where early medieval sand and shell-tempered ware occurs in isolation.

Jars represent the only primary Phase 10 forms identified. The majority have simple profiles with plain or everted rims and sagging bases. The early Surrey jar forms include an 11th-century example with a cylindrical profile and an everted, slightly thickened rim (see Fig. 68.1). Unfortunately, the Stamford-type ware examples are non-diagnostic but demonstrate a yellow glaze, typical to the tradition. With such a small group function remains ambiguous but the range of forms and evidence of sooting and residue most probably indicate settled activity, probably of a domestic nature.

Phase 11 and 12: Mid 12th to 14th century

The Phase 11 assemblage is small, characterised by both South Hertfordshire-type greyware products and London-type wares. The form assemblage comprises

Phase	5 - 9		10		11		12		13		14		Total	
	No.	MNV	No.	MNV	No.	MNV	No.	MNV	No.	MNV	No.	MNV	No.	MNV
Fabric														
Early medieval sandy ware			74	23	1	1							**75**	**24**
Early medieval sand- and shell-tempered ware			20	16	1	1					1	1	**22**	**18**
Early medieval chalk-tempered ware			1	1									**1**	**1**
Early medieval shell-tempered ware			14	5	1	1							**15**	**6**
Early Surrey ware			33	12									**33**	**12**
London-area greyware			2	2	2	2							**4**	**4**
Stamford-type ware			11	5									**11**	**5**
Coarse London-type ware					1	1							**1**	**1**
London-type ware	1	1			5	4	2	2	2	2	5	5	**15**	**14**
South Hertfordshire-type greyware	2	2			15	8							**17**	**10**
South Herts-type flint-temp. greyware					2	2							**2**	**2**
London-type ware; Rouen-style					1	1							**1**	**1**
London-type ware; highly decorated							2	1					**2**	**1**
Kingston-type ware	1	1					4	3			4	4	**9**	**8**
Saintonge ware							1	1					**1**	**1**
Mill Green ware											1	1	**1**	**1**
Coarse Surrey/ Hants border ware							1	1	1	1	1	1	**3**	**3**
Intrusive post-medieval pottery	2	2	1	1					2	2			**5**	**5**
	6	**6**	**156**	**65**	**29**	**21**	**10**	**8**	**5**	**5**	**12**	**12**	**218**	**117**
	3%		**72%**		**13%**		**5%**		**2%**		**5%**			

Table 14 Quantification of pottery fabric by phase (medieval)
Fabrics listed in chronological order. No. = Sherd count. MNV = Minimum number of vessels.

South Hertfordshire-type greyware jars and both South Hertfordshire-type greyware and London-type ware jugs. The South Hertfordshire-type greyware jars demonstrate everted, squared or lid-seated rims and the jug has a thumbed strap-type handle with vertical slashing. The London-type ware jugs include an example with Rouen-style decoration. A number of the features remain broadly dated from the late 12th to mid 14th century although a sherd of coarse London-type ware (LCOAR) suggests a late 12th-century date and the Rouen-style jug indicates a date range from *c*. 1180 to 1270.

Combinations of Kingston-type ware, Saintonge ware (SAIN), coarse Border ware (CBW) and London-type ware date a small number of groups from the mid or late 13th to the mid or late 14th century (Phase 12). Jugs represent the only form type identified. Both scale and highly decorated floral based designs are evident on London-type examples and the single sherd of possible Saintonge ware demonstrates an applied stamped pad and green glaze.

With no evident specialisation in form the assemblage may again simply represent domestic waste.

Phase 13 and 14: 15th century

Just two Phase 13 groups, both make-up layers for road surface [677] (see Fig. 59, Chapter 5), produced pottery. The make-up for this surface, layer [684], contained an early post-medieval red earthenware (PMRE) and a yellow glazed Border (BORDY) ware flanged dish, both probably intrusive. An associated make-up layer [688] produced two abraded residual London-type wares and a coarse Border ware beaded jar rim.

The Phase 14 assemblage is similarly small and composed primarily of residual medieval material, namely Kingston-type ware, London-type ware and Mill Green ware (MG). A single sherd of coarse Border ware from road make-up layer [665] may represent the only primary pottery of 15th-century date.

POST-MEDIEVAL

Phases 15–16: 16th to 17th centuries

The Phase 15 material accounts for 14% of the post-medieval assemblage (Table 15). Well [30] (see Fig. 60, Chapter 5), containing fills [01], [02], [03], [04] and [05], was probably backfilled during the late 15th or 16th century. The number of cross-joining vessels between fills suggests the well was filled in relatively quickly. The assemblage is composed largely of early post-medieval red earthenware cauldron or pipkin forms and sherds of the same post-medieval slip-decorated redware (PMSL) pitcher but also contained a few sherds of late London-type ware (LLON) and coarse Border ware that may be residual or were possibly old when deposited. An almost-complete Raeren stoneware (RAER) rounded drinking jug was recovered from fill [2] and a single sherd of Dutch redware (DUTR) from basal fill [5]. Unless intrusive, the presence of a tin-glazed (TGW) storage jar or albarello rim in the uppermost fill [1] might, however, suggest the well was not finally filled until the late 16th or even early 17th century.

The remaining Phase 15 assemblage comprises a Frechen stoneware (FREC) *Bartmannkrug* from the backfill

[674] of a robber cut into Phase 6C, 'Period I' wall [708], and a green-glazed Border ware (BORDG) flanged dish from the secondary fill of cess pit [758], dating from the mid 16th century. A residual sherd of early medieval sand and shell-tempered ware was also recovered.

Residual medieval pottery was also identified within Phase 16 groups but in addition to combinations of post-medieval red earthenware (PMR), early post-medieval slipped red earthenware (PMSRY/G) and Border ware suggesting date ranges from the late 16th to mid or late 17th century. Few identifiable primary form types are evident, but examples of both olive glazed Border ware (BORDO) and Midlands purple ware (MPUR) were also recovered.

A tin-glazed dish with 'Orton type A' decoration dating from *c*. 1612 to 1650 and a red Border ware (RBOR) carinated porringer were recovered from within a Phase 16C pit fill. Layer [607], a Phase 16C sandy levelling layer, contained a single broadly dated sherd of late 16th to 17th century green glazed Border ware.

Two rim sherds of early post-medieval red earthenware were recovered from foundation [704], relating to the 17th-century structural additions (Phase 16B). Dating from *c*.1480 to 1600 these vessels, including a cauldron and possible chafing dish rim, may have been long-lived or could simply be residual in this feature.

The combination of post-medieval red earthenware and Frechen stoneware in layer [630], the bedding for the brick floor [598] in Building 7, would suggest a late 16th- or 17th-century date. Few forms have been identified but include a pierced post-medieval red earthenware body sherd that may be from colander or, alternatively, a chafing dish or fuming pot. The remaining material associated with Phase 16C building additions is medieval in date and consequently residual.

Phase 17: 1666 Fire horizon

The majority of pottery recovered from Phase 17 features has been exposed to intense heat. Much is burnt, discoloured, distorted or fused together in concretions,

Phase	15		16		17		18		19		Total	
	No.	MNV	No.	MNV	No.	MNV	No.	MNV	No.	MNV	**No.**	**MNV**
Fabric												
Early Surrey/ Hants border ware			6	1							**6**	**1**
Early post-medieval redware	23	12	2	2	3	3	5	4	2	2	**35**	**23**
Post-medieval slip-decorated redware	19	1									**19**	**1**
Raeren stoneware	1	1									**1**	**1**
Post-medieval slipped redware			2	2	1	1	5	1	1	1	**9**	**5**
Dutch redware	1	1									**1**	**1**
Midlands purple ware			1	1							**1**	**1**
Dutch tin-glazed ware					1	1					**1**	**1**
Surrey/ Hants border ware	4	1	3	3	17	13	18	13	12	10	**54**	**40**
Frechen stoneware	1	1	1	1	69	17	12	11	10	9	**93**	**39**
English tin-glazed ware	1	1	1	1	4	4	8	8	5	4	**20**	**19**
Werra slipware							1	1			**1**	**1**
Post-medieval black glazed ware					1	1					**1**	**1**
Post-medieval fine redware					2	2			2	2	**4**	**4**
Surrey/ Hants border redware			1	1	5	4			6	6	**12**	**11**
Post-medieval redware			3	3	9	7	23	14	15	14	**50**	**38**
Chinese blue and white porcelain									4	4	**4**	**4**
Metropolitan slipware					1	1	2	2			**3**	**3**
London stoneware									3	3	**3**	**3**
Staffordshire-type marbled slipware					1	1					**1**	**1**
English stoneware									5	1	**5**	**1**
Creamwares									12	11	**12**	**11**
Pearlwares									39	27	**39**	**27**
Black basalt ware									2	2	**2**	**2**
English hard paste porcelain									2	2	**2**	**2**
Transfer-printed ware									2	2	**2**	**2**
Factory-made slipware									1	1	**1**	**1**
Sunderland-type coarseware									1	1	**1**	**1**
English stoneware with Bristol glaze									1	1	**1**	**1**
Yellow ware									4	2	**4**	**2**
Misc. / vitrified or fused					5	5	5	5			**10**	**10**
Residual	12	10	12	10			5	4	9	9	**38**	**33**
	62	**28**	**32**	**25**	**119**	**60**	**84**	**63**	**138**	**114**	**435**	**290**
	14%		**7.5%**		**27.5%**		**19%**		**32%**			

Table 15 Quantification of pottery fabric by phase (post-medieval)
Fabrics listed in chronological order. No. = Sherd count. MNV = Minimum number of vessels.

Fig. 67 Pottery fused together by intense heat during the Great Fire (scale 100mm)

so identification and precise dating is difficult (Fig. 67). Groups dated from *c.* 1580 to 1700 are characterised by combinations of Border redware, post-medieval red earthenware, fine Essex-type post-medieval red earthenware, post-medieval black-glazed red earthenware, Border wares and Frechen stoneware. The presence of a tin-glazed dish with 'Orton type D' decoration in charcoal layer [657], within Building 7, dated from *c.* 1630 to 1680, would make this the most closely-dated group. A single sherd of Staffordshire-type marbled slipware (STMB), dating from the late 17th century, was also recovered from layer [657] but this, like some of the other pottery recovered from the fire deposit was unburnt and may be intrusive. Indeed, this material is perhaps most likely to have derived from the subsequent, albeit delayed post-fire redevelopment of the site after *c.*1680.

Primary form types identified include Frechen jugs (Fig. 68.3), Border ware flanged dishes and tripod pipkins and a red Border ware chafing dish. A black-glazed red earthenware mug, post-medieval red earthenware jar, Metropolitan slipware flanged dish and tin-glazed plate and possible saggar were also recovered. The form assemblage includes a Frechen *Bartmannkrug* with an unusual medallion depicting a rearing griffin (Fig. 68.4) and a Dutch tin-glazed plate with part of an inscription in a cartouche (Fig 69). The inscription reads '…braden…. kes en vis' probably representing 'ghebraden…. kes en vis' meaning 'fried….(?) and fish' (M. Bartels, pers comm.). The plate represents one of a set, each depicting one part of a larger light-hearted saying. In this case the next in the series perhaps saying something like 'smaken op ieders dis' translated as 'taste on everyone's dish' giving the rhyme fish with dish. A very similar plate was excavated in Delft from a household cesspit on the site of a tin-glazed factory, dated through other material to *c.*1660 to 1680. The example from Delft forms number '2' in the series and although demonstrating slightly different decoration, says 'ghebraden…vlees of vis', meaning 'fried…meat or fish' (Ostkamp 2006).

A similar example can be also paralleled in London at Bombay Wharf, also decorated with a cartouche flanked by griffins but forming part of a different series proclaiming the benefits of tin-glazed plates over pewter ones (Pearce 2007, 85-87). At Bombay Wharf a date of *c.*1660 to 1680 is suggested (Pearce 2007, 87), but the example from Queen Victoria Street may date to the last third of the 17th century (M. Bartels, pers comm.) and thus have been deposited during the late 17th century redevelopment of the site. Sets of plates of this nature were also decorative, intended for display perhaps on a dresser or hung on the wall.

The group, although still relatively small, accounts for nearly 28% of the site assemblage and includes a minimum of 60 vessels (Table 15).

The quantity of drinking and serving forms, relative

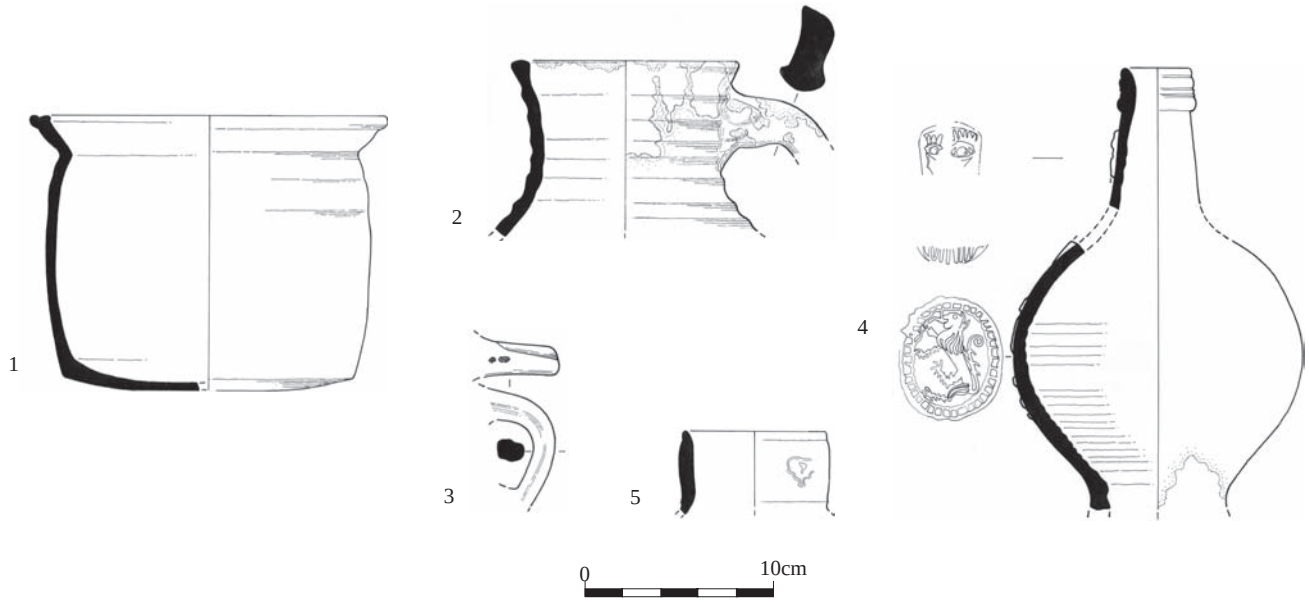


Fig. 68 Medieval and post-medieval pottery: 1) Early Surrey ware 11th-century jar with simple, everted rim; 2) Post-medieval slipped redware jug; 3) Frechen jug handle; 4) Frechen Bartmannkrug. Rearing griffin medallion; 5) Frechen mug with heart-shaped stamp to neck (scale 1:4)

Fig. 69 Tin-glazed plate with armorial and inscription. *c.* 1700 (scale 1:2)

to food preparation or storage vessels, is relatively high and can be paralleled to a number of other assemblages in London thought to represent tavern or inn groups (Pearce 2000, 173–175; Jarrett in prep b). The documentary evidence indicates that these groups were recovered immediately overlying structural remains on the corner plot of Lambeth Hill and Upper Thames Street on the site of the Green Dragon Inn or possibly the Unicorn. These assemblages could well represent the property of this establishment, shattered and burnt during the 1666 conflagration. Great Fire deposits have been observed on numerous sites in the City and a similar range of fabrics and forms have been identified, but the group from the Salvation Army Headquarters represents perhaps one of the first inn assemblage yet identified in this horizon (Milne 1986, 105–115; Milne & Milne 1985; Butler 2000).

Phase 18 and 19: Late 17th to 19th century

With the exception of fill [579], of Phase 18A sub-rectangular pit [580] (see Fig. 64, Chapter 5) the Phase 18 feature assemblages are small and not particularly diagnostic in terms of date. Those containing non-diagnostic sherds of Border ware or Frechen stoneware, [593] (fill of Phase 18A pit [594]) and [633] (Phase 18B bedding for brick floor in Building 9), are broadly dated from *c.*1550 to 1700. The presence of tin-glaze with 'Orton type C' decoration (TGW C), Metropolitan slipware (METS) and Frechen stoneware in Phase 18A demolition layer [591] suggests a narrower date from *c.*1630 to 1700. Fill [579] of pit [580] is similarly dated, containing the same fabrics in addition to a number of Border ware vessels. The latter group also included a tin-glazed albarello or drug jar with geometric decoration (TGW D) probably dating to no later than *c.* 1680 or 1700. Other forms identified include Border ware dishes and tripod pipkins, Frechen stoneware jugs and a mug and tin-glazed dishes and ointment pots. The Frechen stoneware mug has an unusual stamp to the neck (Fig. 68.5). A direct parallel could not be found but other mugs similarly decorated to the neck with a small stamp have been dated to the middle decades of the 17th century (Gaimster 1997, 223; Jennings 1981, 120–121; Pryor & Blockley 1978, 54–55).

The remaining Phase 18 groups contain residual medieval and early post-medieval material. Of some interest among the latter group is a late 16th-century post-medieval slipped red earthenware jug (Fig. 68.2), and a Werra slipware dish dated from the late 16th to mid 17th century.

Diagnostic 19th-century groups are characterised by transfer-printed ware (TPW 4), pearlware (PEAR/BW/PNTD/TR/TR3), yellow ware (YELL), black basalt ware (BBAS) and creamware (CREA). Similarly to Phase 18, a significant quantity of residual pottery was also recovered. The 19th-century form types include creamware and pearlware plates, post-medieval red earthenware handled jars, rounded bowls, flowerpots and sugar cone moulds and an English hard paste porcelain bowl. Other forms include a pearlware cylindrical mug, a ceramic egg cup and a drainer, the latter two decorated with black transfer-prints. The residual assemblage includes diagnostic 17th- and 18th-century form types. These include a tin-glazed ginger jar and storage jar in addition to Frechen jugs, Border ware chamber pots, porringers and dishes.

Of interest is the recovery of a pearlware plate with a central logo of 'WHITE [HART]---- UPPER THAMES STREET' in black transfer print (Fig. 70). The documentary evidence reveals the existence of a White Hart tavern in close proximity to the sewer access pit [590] in which the

Fig. 70 Pearlware plate with a central logo of 'WHITE [HART]---- UPPER THAMES STREET' in black transfer print (scale 100mm)

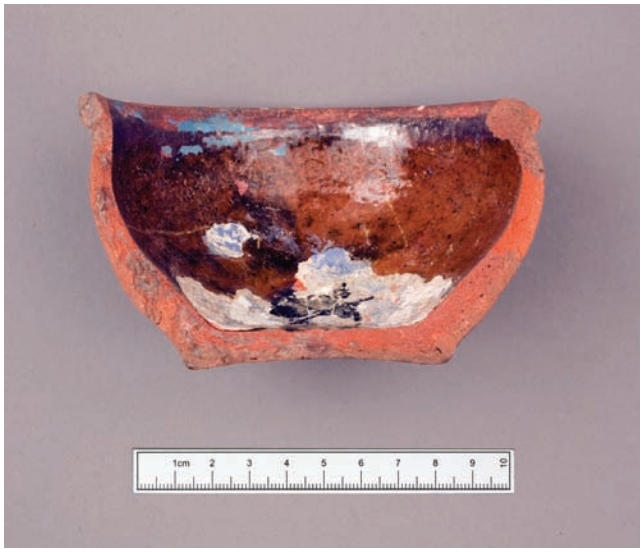


Fig. 71 Border ware paint pot containing thick residues of red, white and blue paint (scale 100mm)

plate was found. Clay pipes from the same group were also marked with the name of this establishment and also record the name of the landlord, an Edmund Taylor; this information, in conjunction with the presence of Swinyard pipes, provides a narrow deposition date of 1855–1856 (see Jarrett, below).

The combination of fabrics in this group, including the black transfer-printed pearlware and yellow ware, would concur with a mid 19th-century date, indicating deposition between *c*.1840 and 1860. Furthermore, the remainder of the group is composed primarily of serving forms, namely plates, bowls and dishes. It is quite conceivable that the group represents refuse from the White Hart although with such small assemblage it is impossible to be certain. Alternatively, it has been suggested that the clay pipes may have been discarded by workmen who had frequented the White Hart whilst digging the access pit to the sewer (see Jarrett, below). If this is the case, the presence of the plates would also suggest they were dining '*al fresco'*, which seems unlikely given the nature of their work and the close proximity of the tavern. It is perhaps more probable, given the character of the remainder of the group, that the hole created by the access pit provided a convenient receptacle for breakages and refuse from the tavern itself.

Two other forms recovered in 19th-century features are of some interest. The presence of a fragment of sugar cone mould may have derived from a group of three terraces to the east of the main area of excavation within which a sugar house or refinery was set up in *c*. 1790 (St. George's Chapel property). Refineries were often located in close proximity to the Thames, although most are sited on the south bank of the river. Excavations at the Millennium Bridge Southwark site (Blackmore 2002, 90), Bermondsey, Shad Thames, Swan Street and at the southern end of Borough High Street have all produced evidence for sugar-refining factories (C. Jarrett, pers comm). Finally, a Red border ware paint pot was identified (Fig. 71), containing thick residues of red, white and blue paint, perhaps broken and discarded by a tradesman.

Building Material

John Brown

The post-Roman building material assemblage was mainly represented by two classes of material, roof tiles from flange-, peg- and pan- tile roofing systems, and hand-moulded bricks. The materials and fabrics represented are typical of those found at City sites (cf Betts 1990; 2001; 2002) and reflect the standard model of urban building development though the medieval and post-medieval periods. Although brick masonry features were found *in situ* during the excavations and brick samples provided examples of the various fabrics used therein, it is more problematic to assign the roof tile fragments to any particular building, as it was largely present as loose material. Other materials included fragments of tin-glazed wall tiles, glazed medieval floor tiles and some stone that may have been reused from medieval contexts.

The ceramic building material was analysed using the system of classification employed in archaeological work in Greater London in which a fabric number specifies an object's form, composition and method of manufacture. Details of fabrics identified in these excavations are stored with the archive and examples of the fabrics can be found in the archives of PCA and the Museum of London.

MEDIEVAL TO EARLY POST-MEDIEVAL BUILDING ACTIVITY

Phases 10–15

No masonry structures of obviously medieval date were represented in the masonry samples, and the loose material is typical of 'background' material found at most sites within the City. Ceramic tiles were introduced as roofing for timber buildings within the City from the early to mid 12th century, the impetus for which is likely to be a series of fires during the reign of King Stephen (Schofield 1999, 75), and the majority of the medieval roof tile fragments most probably represent this type of building activity.

Examples of early medieval (mid 12th to 13th century) roof tile were found in fabrics 2271 and particularly 2273. Many of the fragments were abraded and non-diagnostic, although occasional examples of flanged tiles (fabric 2273) were noted, similar in form, and in function identical, to Roman *tegula* roof tiles. Generally the early medieval roof tiles were splash-glazed with a lead glaze. One or two *imbrex*-style curved thick tiles were also found, again with a splash lead glaze. It is currently thought that the use of early flanged roof tiles is indicative of high-status building (Smith 2001, 126), but the fragmented and abraded nature of the tiles, reflecting secondary deposition, may suggest that they do not relate to such a structure at the site.

Later medieval roof fabrics included 2271 as the most prevalent, with smaller amounts of the sandier fabric 2586. Some of the latter also contained occasional calcium carbonate inclusions. Less common were fabrics 2587 and 2357, with silty inclusions. Where a form was noted it was

invariably a peg tile, however, most of the fabrics were non-diagnostic and sometimes showed signs of abrasion indicating that they may reflect wash-in material derived from the foreshore. Peg tiles replaced earlier systems such as flange tiles from the early 13th century (Betts 1990, 223). Both splash-glazed and unglazed peg tiles were noted, although the practice of glazing roof tiles fell out of fashion during the late 15th century (Betts 2002, 78). During the transitional period of the late 15th and 16th centuries fabric 2276, a similar fabric but with much finer moulding sand, superseded the medieval fabrics as the most common, and continued throughout the post-medieval period into the 19th century, when slate roof tiles became widely available. Both fabrics 2271 and 2276, along with brick fragments from the 3033 group, were used as metalling for Phase 14 road surfaces.

A few possible fragments of roof furniture were noted in a fabric similar to the medieval London ware (LOND), and were recorded as fabric 2278. The first came from the fill of a Phase 14 posthole that also contained glazed peg tile fragments and residual Roman material. Two other fragments came from the backfill [579] of a later Phase 18A pit [580]. This assemblage contained some unusual material and is discussed further below.

A small number of floor tile fragments were found, often extremely abraded, suggesting they had been in use for long periods or suffered from re-deposition. One example in fabric 1811 came from a Phase 12 demolition or foundation layer (including a fragment of glazed peg tile). It was produced in Penn, Buckinghamshire, during the early to late 14th century and had clearly been glazed and decorated, but the design was too abraded to be discernible. Again, decorated floor tiles are indicative of high-status buildings, but the small and fragmented nature of the assemblage might also reflect secondary deposition.

All pre-mid 17th century brick fabrics were from the 3033 group, locally produced, orange-firing bricks with varying amounts of quartz inclusions. Earlier examples tended to show uneven bases, rounded arrises and sunken margins on the top bed face. The fabric 3033 was most common, with occasional sandier examples of 3046. Along with fragments of peg tile fabric 2276, brick fragments in fabric 3033 were found within Phase 14 road metalling surface [653], which if part of the original surface rather than a repair, indicate the road was laid down from the mid-late 15th century. The abraded nature of some of the assemblage supports the premise that the foreshore was exploited to construct the road surfaces.

PRE-FIRE BUILDINGS

Phase 16A: 16th–early 17th century

All of the masonry samples Phase 16A showed a consistent use of yellowish-grey, lime/sand mortar, and where discernible the bonding was English bond.

The east–west wall of Building 7 [567], at 0.75m (2½ft) thick, was the most substantial remaining from this building and most probably represents the boundary wall fronting onto the north side of the old Thames Street. This orientation for the building is supported by the arrangement of the bricks in the basement floor [681], although heavily truncated the southern wall of the building [567] returned to the north as [631]. West of the north–south return was a wall interpreted as a Phase 16B extension [680]. A north–south aligned wall [648] approximately 0.75m thick may have formed a party wall dividing two properties. If this was the case then the width of the room formed by [567] and [648] at *c*. 13 feet could be equivalent to the small single room type tenements at Billiter Lane recorded by Ralph Tresswell in 1612 (Schofield 1999, 158 & fig. 131), with a similarly sized unit to the east fronting onto Thames Street. However, as there were indications of a door at the southern end of the wall it seems more likely that both rooms represent a single property of the middling two-room type frequently represented in Treswell's surveys (Schofield 1999, 158). Unfortunately due to the limits of excavation it is unclear how much further to the north the building extended, and indeed if there were further rooms to the north.

Phase 16B: 17th century

An extension [680] constructed to the west of Building 7, along the same alignment as its southern wall, can be seen to be later due to the non-alignment of bricks in the coursing. The fabrics used included stone fragments, potentially reused from a medieval precursor. Two north–south aligned walls [647] and [656] were less substantial and probably represent alterations or partitions. Masonry samples from this phase generally had off-white or light grey lime/sand mortar, all with obvious white lime inclusions. Some examples also displayed the yellow/grey lime/sand mortar type seen in Phase 16A elements of Building 7, and were presumably reused.

Phase 16C: mid 17th century

The masonry samples from Phase 16C floor [598] in Building 7 were consistent with pre-Fire fabrics and showed signs of burning, indicating that the floor was laid down prior to 1666. Again, ragstone and chalk used in construction may be representative of reused medieval material.

The masonry contexts from Phase 16 are thought by the excavator to represent a pre-1666 building, however the range of fabrics initially seems to belie this interpretation. The basis for this date is the interpretation of a fire destruction layer above the masonry contexts as relating to the Great Fire of 1666. Brick fabrics and dimensions from samples are tabulated (Table 16).

The use of earlier brick fabric 3033 and also Reigate stone (fabric 3107) would support such an interpretation. The dimensions of the bricks themselves would also indicate a pre-1700 date. Material from one of the north–south walls of the extension [647] represents a north–south wall and included a Reigate stone ashlar block with diagonal tool marking. [681], the original brick floor of the building, contained a reused Purbeck marble paving

Phase	Context	Description	Fabric	Type	No.	Dimensions (mm) Length Min	Length Max	Width Min	Width Max	Depth Min	Depth Max
16a	**567**	E-W Pre-1666 brick wall	3033	BU ub	1	230	230	111	111	54	54
	648	N-S partition wall of pre-Fire building 7	2276	T	3			154	154	13	13
			3032nr3033	BU	1	230	230	105	105	65	65
				BU snm	1	224	224	105	105	64	64
	673	Chalky mortar bedding for wall [648]	3112	SP	1					34	34
	681	Brick floor of pre-Fire Building 7	3032nr3033	BU	2	224	224	105	107	58	63
			3112	SP	1					37	37
	888	Small truncated E-W pre-fire wall to east of site	3032nr3033	BU	1	205	205	103	103	53	53
16b	**640**	Lower brick floor N. of wall [680]	3032nr3046	BU	1	230	230	114	114	52	52
	647	N-S wall abutting [567] standing on [640]	3033	BU snm	1	217	217	107	107	52	52
			3107	SF	1					62	62
	656	N-S curved wall abutting [567] on [640]	3032	BU ub	1	226	226	108	108	58	58
	680	E-W pre-Fire brick wall E. of [567] (abutting)	2276	TP	1			159	159	16	16
			3032nr3033	BU	3			112	112	65	65
			3033	BU	2	220	275	106	128	52	60
				BU bull	1	265	265	130	130	60	60
				BU ub	2	217	218	104	108	54	58
			3104	OPSIG	1	130	130	104	104	70	70
16c	**598**	Burnt brick, stone & chalk floor of wall [567]	3107	SF	1	167	167	140	140	80	80
			3033	BU	1			103	103	58	58

Table 16 Building material samples from pre-Fire Building 7
Key: BU = unfrogged brick, SP = stone paving tile, SF = faced stone, T = tile, TP = peg tile, OPSIG = opus signinum; bull = bull nosed brick, snm = sunken top margin, ub = uneven base

stone, showing signs of burning, and another was used in the bedding for wall [648]. This seems to represent reused medieval building material, and both stone types were popular for the interiors of high-status medieval building.

In other contexts the appearance of transitional fabrics 3032nr3044/3046 and the more evolved fabric 3032 in the curved wall [656] would generally indicate a date of construction either immediately prior to 1666, or later in the late 17th to early 18th century. This date also concords with the dating for clay tobacco pipe found within the destruction layer, although this showed no signs of burning and may be intrusive. Similarly the brick in fabric 3032 was only one example and may represent a later insertion. The appearance of these fabrics will be discussed further below.

Phase 17

Two deposits [573] and [657] contained fragments of roof tile in fabric 2276 and 3216, some of which showed reduction that may have been the result of fire, but only one fragment was obviously vitrified.

POST-FIRE BUILDINGS

Phase 18

Phase 18A: Pit group [580]

The assemblage from fill [578] of pit [580] was unusual and contained several fragments of unglazed Flemish floor tiles in fabric 2318, one plain glazed tile in fabric 2324 and one fragment of a tin-glazed wall or floor tile in fabric 2189, with a polychrome grape and flower design. Parallels for this tile are held in the Museum of London's Reserve Collection of Ceramics and Glass (accession nos. 6933 and AI6598), and are thought to date from *c*.1570 to *c*.1663. Other ceramics included two fragments of probable roof furniture in fabric 2278 and some peg tiles in fabric 2276, the latter being heavily vitrified, presumably as a result of burning. A fragment of dark grey, shelly limestone was also recovered and is tentatively interpreted as a carboniferous limestone, although the fragment retained a distinct sulphurous odour and may be a type of shale. A fragment of burnt daub, and the only fragment of pan tile (fabric 2279) from the site observed during analysis, completed the assemblage. Pan tiles were imported to Britain from the Netherlands from the first half of the 17th century and were produced in England from the second half of the 17th century. As yet sources for the production of individual pan tile fabrics have not been determined. Following the Great Fire they were adopted alongside peg tiles as the more typical forms of roofing used in London (Betts 2001, 230).

Phase 18B: Building 9 (c. 1701–1735)

Fabrics 3032, a transitional fabric 3032nr3033, and occasionally a silty version 3034 accounted for nearly all of the later post-medieval brick fabrics. Generally the forms become more regular in shape with sharper arrises through

time. These fabrics represent a development of the earlier 3033 fabric group, utilising the same clay sources but with the inclusion of combustible organic material known as 'Spanish' (Hobhouse & Saunders 1989, 4). The majority of roof tile fragments were in fabric 2276, a fabric similar to 2271 and from the same clay sources, although generally more neatly produced and with finer moulding sand. Where discernible the form was invariably peg tile. Peg tiles were also noted in fabric 3216, a fine sandy fabric, often with mica particles.

Building 9, represented by wall [566], was built using brick fabrics 3032 and reused bricks in fabric 3033, with a stone and brick floor only surviving near to an internal dividing wall [578]. The foundation for the wall contained the reused Penn fabric decorated floor tile discussed above. An 18th-century date is postulated for the building, which has a wall thickness of two-and-a-half bricks, which could potentially represent post-Fire regulations for buildings of the 'second sort' to be constructed fronting 'streets and lanes of note, and the River Thames' (Reddaway 1940, 81).

Building 9 superseded Building 7, shifted further to the north by approximately four-and-a-half feet, perhaps as a response to the building restrictions imposed by the 1667 Act for Rebuilding the City of London and the desire for wider streets to prevent fire spreading.

Phase 19

A Victorian culvert [430] observed along the southern limit of excavation was constructed with frogged and stamped bricks in the post-Fire fabric 3032, bonded with Portland Cement type mortar thus indicating a post-1860s date for construction (the use of Portland Cement became popular after Bazalgette's successful employment of it for his intercepting sewers). Examples of 19th-century frogged and stamped bricks in fabric 3032 were recovered from the fill [620] of pit [621], showing the use of 'Roman' cement. Both mortar types are hydraulic and set hard under water, which explains their use in drainage systems or in damp environments such as cellars. The scale of subterranean works increased dramatically in the 19th century, and deep cut foundations most probably accounts for the dispersal and redeposition of earlier material found in the later phases.

DISCUSSION

The medieval and early post-medieval assemblages represented typical building material from these periods and were generally unremarkable, with the exception of a possible medieval Purbeck marble fragment and other 'high status' material of polished and moulded stone and flanged roof tiles. Taken as a group this material could reflect dismantling and reuse of material from substantial medieval buildings. The documentary evidence does indicate that at least two significant properties were in existence in the vicinity before the mid 15th century, both of which could be a candidate for the origin of high-status materials. These were the property east of Lambeth Hill granted to St. George's Chapel at Windsor in 1423 and a larger property to the west granted to the Corporation of London through the will of Sir John Phillpott in 1389 (see Fig. 77, Chapter 7).

The traditionally accepted date of the Phase 16 building fabrics did not accord well with the fire destruction layer and this raised the question of whether the burning observed might represent a localised incident, possibly unconnected to the Great Fire of 1666. It should be noted that other serious fires occurred after the Great Fire, including one at Middle Temple Lane in 1679, although there is no record of one at this site (Milne 1986, 98). The width of the principal walls would be sufficient to represent post-fire building regulations, although this by itself cannot be taken as proof of a post-Fire date. As most of the documentary evidence points to the fire layer being that of the Great Fire however (cf extract from Thomas Vincent in Milne 1986, 43), an explanation of the presence of these fabrics is required.

It is perhaps possible that organic material present in earlier brick could have been consumed by intense heat, giving the impression of deliberate production processes associated with later post-medieval brick making techniques. However, one would expect that material subjected to such heat would show more deformity through vitrification than was visible in the samples if this was the case. Such deformity was observed in two deposits, [579] and [625] which contained highly vitrified, heat-affected peg tiles, most probably representing demolition material associated with the Phase 16 building and the fire destruction layer above it. This would incidentally imply that the building was roofed with peg tiles, as was usual for a building of this period.

A parallel for early examples of transitional bricks dating to before the Great Fire can be seen at the early-mid 17th-century buildings excavated at The Stowage, Deptford. Here transitional bricks described as fabrics 3039nr3032 and 3033nr3032 were used in the construction of almshouses built at least as early as *c*.1663 (Sabel 1998, 89–97). The presence of such bricks, unaffected by any fire, indicates that the practice of adding combustible organic material to brickearth was already undertaken by this date, and did not come about from changes in brick making in London as a response to the calamitous event, as was previously thought. In order to verify this hypothesis it would be important to find further parallels that can be securely dated to the pre-Fire period.

Documentary evidence indicates a possible construction date of *c*. 1629 for the west extension (Phase 16B), the corner tenement owned by Bowyer and Plowright at the junction of Lambeth Hill and Thames Street. As both phases of the pre-Fire building contained these fabrics, it would push back the known date for use of transitional building fabrics by at least thirty years, assuming the building has been correctly identified in the sources.

Worked Stone

Kevin Hayward

Two worked architectural fragments were found reused in post-medieval contexts on the site (Fig. 72). Examination of

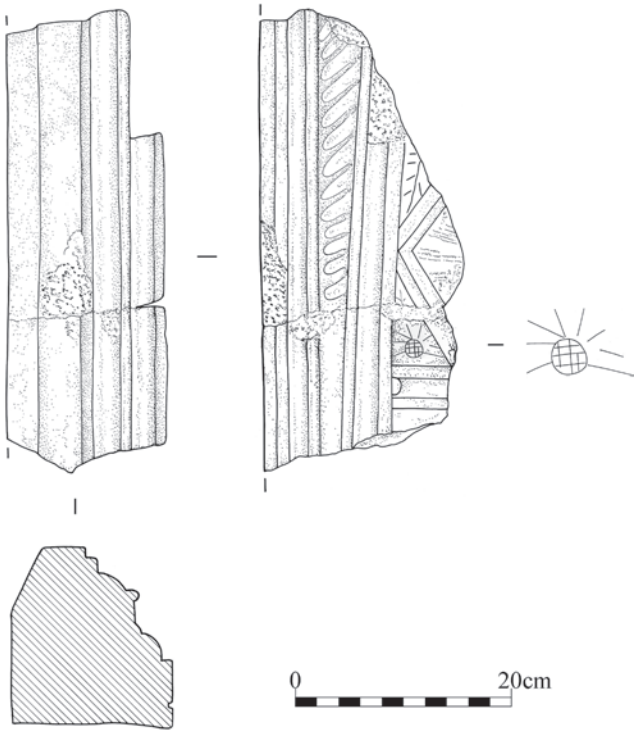


Fig. 72 Worked architectural fragment in Reigate stone (scale 1:8, mason's mark 1:4)

the two pieces was conducted using a hand lens (Gowland x 10) and the author's own comparative reference collection was used to help identification.

GEOLOGICAL CHARACTER

Both materials are made from the same rock type. This is an olive-green fine calcareous glauconitic sandstone. In addition to the green mineral glauconite, white (muscovite) mica flakes are present. The presence of calcite is indicated following its reaction with dilute Hydrochloric acid. Under a higher magnification black iron oxide specs can be identified. These have also been oxidised (weathered) red-brown. Each architectural fragment has a very low density.

GEOLOGICAL SOURCE

The minerals, fine grain size and the low specific gravity of each example are consistent with Reigate Stone (Upper Greensand – East Surrey). Although the colour is a darker olive green than a typical Reigate stone (lime-green and more micaceous) there can be no doubt that the rock derives from this formation. These properties enable the rock to be finely carved (see function).

Apart from examples of Reigate stone at this site (see Sudds, above) and from Roman Southwark (Drummond-Murray *et al* 2002) the quarrying, supply and working of Reigate stone at London remains exclusive to the medieval period. The statue of a genius and an ash-chest recovered from a Roman well at Southwark Cathedral in 1977 (Merrifield 1996) have recently been identified as Reigate Stone (Hayward pers obs; Henig in prep) The greensands in use during the Roman period are by contrast much heavier (e.g. Hassocks Greensand from the Medway area).

FUNCTION

Both elements fit together. Combined, the architectural profile gently curves (arches). It measures 430mm long x 150mm across and weighs 10.25kg. This probably forms part of an archway (voussoir). The use of low density Reigate stone would suggest two things. First, as the iron-rich glauconite in Reigate stone readily decomposes when exposed to external weathering this archway would have formed an element of the interior of a building (possibly an arcade). Second, its low density (due to a high porosity of 30%) would make it an ideal material for an archway.

Each example is finely decorated with 'fern leaf patterning'. This, and a possible mason's mark make this a very interesting example of medieval carving. There are also traces of a light blue paint. Painted architectural elements constructed from Reigate stone are a common feature of many sites such as Merton Priory (Miller & Saxby 2007, 16).

The function of the building to which this architectural fragment originally belonged to is most probably ecclesiastical. From the 12th to the early 16th century Reigate stone was quarried and worked in very large quantities for priories. It has been identified in a very large quantity at Bermondsey Abbey (pers. obs.) and Merton Priory (Miller & Saxby 2007) in the Southwark/Merton area. Medieval priories from the City such as Holy Trinity Aldgate (Schofield & Lea 2005) and especially Blackfriars (Schofield with Maloney 1998, 268–269) also contain large quantities of this stone.

As mentioned above Reigate Stone is used in London during the Roman period. However, on the basis of architectural style, there is no doubt that these two pieces were quarried and worked during the medieval period.

CONCLUSION

Although reused, this is a highly decorative example of Reigate stone for London. Undecorated and highly weathered examples of tracery are very common, e.g. Bermondsey Abbey or the Abbey of St Mary Graces at the Royal Mint site (Thompson *et al* 1998, 243–244). To find such intricate carving and the possible mason's mark in such good condition is very unusual.

Clay Tobacco Pipe

Chris Jarrett

The site produced a relatively small assemblage of 192 fragments of clay tobacco pipes consisting of 85 bowls, some represented only by heels or spurs, 96 stems and eleven nibs or mouth parts. The bowl types have been classified according to Atkinson and Oswald (1969) and coded AO. As there were no 18th-century AO type 25 and 26 bowls the practice of sub-division of the latter long-lived types according to Oswald (1975) was not considered necessary. The bowls range in date between 1640–1710 and 1780–1910 and despite a fragmentary, as well as a residual

element to the assemblage, most are in a good condition and the typology of the bowls could be confidently assigned for most examples.

THE BOWL TYPES

1640–1660

There are three AO10 heeled bowls of a good or fair quality finish and all with complete milling around the rim, but two moulds could be recognised, one bowl being a larger variant.

1660–1680

All the tobacco pipe bowls dated 1660–1680 are plain and do not have any makers' stamps. The two heeled AO13 bowls are represented by different moulds, the first is poorly milled and finished with a less slender profile than the second bowl (in a grey fabric) and is nicely burnished. Grey and off white tobacco pipe fabrics are often associated with continental and Dutch highly burnished pipes, but this bowl, although similar to the Dutch AT13 bowl, dated 1645 (Atkinson & Oswald 1972, 176) is probably of a local source. The fourteen examples of the spurred AO15 pipes were made to varying degrees of quality and at least three variants are detected, first eleven examples of the typical rounded shape, secondly a single bowl, waisted more at the base and thirdly a type with a more pronounced lip. Four examples of the heeled AO 18 bowls are recorded and all have complete or near complete milling of the rim and good finishing. These bowls are present as three different versions; the first two having a rounded barrel shape, while the third type is taller.

1680–1710

All the bowls dated to the period 1680–1710 were plain and not marked. There were six heeled and rounded AO20 bowls with two versions detected, one with narrow heels (two examples) the other with broader heels (four examples). There were ten examples of heeled and straighter sided AO22 bowls with five versions or different moulds detected, mainly by their heels. The first version has a narrow 'heart-shaped' heel, the second has a narrow oval heel, the third is more barrel or rounded in shape with a long, narrow heel and the fourth has a narrow circular heel. All these AO22 bowl versions occur as singular incidences but there are four examples of the fifth type with a broad circular heel base. There is also a single good quality, spurred AO19 bowl, dated 1680/90–1710, however it may be a taller version of the earlier AO15 bowl as it has complete milling on the rim, a feature largely debased on the AO19 and other contemporary bowls.

1780–1830

It is becoming increasingly clear that there were a number of pipe makers producing the AO27 bowl who could only have been working in the 1820s (see Jarrett in prep a) Therefore the date range of the AO27 bowl needs to be extended. A single AO27 bowl occurs decorated with oak leaves on the front and back of the bowl and vertical ribs of alternating widths. The bowl is initialled, but only the forename I is readable and the family name illegible, but possibly also I.

1820–1860/80

Spurred AO28 bowls have been traditionally dated to the 1820–1840 period, but the number of incidences of master pipe makers dating to after 1840 associated with these bowls indicates that they were fashionable up to 1860 and a small number were still being made towards the end of the century (Higgins 2003, 100; Jarrett in prep a). There are four examples of AO28 bowls including two decorated with oak leaf borders, finely moulded on the front of the bowl but poorly so on the back (Fig. 73.1). One example is clearly marked I S on the spur, but on the second bowl the forename initial is illegible. There are a number of possible makers with the initials I S (see Oswald 1975, 145–146), but James Swinyard, 1828–1856, Westminster Road, is considered a likely candidate from the evidence of later bowl types present on the site where his surname is also clearly stamped (see below). Another bowl of this type with oak leaf borders has possible moulded leaves on the spur, while a fourth bowl (in addition to having the oak leaf borders) has alternating sizes of fluting on the bowl (Fig. 73.2). It is marked I E/F on the spur, the initial of the family name being unclear.

1840–1880

The most common bowl type on the site (21 examples) is AO29, characterised by a forward-sloping rim. There are six different bowls of this type and four are very similar in appearance with an acorn and oak leaf border on the front and a plain oak leaf border on the back. However, these bowls differ by the markings on the heel, the first has a 'wreath-like' emblem (Fig. 73.3) and occurs as one example, the second (as five examples) has a large star and the third (eight examples) has a finer star (Fig. 73.4). The fifth is a sole occurrence and identified by a dimple at the centre of the star (Fig. 73.5); this was poorly trimmed around the right side of the rim where a diagonal ridge of clay survives. Another of this bowl type has oak leaf borders on the front, but on the back the border is smudged or poorly moulded. It is initialled W B (Fig. 73.6), a fairly common set of initials for pipe makers in the 1840–1880 period (see Oswald 1975, 132–133). Amongst the known local pipe makers with these initials is William Brown, 1805–1844, Westminster; but this example could derive from slightly further afield, either from William Bishop, 1856–1898, Old Street or William Bush & Co., 1859–1862, High Holborn.

A number of bowls of this type are stamped. There are five identical bowls all with a circular incuse stamp on the back of the bowl with the name 'SWINYARD' in

sans serif lettering above a spiral design. Other examples have a star on each side of the heel (Fig. 73.7). Tobacco pipe makers adopted *sans serif* lettering on their stamps and moulds around 1850, responding to the Post Office changing their date stamps to this letter type after *c*. 1845 (Atkinson 1977, 261). There were a number of people named Swinyard either involved or originating in the London clay tobacco pipe industry, some, if not all, related. The earliest so far known identified is George J. Swinyard, 1783–1787, of Kingsland Road, but a contemporary Thomas Swinyard (not known to be a pipe maker) of Shoreditch had two sons who were in the profession. These brothers were James Swinyard, 42 Hooper Street, Westminster Road and Newington, working *c*.1828–1852 (who continues to be listed in directories until 1856) and William Swinyard, died 1864, at Guildford, while another Thomas Swinyard, 1836–1853, Westminster, incidentally shares the same name of James and William's father (Oswald 1975, 145–146; Hammond 1989, 37–38). The Swinyard-stamped bowls occur with other pipe fragments marked with the name of the publican Taylor, White Hart (see 1850–1910-dated pipes below), in tenure of this public house between 1855–1857, suggesting that James Swinyard is maker of this stamped bowl, although Thomas should not be discounted.

Amongst the more fragmentary bowls, probably dating to this period, is one with a spiral heel (Fig. 73.8).

1850–1910

All the bowls dated 1850-1910 were of the AO 30 type (without heels or spurs), as ten examples with four types present. There are five plain AO30 bowls all with forward sloping rims, one example has stamped in relief on the stem 'TAYLOR · WH[ITE HART]' '[UPPER] THAMES STREET' in *sans serif* lettering (Fig. 73.9), and a stem and nib survive with the complete inscription (Fig. 73.10). Edmund Taylor was the publican of the White Hart, 213 Upper Thames Street, between 1855 and 1857 (Kelly's Directory, London 1855, 1808; Kelly's Directory, London 1857, 1922). This bowl is almost certainly the correct size for a cutty (short pipe) as are probably many of the AO30 bowls present on the site. Four other bowls occur with an oak leaf border on the front and back of the bowl, some with very poor definition indicating the mould was worn when used. The final two AO30 bowls are highly decorated or fancies but are as single occurrences. The first has around the rim a scale border above scalloped panels containing a 'tassel' and a rib at the base of the stem (Fig. 73.11). The second highly decorated bowl is moulded partially as a barrel while the fragmentary lower third has a grape vine motif (Fig. 73.12). This bowl may possibly be associated with a public house or drinking establishment. A small fragment of a stem bears the stamp 'BURNSCL[IFFE]' '[CU]TTY PIPE' and probably came from an AO 30 bowl, but a possible maker, locally or nationally, could not be traced.

DISTRIBUTION AND DATING

The tobacco pipes were distributed through deposits dating from the early 17th century (Phase 16) onwards and their distribution as discussed below.

Phase 16C: Additions to Building 7

The earliest stratified clay tobacco pipes were recovered from fills of two Phase 16C pits one of which produced five fragments of clay tobacco pipes as two stems, a mid 17th-century heel type, a single AO10 bowl, dated 1640–1660 and a single AO18 bowl dated 1640–1660. Above this a further pit produced two clay pipe stems.

A flooding deposit against wall [680] produced three stems and a single AO15 type bowl, dated 1660–1680. Sealing the latter, a bedding layer for floor layer [598] produced five stems and five AO type 15 bowls. The pipes in these deposits could very well be associated with the Unicorn or the Green Dragon drinking establishments.

Phase 17: 1666 Fire Horizon

Tobacco pipes from deposits on the corner block of the west side of Lambeth Hill and the north side of Thames Street, are again probably associated with the Unicorn and Green Dragon. The burning layer [657], associated with the Great Fire of London of 1666, produced a single nib, five stems, including one pinched in alternate directions and three bowls. The earliest bowl was an AO13 type, dated 1660–1680, but two bowls are dated 1680–1710 as AO type 20 and AO22 examples. Clearly the dating of the latest bowls does not correlate with the date of the Great Fire and further to this the clay pipe fragments show no indication of burning and therefore they remain as an anomaly discussed below (see discussion).

Above the burnt layer, a deposit containing bricks infilling a doorway produced a group of 30 fragments of clay tobacco pipes including twelve bowls as a three AO15 bowls and a single AO18 bowl, dated 1660–1680. The latest pipes are dated 1680–1710 as two AO20 bowls and six AO22 examples. An overlying deposit produced a residual AO type 13 bowl, dated 1660–1680 and its fabric was a reduced grey colour throughout, possibly due to a reducing atmosphere in the kiln or heat from a fire. There was also a heel of a bowl probably dating to the 1680–1710 period.

Phase 18: 1666–18th century

Several tobacco pipe types were associated with post-fire clearance and levelling deposits. Pit [617] contained seven thick mid 17th-century dated stems, and an overlying demolition layer produced an AO15 bowl covered in mortar. The fill of pit [580] produced a group of pipes spanning the period 1640–1710, with two residual bowls, an AO10 and AO15, the latest contemporary bowls were an AO22 and a 1690–1710 dated AO19 bowl. Pit [594] produced a single AO22 bowl in its fill [593].

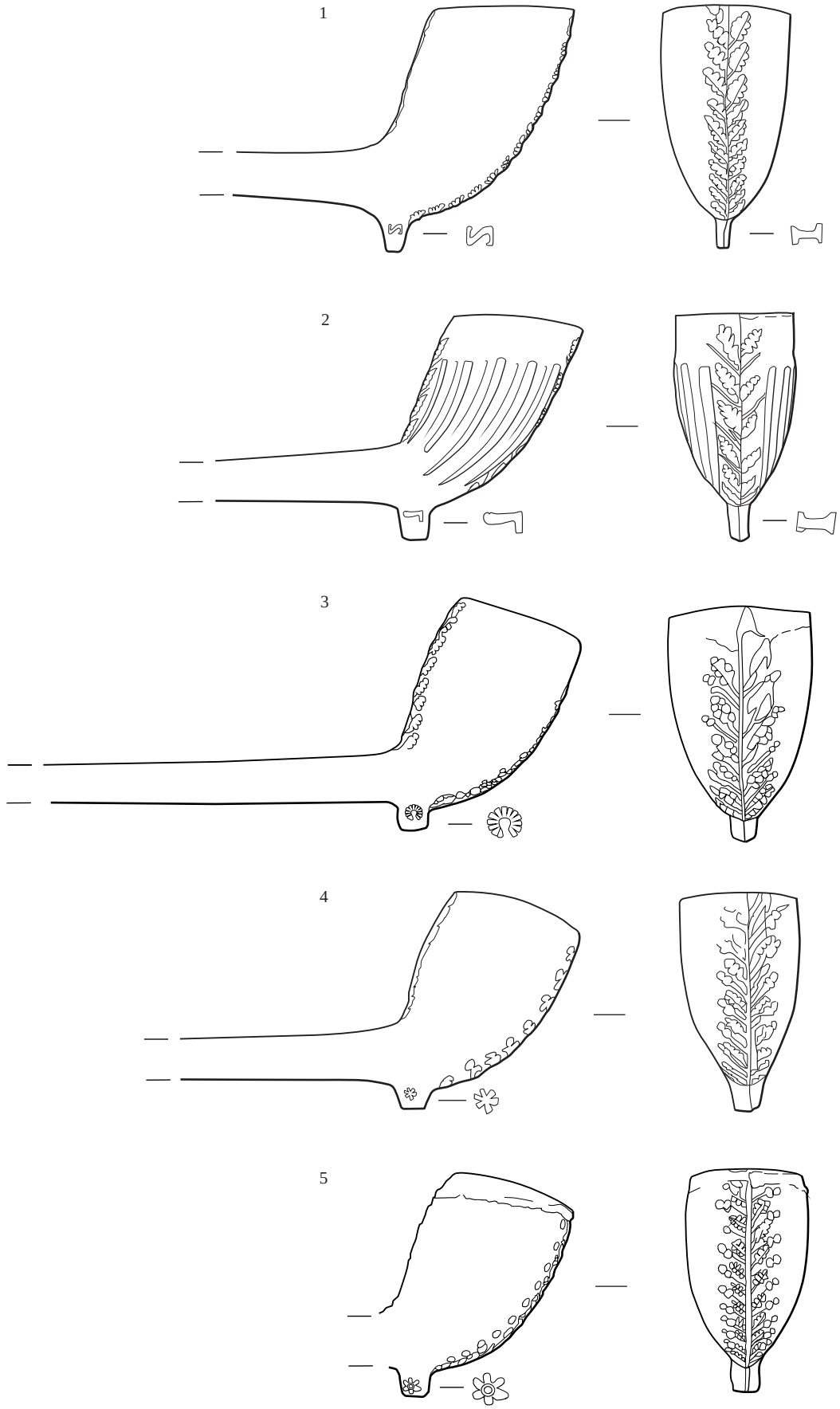
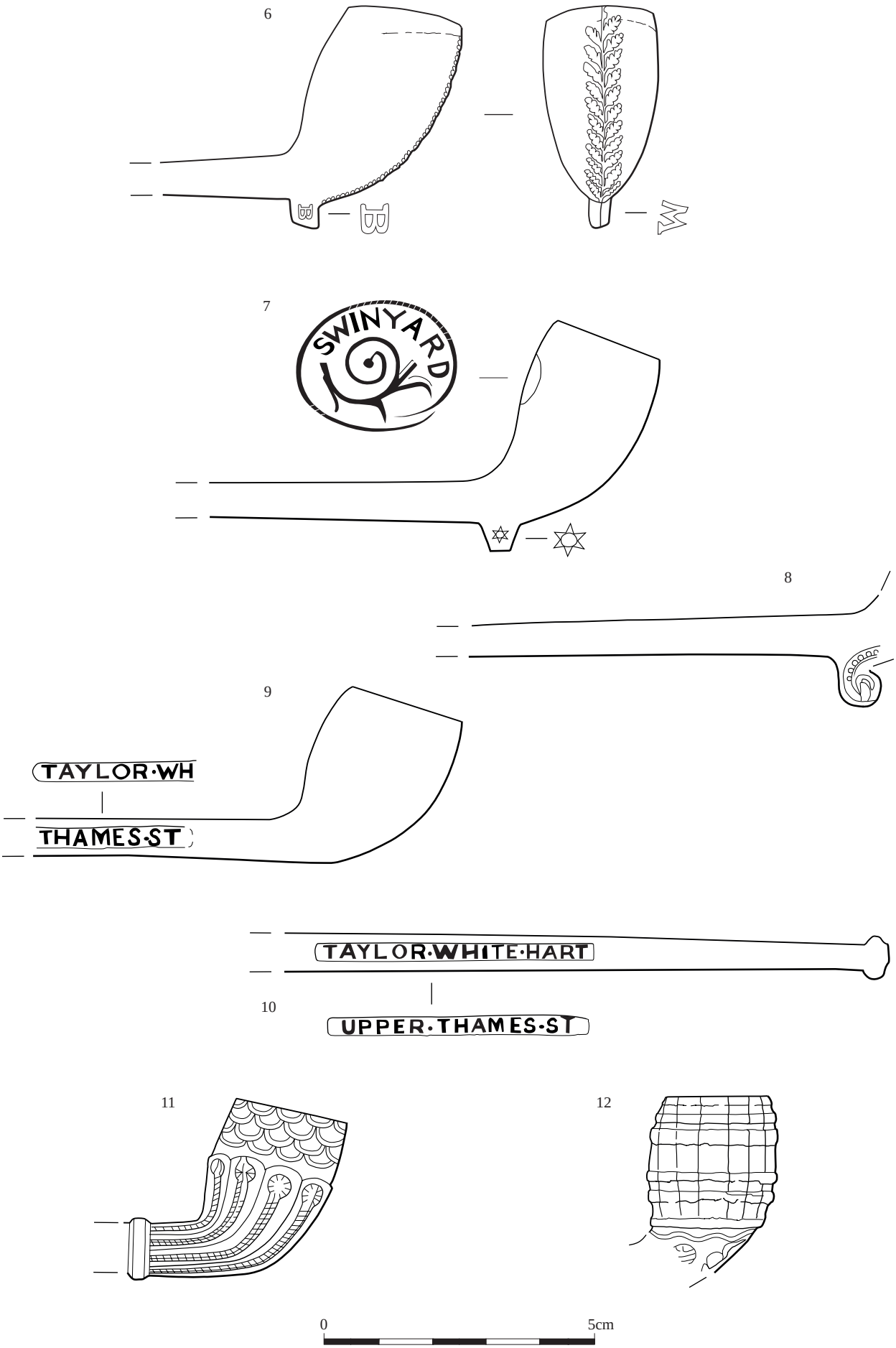


Fig. 73 Clay tobacco pipes (scale 1:1)


6
7
SWINYARD
8
9
TAYLOR·WH
THAMES·ST
TAYLOR·WHITE·HART
10
UPPER·THAMES·ST
11
12
0
5cm

The construction cut for wall [578] of Building 9 contained a single 1660–1680 AO type 18 bowl and a single 1680–1710 AO type 22 bowl. Above this fill, a bedding layer for the floor produced a single stem.

Phase 19: 19th century

A number of Phase 19 pit features produced clay tobacco pipes, including a single AO15 bowl as the variant more waisted at the base of the bowl and the spur of a bowl either from an AO15 bowl or its succeeding type the AO19 bowl, indicating a date between *c*. 1660–1710.

The east–west main sewer [569] produced three 1660–1680 bowls as single examples each of the AO13, AO15 and AO18 bowls, but the latest pipe was a sole AO27 bowl, dated 1780–1820 decorated with fluting and marked I I (Fig. 73.2).

A medium sized group of pipes was recovered from the fill [589] of an access pit for the sewer: 43 fragments, 31 of which are bowls. Apart from one residual AO20 pipe the rest of the bowl types date to between 1820 and 1910. The only AO28 bowls, dated 1820–1840, found on the site occur in this feature as four examples described above. The most common type of pipe is the 1840–1880 AO29 bowl as eighteen examples and include mostly examples with acorn and oak leaf borders either with either thick, thin (Fig. 73.4) and 'dimpled' stars (Fig. 73.5) or wreaths (Fig. 73.3) on their heels, but one bowl is initialled W B (Fig. 73.6). There are also four examples of the AO29 bowls with the Swinyard name stamp (Fig. 73.7) and a heel moulded in the shape of a spiral (Fig. 73.8). The AO30 bowls dated to between 1850–1910 are present in this feature as eight examples and four are plain but a fifth bowl, dating to between 1855–1857, has 'TAYLOR · WH[ITE HART]' '[UPPER] THAMES STREET' stamped on the stem. The three other AO30 bowls in this feature include one with oak leaf borders front and back and two highly decorated examples (Fig. 73.11, 73.12). The presence of both the Swinyard pipes and the stem referring to the landlord Edmund Taylor indicates a tight deposition date of 1855–1856 for this clay pipe group.

A north–south pipe trench produced a residual AO20 bowl, two AO29 bowls, including another example of the Swinyard stamped bowl, and one bowl with acorns and oak leaf border on the front of the bowl and a large star on the heel. A stem is also of note with a stamp 'BURNSCL[IFFE]' '[CU]TTY PIPE' of a late 19th-century date.

A construction cut in the vicinity (probably to the rear) of the White Hart produced a group of 28 fragments of clay tobacco pipes with seven bowls represented, several of which are damaged. The most recent bowls are an AO29 bowl with an acorn and oak leaf border front and back and a 'fine' star on the heel, but there are two identical AO30 bowls with poorly moulded oak leaf borders on the front and back. There is also present a stem and its nib with the stamp 'TAYLOR · WHITE HART', 'UPPER THAMES STREET'.

DISCUSSION

The earliest pipes recorded date from 1640–1660 and probably reflect the socio-economic status of the properties on the site at this time, as it was only in this period that tobacco became affordable by most levels of society. Generally in London the earliest pipes recovered from sites date to the mid 17th century and it is usually only where higher status residences, areas of merchants, people with maritime connections or probable drinking establishments are excavated that late 16th- and early 17th-century tobacco pipes are recorded.

Clay tobacco pipes were only recovered from one deposit associated with the Great Fire of 1666, layer [657], but these bowls are problematic. All the bowl types from that layer are of the period 1680–1710 and so later than the Great Fire and it is generally accepted that the chronology for both the *c*.1660–1680 and the *c*.1680–1710 bowls is accurate. Excavations in the City of London have encountered Great Fire deposits on numerous occasions (Milne 1986, 105–115) and where tobacco pipes are present as at Peninsular House, Pudding Lane and 49–52a Bow Lane, these fall in the 1660–1680 date range (Milne & Milne 1985, 176; Butler 2000, 10). Additionally the pottery recovered from the Great Fire deposits was heavily burnt and often fused to other material (see Sudds, above), whereas the 1680–1710 pipes showed no evidence for being burnt in a fire. Therefore the 1680–1710 tobacco pipes recovered from the Great Fire deposits are an anomaly. They are recovered from an area showing no post Great Fire redevelopment on Ogilby and Morgan's 1676 map. An interpretation might be that these pipes were recovered from the upper surface of the conflagration deposit during excavation and relate to a period of rebuilding, some two or more decades after the catastrophe, when other pipes of this date are also well represented on the site.

One aspect of the clay tobacco pipe assemblage from the site that should be considered is what sort of premises specific groups derive from. While several of the contexts producing clay tobacco pipes may be associated with purely domestic households, others may be associated with known drinking establishments located within the area of the excavation. Large numbers of clay pipes are important criteria that maybe used to determine the presence of post-medieval inn, public house, tavern and ale house assemblages (Bragdon 1988; Pearce 2000). However, the clay tobacco pipes from the Salvation Army Headquarters excavations occur in small or medium-sized groups, but were recovered from areas (particularly the western part of the site) where drinking establishments were located. Pre-Fire clay tobacco pipes might be associated with the Green Dragon and the Unicorn, where one group has been found associated with a masonry structure for possibly housing either a vat or a barrel for brewing. The Green Dragon was rebuilt after the fire, while later public houses within the bounds of the site include the White Hart and the Barleymow. Some pipes are specifically associated with Edmund Taylor, landlord of the White Hart. One of the groups containing

his pipes was located in the vicinity of the rear of this establishment, but another group is derived from an access pit (dug perhaps in 1855–1856) to the 1841 sewer. These pipes might be refuse from the White Hart or were perhaps the discarded possessions of workmen who had frequented that public house during their period of work on the sewer.

Glass

John Shepherd and Sarah Carter

Thirty-seven fragments of post-Roman glass were found in the course of the excavation. No medieval fragments were identified and all were post-medieval, dating from the 17th to 19th centuries. The assemblage is fragmentary and presents a diverse range of vessels. There are no coherent, large groups and, considering the general high frequency of glass from post-medieval contexts elsewhere in London, it is likely that these fragments represent very random scatters. As one would expect, bottle and window glass fragments were the most numerous. None of the fragments have been illustrated and a catalogue of all material recovered is held with the archive.

Registered Finds

Märit Gaimster

In total, some 59 individual finds of metal, bone and ceramic were retrieved from medieval and post-medieval contexts, of which fifteen were iron nails. This report focuses on finds of significance, which reflect the development of the site in the medieval and post-medieval periods; a fuller list of the metal and small finds can be found in the assessment report for the site (Nooijen 2004). The finds relate directly to buildings and occupation along Thames Street and Lambeth Hill at this time, and notably include debris from the Great Fire of 1666. A second finds context is provided by the sequence of metalled road surfaces relating to medieval and early post-medieval Thames Street.

Two major features, a sequence of road surfaces and the site of a building, represent the development of the site from the mid 12th century onwards. The finds from these features are discussed separately below.

Medieval and early modern Thames Street

From the five phases of road metalling identified, dating from the 12th through to the 17th centuries, finds were recovered which reflect the hustle and bustle of a busy street, such as horseshoe nails from the 17th-century road surface [599] and the part of a standard-type late medieval horseshoe <47> found further west under the foundations for wall [567] of Building 7 (Nooijen 2004, 253). A more unusual find is a cruciform horse-harness pendant <12> from the mid 12th to 13th-century road surface (Fig. 74.1); it is gilded, which is not unusual among the more frequent harness pendants at this time (Griffiths 1995, 62). There are an increasing number of known horse-harness pendants, above all as a result of metal-detector finds recorded through the Portable Antiquities Scheme. Many are isolated finds from rural sites; not surprisingly pendants were often lost *en route*. Suspended from the breast band or rear strap, these decorations were clearly associated with horsemen of some status; the numerous heraldic pendants were most probably worn by the retainers of knights and nobles (Griffiths 1995).

The Phase 14 road surface yielded a piece of worked animal bone; the surface is highly polished from frequent handling but the function of this object remains unknown.

An object made of folded copper-alloy sheeting <14>, was retrieved from the late 15th-century Thames Street surface. Two pieces fit together and the angular shape is suggestive of a buckle. Buckles made of folded strips of copper-alloy are known, in particular from a late 15th-century workshop hoard recovered from the bottom of a well near Cheapside in London (Murdoch 1991, 156–157 no. 413). This method represented a novelty in producing cheap dress accessories without the need for casting and melting metals (Egan & Forsyth 1997, 217). However, while other known sheet buckles are made of thin strips of

Phase	Pottery date	Context*	SF	Description	Figure
11	mid C12th –13th	Road surface [715]	<34>	copper-alloy mount or strap end; incomplete; 3 rivet holes; L 21mm; W 7mm	
12	mid C13th–14th	Road surface	<12>	copper-alloy horse-harness pendant; complete; cruciform with central boss with three protrusions for domed rivets; traces of gilding; L 46mm W 32mm	Fig. 74.1
14	late C15th	Road make-up	<67>	worked and polished piece of animal bone; rib probably from pig; L 135mm; W 9-17mm	
14	late C15th	Road surface	<14>	three pieces of copper-alloy tube formed by rolled sheet; one piece with right-angle bend; L 54mm; W 5mm (two pieces fitting together)	
16A	17th century	Road surface		two incomplete iron horseshoe nails with rectangular heads; L 13 and 30mm	
16A	17th century	Foundation [690]	<47>	incomplete iron horseshoe; Clark Type 4; one web complete L 110mm; W 115mm	

Table 17 Finds from medieval and post-medieval metalled road surfaces of Thames Street
*Context no. only shown where context illustrated elsewhere in plan.

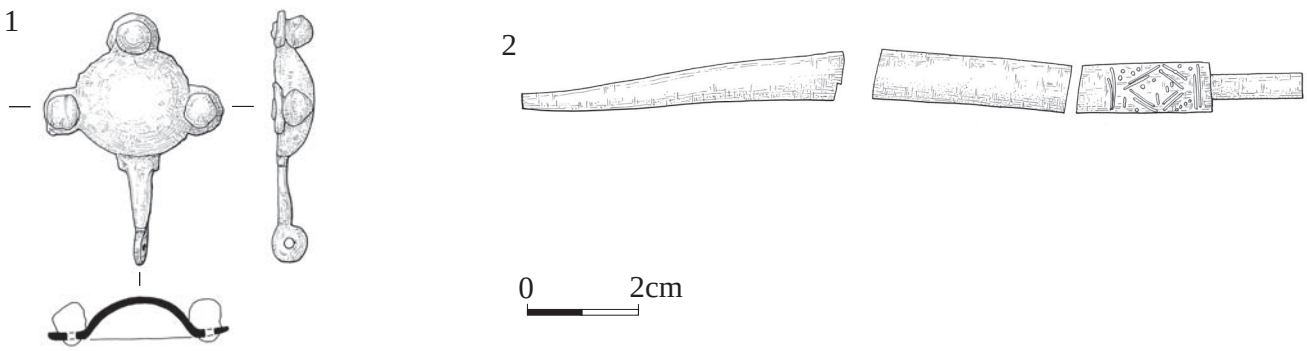


Fig. 74 Horse equipment: 1) copper-alloy horse-harness pendant, 2) Fragment of a decorated spur (scale 1:2)

copper-alloy, folded over and bent into shape, this object consists of a rolled and bent sheet. It may be compared to a group of large and earlier medieval lace-chapes (Egan & Pritchard 1991, 290 and fig. 188).

The buildings on the north side of Thames Street

Finds from below the remains of pre-Fire Building 7 indicate the existence of earlier buildings on this property from at least the 13th century. As outlined above several phases of the building were recorded, culminating with a fire horizon; almost certainly caused by the Great Fire in 1666. Redevelopment of the area did not commence until the late 17th century, with the construction of the walls of Building 9 within the footprint of the pre-Fire building.

Numerous metal finds were retrieved from the main part of Building 7, notably architectural fittings from the charcoal deposit [657] associated with the Great Fire. These include two rod-pivoted strap hinges <61> and <62>, the latter with a base plate (Fig. 75.3). There is also a substantial piece of strap fitting with decorative protruding roundels for nails (Fig. 75.5), as well as an incomplete 'Cockshead' hinge (Fig. 75.4); all these are likely to be door fittings. Numerous 17th-century 'Cockshead' hinges are known, both from dated houses and archaeological excavations (Alcock & Hall 1994, 25; Drewett 1976, fig. 14: 29). Other structural fittings are more difficult to place: the incomplete hook or staple <59> is one example (Fig.

Phase	Pottery date	Context*	SF	Description	Figure
11	mid C12th-13th	Make-up dump	<50>	iron hinge pintle; L (spike) 105mm (pivot) 45mm	
16a	1600-1700	Fire horizon	<23>	iron spur; incomplete; L 85mm; W 15mm; decorated with non-ferrous inlay	Fig. 74.2
16c	1612-1650	Pit fill [605], of [606]	<8>	copper-alloy thimble; dome-shaped; brazed with stamped indentation; ht. 29mm; diam. 11mm	
17	1580-1700	Collapse [573] in Building 7	<21>	copper-alloy dome-shaped mount; cast with central rivet; diam. c. 23mm; decorated	
17	1630-1680	Fire horizon [657] in Building 7	<57>	iron knife; whittle tang; incomplete; L 75mm; W (blade) c. 20mm	
17	1630-1680	Fire horizon [657] in Building 7	<59>	iron hook/staple or other structural fitting; square-sectioned rod/spike flattening out to U-shaped hook; L 65mm; W 35mm; incomplete	Fig. 75.1
17	1630-1680	Fire horizon [657] in Building 7	<60>	iron binding; two overlapping pieces; W (bottom piece) 40mm (top piece) 30mm	
17	1630-1680	Fire horizon [657] in Building 7	<61>	iron strap hinge; rod pivoted; tapering; incomplete; L 125mm; W (max) 45mm; two nails extant	Fig. 75.2
17	1630-1680	Fire horizon [657] in Building 7	<62>	iron strap hinge; rod pivoted; L 170mm; W (rod) 60mm; tapering; ?base plate corroded to strap; two nails extant	Fig. 75.3
17	1630-1680	Fire horizon [657] in Building 7	<63>	iron "Cockshead" hinge; rod pivoted; incomplete; L (rod) 60mm; W 55mm	Fig. 75.4
17	1630-1680	Fire horizon [657] in Building 7	<65>	iron strap fitting; incomplete; tapering; L 270mm; W 20-25mm; two nails extant	Fig. 75.5
17	1630-1680	Fire horizon [657] in Building 7	<66>	numerous bits of iron binding; W 30mm	
18	C15th	Fill [829] of barrel well [830]	<37>	irregular lead disc or weight; diam. 50-55mm; ht 10-18mm; weight 147g	

Table 18 Finds from medieval and post-medieval buildings on the north side of Thames Street
*Context no. only shown where context illustrated elsewhere in plan.

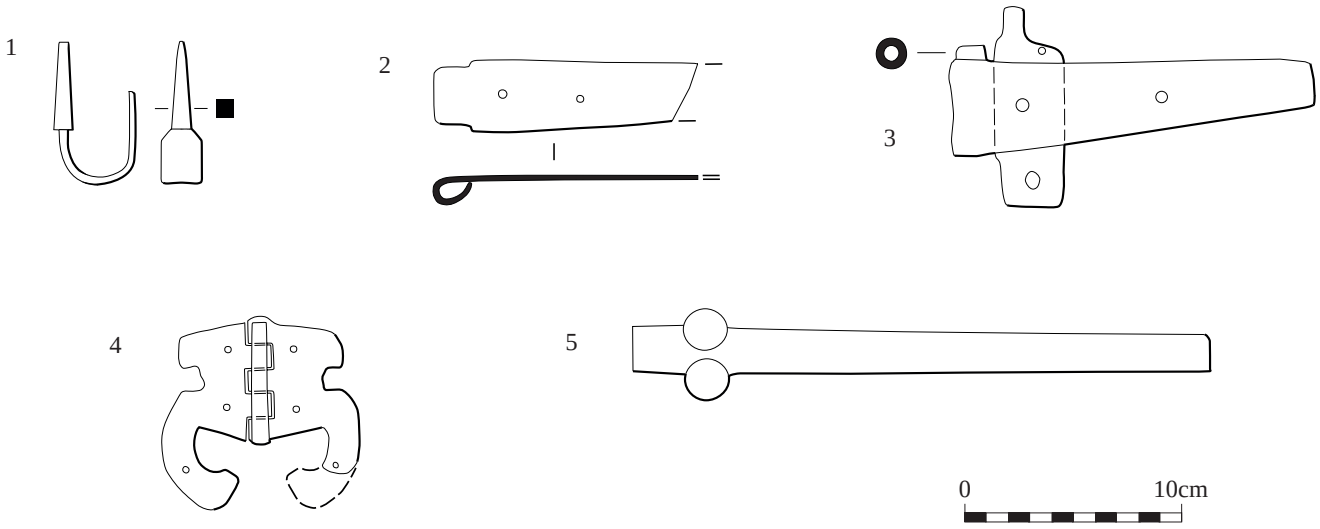


Fig. 75 Fragments of door furniture recovered from the Great Fire burnt horizon in Building 7 (scale 1:4)

75.1). Other elements of ironwork were also present among the finds from the fire debris. They include several bits of iron binding, testifying to the presence of one or several barrels in the house. Among these iron finds was also part of a whittle tang knife.

A decorated copper-alloy mount <21> was retrieved from the rubble infill of the doorway in wall [680], of the early to mid-17th century extension of Building 7. The surface of the mount is much corroded but cleaning has revealed a raised central motif, possibly of a five-petalled flower. The mount is dome-shaped and quite substantial and would have been originally fitted on to a leather belt or strap. Petal-shaped mounts and rivets are common during the medieval period, but seem to be in decline by the 17th century (Egan & Forsyth 1997, 219–220). The mount may be compared with a 17th-century cast button from Exeter (Goodall 1984, fig. 191 no.134). A fragment of a decorated spur <23> was also recovered from the secondary infill between the walls of the extension and the original building. This consists of two joined fragments of the shank, as it tapers towards the terminal, decorated with a pattern of lines, dots and lozenges (Fig. 74.2). An almost identical decoration can be seen on an iron rowel spur from Winchester, dated to *c.*1630 (Biddle 1990, fig. 331 no. 3873). Other decorated spurs, often with silver inlay, are known from the early 17th century (Biddle 1990, 1041 fn. 15); another example is a high-class copper-alloy spur, decorated with trefoil leaves, from Bolingbroke Castle in Lincolnshire (Drewett 1976, fig. 15 no. 54).

Apart from nails, few other objects can be identified among the finds from Building 7. However, a few earlier finds may be associated with the property. They include a copper-alloy thimble from a rubbish pit [606], associated with early 17th-century pottery. This type of thimble, tall and domed and with machine-made indentations, has been defined as Dutch Type II; it is conventionally dated to the period 1650–1730 (Holmes 1988, fig. 7). An iron hinge pintle <50>, for hanging a door or shutter, comes from a dump layer below the pre-Fire building, dating from the mid 12th–13th century; numerous similar fittings are known from medieval sites (cf. Egan 1998, 43–46; Goodall 1984, fig. 189 nos. 14–16).

19th-century occupation at Thames Street/Lambeth Hill

The 19th century saw the construction of a large east–west brick-built sewer along Thames Street, with a series of north–south orientated pipes feeding into it. There were also traces of a 19th-century building in the form of a vaulted basement to the north of the 18th-century building.

Finds from this period include iron nails, bars and pipe, but also an interesting spherical ceramic object. Made of well-fired 18th/19th-century fabric containing clinker (B. Sudds, pers comm), the object is pierced for suspension or the insertion of a narrow bar. This is most likely some form of weight. A similar ceramic object is on display in Aylesbury Museum, Buckinghamshire, in a 19th-century local production case; there it is described as a plumb bob (C. Jarrett pers comm).

Also, from the fill of a 19th-century sewer, a copper-alloy disc with scalloped edges was retrieved. There are no traces of rivets or other elements for mounting, and the function of the disc remains unknown.

Animal Bone

Robin Bendrey

The excavation produced a hand-recovered assemblage of 1,225 animal bone fragments from medieval and post-medieval phased deposits together with a further 13 fragments which were recovered from bulk-sieved samples (Tables 19 and 20). The sample sizes of animal bones from individual phases are, however, rather limited. This report considers the general characteristics of the phased assemblages, but will focus in greater detail on the larger samples from Phases 10 and 15. The methodology followed is the same as for the Roman assemblage (see Bendrey, Chapter 3).

Phase	10	11	12	13	14	15	16A	16B	16C	17	18	19	Total
mammal													
cattle	104	55	38	91	16	29	14	1	18	7	12	23	408
sheep/goat†	84	16	4	10	6	24	12	-	30	19	9	14	228
(sheep)	(38)	(5)	(2)	(4)	(93)	(10)	(2)	-	(14)	(7)	-	(6)	(91)
(goat)	(3)	-	-	-	-	-	-	-	-	-	-	-	(3)
pig	57	12	2	7	2	10	5	-	10	4	11	3	123
horse	3	-	-	-	-	-	2	-	-	-	-	-	5
dog	2	-	-	-	-	1	-	-	-	-	-	-	3
cat	1	-	-	-	-	6	-	-	-	-	-	-	7
red deer	2	1	-	-	-	-	-	-	-	-	-	1	4
fallow deer	-	-	-	-	-	-	1	-	1	-	-	1	3
roe deer	2	-	-	-	-	-	-	-	-	-	-	-	2
hare	-	-	-	-	-	-	-	-	-	-	-	-	0
rabbit	-	-	-	0	-	3	-	-	-	-	2	1	6
cattle-sized	92	41	14	33	13	29	9	-	36	4	11	5	287
sheep-sized	31	3	1	1	2	21	4	1	5	12	24	6	111
indeterminate	3	1	-	-	1	2	1	-	-	-	4	-	12
bird													
galliform†	4	-	-	1	-	8	-	-	-	-	1	1	15
(chicken)	(4)	-	-	-	-	(3)	-	-	-	-	-	-	(7)
goose	2	-	-	-	-	-	-	-	-	-	-	-	2
duck	-	-	-	-	-	2	-	-	-	2	-	-	4
indeterminate	2	-	-	-	-	2	1	-	-	-	-	-	5
Total	**389**	**129**	**59**	**143**	**40**	**137**	**49**	**2**	**100**	**48**	**74**	**55**	**1225**

Table 19 Distribution of hand-recovered animal bone from medieval and post-medieval contexts, by number of fragments (NISP)
† - sheep/goat and galliform include specimens identified at species level

	phase 10 context 806 sample 72
sheep/goat	2
pig	1
red deer/fallow deer	-
cattle-sized	2
sheep-sized	5
indeterminate mammal	3
indeterminate small mammal	-
galliform	-
Anas sp.	-
indeterminate bird	-
Total	**13**

Table 20 Distribution of animal bone from bulk-sieved samples from Phase 10 11th–12th-century contexts, by number of fragments (NISP)

TAPHONOMY

A relatively high proportion of the excavated animal bones from medieval and post-medieval features exhibit abraded surfaces and rounded edges consistent with being worn by fluvial action (Table 21). Other processes, other than fluvial transport, can abrade bone, such as trampling and aeolian activity (Lyman 1994, 187). The evidence suggests that fluvial transport is the cause here as worn areas are recorded over entire specimens and not only on restricted (exposed or top) surfaces as is caused by aeolian activity, and are not possessing deep scratches as is recorded from trampled bone (Lyman 1994, 187).

Abraded fragments are best represented in the road make-up deposits, probably introduced in foreshore material used as levelling layers. Consideration of this taphonomic evidence is vital to an understanding of the assemblage, in order to differentiate between material discarded on site from that brought in from the foreshore. Material that has undergone fluvial sorting is likely to be biased. The assemblages from contexts where this material occurs often differ in composition from contexts without abraded fragments (Table 22): these assemblages have different taphonomic histories and arrive on site via different pathways.

Detailed consideration of the Phase 15 animal bone assemblage indicates the bias that is present. The relatively large size of this assemblage allows the difference between these deposits, which also exists in other phases, to be explored. The presence of cattle is exaggerated by a number of contexts that produced relatively high proportions of abraded fragments consistent with being worn by fluvial action (Table 23: also visible in Phases 11, 12 and 14). In Phase 13 these abraded fragments are best represented in the make-up deposits for road surfaces. In these deposits ([677] and [688]) 87% and 82% of the fragments have an abraded surface respectively (Table 24) and, as stated above, may have come from the use of foreshore material as make-up for the roads.

The bones picked up in foreshore material would not be representative of the original waste discarded into the river or onto the foreshore; the action of the water would

phase	abraded surface	carnivore gnawed	rodent gnawed	green staining	butchery marks			Total NISP
					chop	cut	saw	
10	8	36	-	-	24	14	1	83
11	40	5	-	1	4	5	-	55
12	28	5	-	1	2	1	-	37
13	114	4	-	2	2	-	-	122
14	17	-	-	-	2	-	-	19
15	-	23	3	1	4	7	2	40
16A	10	3	-	7	2	1	-	23
16B	1	1	-	-	-	1	-	3
16C	2	15	-	2	10	5	1	35
17	3	1	-	-	4	3	1	12
18	8	3	1	-	1	4	8	25
19	15	4	5	1	1	1	3	30
Total	246	100	9	15	56	42	16	484

Table 21 Some taphonomic data from medieval and post-medieval contexts, by number of fragments (NISP)

	Phase 13 road surface intersection [677]		Phase 13 sandy gravel bedding below road [684]		Phase 13 sandy gravel make-up for road [688]		Phase 15 chalk lined well [1]–[5]	
	No.	%	No.	%	No.	%	No.	%
cattle	39	73.6	17	18.9	4	25.0	17	18.9
sheep/goat†	3	5.7	11	12.2	3	18.8	11	12.2
(sheep)	(1)	-	(5)	-	(3)	-	(5)	-
pig	3	5.7	3	3.3	1	6.3	3	3.3
cat	-	-	6	6.7	-	-	6	6.7
rabbit	-	-	3	3.3	-	-	3	3.3
cattle-sized	8	15.1	19	21.1	7	43.8	19	21.1
sheep-sized	-	-	18	20.0	1	6.3	18	20.0
indeterminate	-	-	1	1.1	-	-	1	1.1
galliform†	-	-	9	10.0	-	-	9	10.0
(chicken)	-	-	(3)	-	-	-	(3)	-
duck	-	-	1	1.1	-	-	1	1.1
indeterminate	-	-	2	2.2	-	-	2	2.2
Total	53	100	90	100	16	100	90	100
% worn/abraded	86.8		56.3		81.9		0.0	

Table 22 Comparison of bone-producing features from Phase 13 roads & Phase 15 well, by number of fragments (NISP)
† - sheep/goat and galliform include specimens identified at species level

	total assemblage					adjusted assemblage		
	cattle	sheep/ goat	pig	abraded surfaces		cattle	sheep/ goat	pig
phase	No.	No.	No.	No.	%	No.	No.	No.
10	104	84	57	8	5.2	36	36	26
11	55	16	12	40	31.2	19	8	3
12	38	4	2	28	47.4	1	-	-
13	91	10	7	114	49.3	-	-	-
14	16	6	2	17	26.1	2	3	-
15	29	24	10	-	0.0	29	24	10
16a	14	12	5	10	20.4	-	2	-
16b	1	-	-	1	50.0	-	-	-
16c	18	30	10	2	25.0	9	25	8
17	7	19	4	3	6.2	-	7	1
18	12	9	11	8	11.1	2	7	10
19	23	14	3	15	25.8	4	4	1

Table 23 Comparison of numbers of cattle, sheep/goat and pig bones with numbers of fragments with abraded surfaces in medieval and post-medieval assemblages, by number of fragments (NISP)
The 'adjusted assemblage' excludes all contexts that have any evidence for abraded fragments

phase	10	13	13	15	16C
feature	Circular possible robber cut for wall	Road surface intersection	Sandy gravel make-up for road	Chalk lined well	Pit [606]
context	[854]	[677]	[688]	[30] [1]-[5]	[605]
cranium	2	1	-	1	1
mandible	9	5	6	1	1
loose teeth	4	-	2	-	-
hyoid	-	-	-	-	1
cervical vertebra	2	1	4	-	1
thoracic vertebra	-	-	-	-	-
lumbar vertebra	-	-	2	-	-
sacrum	1	-	1	-	-
rib	1	-	2	-	1
scapula	2	5	2	-	-
humerus	2	2	-	2	2
radius	6	4	3	1	-
ulna	4	1	2	-	-
pelvis	1	3	4	2	-
femur	3	1	-	1	-
tibia	6	4	6	2	1
astragalus	2	1	2	1	-
calcaneum	3	2	4	1	-
tarsal	1	-	-	-	-
metacarpal	3	2	3	2	-
metatarsal	2	3	5	2	-
metapodial	1	1	-	-	-
1st phalanx	1	3	-	1	-
2nd phalanx	-	-	-	-	1
3rd phalanx	-	-	-	-	-
Total	56	39	48	17	9

Table 24 Cattle skeletal element representation in the larger feature-samples from medieval and post-medieval contexts, by number of fragments (NISP)

have adjusted the assemblage as some skeletal elements are more easily moved than others (Lyman 1994, 172), and the high proportion of cattle may represent the assemblage left behind by the action of the water. These road deposits, containing abraded bones and a high proportion of cattle, contrast with others with a wider range of taxa, for example the Phase 15 fills of well [30] (Table 24). This feature contained all the bird bone from this phase, and a range of the smaller mammals: some food waste, such as rabbit, and some not, such as cat, but all indicating a much greater domestic character. The proportions of the taxa in this feature are probably more representative of the contributions made by the different taxa to the diet and economy, than deposits such as the road make-ups discussed above.

TAXONOMIC REPRESENTATION

Ranking the common taxa in order of numerical importance indicates a number of trends (Tables 21 and 23). Cattle are the most common taxon in Phases 10 to 16A, although the proportion of cattle is far closer to that of sheep/goat and pig in Phase 10 (11th century) an assemblage with relatively limited evidence of fragments with abraded surfaces. Assemblages from Phases 11–14 all contain high proportions of cattle. The later assemblages, from Phases 16 to 19, are all rather small with samples sizes of less than 100 fragments. Exclusion of contexts containing abraded specimens from the fragment count reveals a similar picture (Table 23: adjusted assemblage) in terms of cattle being the most common taxon in Phases 11 to 14, but their dominance is significantly reduced.

SKELETAL ELEMENT REPRESENTATION AND BUTCHERY

Examination of cattle skeletal element representation from Phase 10 (context [854] the robbing of 'Period I', Phase 6c, wall [910]) shows bones from all areas of the skeleton (Table 24), indicating complete carcasses contributing to the assemblage. Best represented are the larger and more robust bones: the mandible, radius and tibia. This pattern is also true for the sheep/goat and pig samples from this context (not shown), in which the mandible and tibia were also the best-represented elements. This, linked with the evidence for carnivore gnawing, suggests that this pattern may reflect preservation bias associated with delayed burial following disposal on site: taphonomic attrition would

preferentially destroy the smaller, less dense bones.

Examination of skeletal element representation, apart from context [854], is limited by small sample sizes. Relatively large samples, from Phase 13 road make-ups [677] and [688], allow analysis of the cattle bones (Table 24): these indicate that it is the larger and more robust elements that are surviving (the mandible and the tibia are best represented). This is largely due to preservational bias, indicated by the range of taphonomic data (Table 21), such as abraded surfaces and carnivore gnawing marks, and is particularly evident in Phases 11 to 13.

Individual assemblages are rather small and derive from different activities, including butchery and consumption waste. Butchery evidence from Phases 10 and 11 indicates occasional examples of joint disarticulation, meat removal and marrow extraction. Evidence for kitchen/table waste derived from Phase 15 fills of the chalk lined well [30], and Phase 16C pit [606], where there are bones of veal and young pig. Quantities of kitchen/table waste are also represented amongst the assemblages from Phases 17 to 19.

Most of the deer remains from the site are post-cranial bones and are evidence for consumption, although there is one fragment of red deer antler (Phase 11) and a fallow deer distal metapodial fragment (Phase 16C) has numerous chops across its shaft and may represent bone working residue.

A cattle metatarsal, from Phase 19 sewer fill [568], has been made into a socketed point: a hole has been made in the proximal articular surface (*c.* 2 cm in diameter) and the shaft has been fashioned into a point.

AGE AND SEX DATA

Apart from a single Phase 10 specimen, all the cattle mandibles are from mature animals (Table 25), indicating the importance of secondary products such as traction, milk or breeding. The epiphyseal fusion data generally supports this, though it also indicates a few animals culled within their first three years (Table 26). The low quantity of younger material is probably also a result of taphonomic attrition. As the material from the road make-up deposits greatly over-represents the large bones of cattle compared to the smaller taxa, so the older animals are over-represented in relation to the more fragile bones of younger animals; for example in Phase 15 the majority of the immature material derives from the fills of the chalk well. A number of pelves were sexed: one male and one female specimen from Phase 12; one male from Phase 10; one female from Phase 16.

Sheep/goat dental and epiphyseal fusion data (Tables 25 and 26) indicate some animals being culled within the first three years: presumably secondary products, such as wool, were not of prime importance with these animals. A number of pelves have been sexed: single female pelves were recorded from Phases 10, 16 and 17 and two male pelves are recorded from Phase 13 and one from Phase 16C.

Age data for pigs is also rather limited (Tables 25 and 26) but suggests a mixed age of 12 months, 24 months and 36–42 months at death. A number of specimens could be sexed on the morphology of the lower canine: Phase 10 produced two male specimens; Phase 11 produced two male and one female lower canine; and a male lower canine is recorded from Phase 13.

Neonatal bones are rare in the assemblage, with fragments of neonatal pig deriving from Phases 15 and 16C and cattle from Phase 16C.

PATHOLOGY

Two rib fragments, from Phase 10 [854], one identified to cattle and one cattle-sized have periosteal bone growth on the inner surface. These indicate a chronic pulmonary infection, perhaps tuberculosis.

A Phase 15 cattle metatarsal exhibits eburnation on, and extension of, the medial condyle and new bone growth on the posterior side of the distal diaphysis, mostly on the medial side. This is probably a work-related change.

A sheep humerus from Phase 15 has a small exostosis on the lateral side of the distal articulation. In sheep, such exostoses on the elbow joint are common and may be due to trauma to this relatively exposed site (Baker & Brothwell 1980, 127).

A pig mandible from Phase 11 has a notable pathology.

age stage	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
cattle	0-1 mth	1-8 mth	8-18 mth	18-30 mth	30-36 mth	young adult	adult	old adult	senile
Phase 10	-	-	-	1	-	-	2	-	-
Phase 11	-	-	-	-	-	-	1	1	-
Phase 12	-	-	-	-	-	-	1	1	1
Phase 15	-	-	-	-	-	-	-	1	-
sheep/goat	0-2 mth	2-6 mth	6-12 mth	1-2 yrs	2-3 yrs	3-4 yrs	4-6 yrs	6-8 yrs	8-10 yrs
Phase 10	-	-	-	4	3	-	-	-	-
Phase 13	-	-	-	-	-	-	1	-	-
Phase 15							1		
Phase 16C	-	-	1	-	-	-	-	-	-
pig	0-2 mth	2-7 mth	7-14 mth	14-21 mth	21-27 mth	27-36 mth	adult	old adult	senile
Phase 10	-	-	-	1	1	-	-	-	-
Phase 16A	-	-	-	1	-	-	-	-	-

Table 25 Aged cattle, sheep and pig mandibles from medieval and post-medieval contexts
Suggested ages follow Halstead (1985), Payne (1973) and Hambleton (1999)

		phase	10	11	12	13	14	15
cattle								
distal humerus/	12-18 mths	unfused	-	-	-	-	-	1
proximal radius		fused	7	2	3	5	2	1
distal metacarpal/	24-30 mths	unfused	3	-	-	-	-	-
distal tibia		fused	5	2	1	7	1	2
distal metatarsal	28-36 mths	unfused	1	-	-	-	-	1
		fused	1	1	-	2	-	2
calcaneum	36-42 mths	unfused	1	1	-	-	1	1
		fusing	-	-	-	0	-	1
		fused	4	2	3	3	-	-
sheep/goat								
distal humerus/	10 mths	unfused	1	-	-	-	-	-
proximal radius		fused	11	5	-	1	2	4
distal metacarpal/	18-24 mths	unfused	4	1	-	1	-	0
distal tibia		fusing	1	-	-	-	-	-
		fused	8	1	1	1	0	2
distal metatarsal	20-28 mths	unfused	2	-	-	1	-	-
		fused	-	-	-	-	-	-
pig								
distal humerus/	12 mths	unfused	-	-	-	-	-	1
proximal radius		fusing	1	-	-	-	-	-
		fused	3	1	-	1	1	-
distal tibia	24 mths	unfused	3	1	-	2	-	-
		fused	4	-	-	-	-	-
proximal ulna	36-42 mths	unfused	4	-	-	-	-	-
		fused	1	-	-	-	-	-

Table 26 Medieval and post-medieval cattle, sheep/goat and pig epiphyseal fusion data
Suggested ages follow Silver (1969)

There is a swelling on the lateral side of the horizontal ramus, the bone at this point is very thin, and has broken (taphonomic rather than pathologic) and the root apex of the canine is almost protruding through at this point. The enamel of the root end of the canine exhibits a 'wrinkled' appearance.

DISCUSSION

The sample sizes are generally too small to accurately judge the relative contributions of the different taxa, but the data does indicate that cattle, sheep and pig made the major contribution.

Taphonomic analysis has highlighted different pathways that bones have taken in arriving on site in the medieval and post-medieval periods. Bone fragments with abraded surfaces, many consistent with fluvial action, are recorded from most phases and are relatively well-represented in Phases 11–14 (Table 21). These fragments are best represented in the road make-up deposits, probably introduced in foreshore material used as levelling layers. Taphonomic attrition has resulted in relatively large proportions of cattle bones and also the larger and more robust skeletal elements predominating in these deposits. Other contemporary deposits produced evidence for domestic waste, with evidence for butchery and consumption such as the fills of the chalk-lined well in Phase 15. Even allowing for the bias produced by material exhibiting abraded surfaces, cattle is still shown to be the most common taxon in Phases 11–14. Age data for cattle indicates most animals were culled after a useful working life, however this pattern is also probably biased by taphonomic attrition and it can be seen from deposits of domestic waste that veal was contributing to the diet. The single pathological cattle specimen, from Phase 15, can be seen to support the idea of meat derived from work animals, as this arthropathy is most likely a result of the beast being used for traction.

Small quantities of age, sex and pathology data are obtained from most phases. These are generally too limited to provide much insight into practices of animal husbandry and the dominance of mature cattle in Phases 11 to 13 is probably biased by the conditions of preservation. The sizes of the animals, as indicated by reconstructed withers heights, are within the limits of known contemporary animals (e.g. Luff 1993, 130 & 133). Measurements were too few to fully explore changes in animal size through time.

The identification of lesions on the inner surfaces of the cattle and cattle-sized ribs from Phase 9, dated to the 11th century, are indicative of a chronic pulmonary infection and although this could result from a number of causes one possibility is tuberculosis. Infection of tuberculosis in cattle is generally respiratory (up to 95% of cases, Lignereux & Peters 1999, 340). Identification of tuberculosis in animals is an important step for understanding its impact on past human populations as tuberculosis in humans and animals was closely connected (Lignereux & Peters 1999, 341). The domestication of aurochs (wild cattle) has been argued as a major factor that would have probably greatly increased the effect of tuberculosis on both cattle and human populations,

with domestic cattle kept in herds and enclosed spaces that enhanced exposure to infected animals (Ortner 1999, 255). Bovine tuberculosis, caused by *Mycobacterium bovis*, normally enters the human host via the gastrointestinal portal (Ortner 1999, 255) and it is interesting that both rib specimens from [854] are butchered and presumably contributed to the diet. The earliest evidence for tuberculosis in humans in Britain is of Iron Age date (Mays & Taylor 2003).

Fish Bone

Philip Armitage

A total of thirteen bone elements were submitted for assessment, all are recognised as fish and represent the four marine and freshwater species: Cod *(Gadus morhua)*, Plaice *(Pleuronectes platessa)*, Freshwater eel *(Anguilla anguilla)* and Pike *(Esox lucius)*.

Identifications were made using the author's modern comparative osteological collections. Measurements (in mm) were taken from selected specimens using dial callipers, following the system of Morales and Rosenlund (1979). A full catalogue of all fish bones has been made and is held with the archive. This material is summarised by phase below.

	QUV01	modern (TL45.7cm)
1-chord length	104.0	50.8
2-height	101.6	50.1

Table 27 Measurements (in mm) of the pike cleithrum recovered from fill [03] of well [30]

Phase 15

The following remains were recovered from the fills of well [30]: 1 spine/ray of unidentified species (fill [01]), 1 post-temporal from a cod (fill [02]) and 1 preoperculum and 2 caudal vertebrae of plaice (fill [03]). The size of this latter fish was small and compares with modern specimens of TL 34–35cm (average size is 50cm). A pike cleithrum was also recovered from fill [03] along with 1 vertebra and 3 spines/rays, from unidentified species. From fill [05] a cleithrum, probably of cod was recovered (represented by two pieces).

From fill [802] of pit [803] 1 piece of cleithrum was recovered, probably of cod,

Phase 18

1 precaudal vertebra of freshwater eel was recovered from 18th-century east–west brick wall [566] of Building 9.

INTERPRETATION AND OBSERVATIONS

All of the fish bone elements from all phases/contexts are recognised as discarded food debris (kitchen/table waste).

Both the cod and the plaice could have been caught close to London (see Wheeler 1979 for distributions of fish species in the Thames) and therefore indicate consumption of fresh marine fish. Alternatively the cod may have been obtained in preserved (salted & dried) form originally caught and transported from a distant (deep) water fishery.

The pike cleithrum from context [03] (Phase 15) is noteworthy for its large size and probably derived from a fully grown/mature fish (see Table 27). Pike is today common above the tidal reaches of the Thames, but also has been recorded from brackish sections of the river (see Wheeler 1979). However, given the exceptional size of the pike identified here it is suggested that it had been supplied from a fishpond rather than from a river fishery. The presence of such a fish indicates the food waste in the well [30] derived from a wealthy (high status) household, as pike in the medieval period was the most expensive freshwater fish. As discussed by Dyer (2000, 106–108) 'a mature pike at 2s or 3s in the fifteenth century cost as much as a skilled craftsman's wage for a week'.

Environmental Analysis

Alys Vaughan-Williams, Phil Austin

The results of archaeobotanical (plant macrofossils and charcoal) analyses of 17th-century contexts, most particularly those of Phase 17, which represents the Great Fire horizon, are presented below, followed by a general discussion of the results. The methodology used is the same as that outlined for the environmental analysis of samples from Roman contexts (see Branch *et al*, Chapter 3). Both flot samples <68> and <69> selected for wood charcoal analysis consisted of low quantities (<100 fragments) of wood charcoal; all fragments >2mm in these two samples were examined. Microscopic analysis followed standard procedures as described in Gale & Cutler (2000); identification was made with reference to descriptions in Schweingruber (1991); the full Latin name is given where identification could be made to this level or when only one species of the genus is native to the UK; nomenclature follows Stace (1997).

PLANT MACROFOSSIL ANALYSIS

A burnt deposit dated to the 17th century (Phase 17) was sampled for analysis (samples <68> and <69>). Preservation of charred and waterlogged plant remains was moderate to good.

The burnt deposit [584], recovered from the doorway in wall [680], into the extension to Building 7, both presented rich charred assemblages of cultivated grain and occasional chaff (Table 28). Hulled barley, with a large proportion identified as the straight variety, represented around 89% of the assemblage. Occasional naked barley grains and oat grains were also identified. Both embryos and the broken ends and middle sections of grains were abundant. Chaff was scarce, with just two internodes of 2-row barley occurring. No charred weed seeds were present, however

Family	Genus	Species	English Name	Habitat	Sample	68	69
					Context	584	584
					Sample vol. (l)	10	30
					Flot vol. (ml)	5000	3000
					Feature	dump	burnt
Caryophyllaceae	*Agrostemma*	*githago*	Corncockle	c, wa		25	
Caryophyllaceae	*Silene*	*vulgaris*	Bladder campion	g		25	
Polygonaceae	*Polygonum*	*mite*	Tasteless waterpepper	w		1	
Polygonaceae	*Polygonum*	*dumetorum*	Copse bindweed	h		13	
Fabaceae	*Lens*	*culinaris*	Lentil	c, wa		2	
Gentianaceae	*Gentianella*	*sp.*	Gentians			6	
Lamiaceae	*Galeopsis*	*segetum*	Downy hemp-nettle	c, w		1	
Rubiaceae	*Galium*	*aparine*	Cleavers	c, h, wa		5	
Rubiaceae	*Galium*	*cruciata*	Crosswort	g, h, wa		3	
Asteraceae	*Centaurea*	*sp.*	Knapweed	g, wa		1	
Compositae	*Crepis*	*biennis*	French hawk's-beard	wa, g		2	
Poaceae	*Indet*		Grasses	g		190	150
Poaceae	*Hordeum*	sp.	Hulled barley	c		710	420
Poaceae	*Hordeum*	sp.	Naked barley grain	c		16	2
Poaceae	*Hordeum*	sp.	Barley grain	c		200	420
Poaceae	*Hordeum*	sp.	Straight hulled barley grain	c		1320	760
Poaceae			Broken grains	c		++++	++++
Poaceae	*Hordeum*	sp.	2-row barley glume	c		5	
Poaceae	*Avena*	*sativa gr*	Oat	c		28	5
Poaceae			Embryo	c		++++	++++

Table 28 Charred plant macrofossils from Phase 17 Fire horizon in extension to Building 7
w = wet, wa = waste land, c = cultivated land, h = hedgerows, g = gardens ++++ = >100 items

a number of weed seeds occurred in sample <68> from the context (Table 29), including corncockle (*Agrostemma githago*). Seeds of crosswort (*Galium cruciata*), knapweed (*Centaurea sp.*), restharrow (*Ononis* sp.) and bladder campion are also present and can be found on rough ground and grassland. Tasteless waterpepper (*Polygonum mite*) occurs in shallow water or damp ground.

CHARCOAL ANALYSIS

The condition of the charcoal in fire-horizon [584] ranged from poor to good (Table 30). Acute thermal degradation had affected several of the fragments and, in extreme cases, made identification impossible. Fragment size in these samples was too small to allow detailed study of growth phenomena or estimates of diameter size. However, both the taxa present, oak and pine (*Pinus* sp.), appeared to derive exclusively from mature stem-wood. No bark was present in these samples.

DISCUSSION

The charcoal present in Phase 17 fire-horizon [584] almost certainly represents the remains of a structural feature. Only two woods, oak and pine, were identified among the total of 129 fragments examined from the two samples <68> and <69> from context [584]. Both these woods have been used extensively throughout the historic period for structural work. Oak timber framed buildings were a ubiquitous feature of much of London prior to the Great Fire of 1666 (after which construction in timber and thatch was banned) and it is most likely that whilst functioning in this capacity the oak became burned along with the pine. That acute thermal degradation was evident in many fragments may

Genus	Species	English Name	Habitat	Sample	68
				Context	584
				Sample vol (l)	10
				Flot vol (ml)	5000
				Feature	dump
				Century	17th
Chenopodium	*album*	Fat hen	c		8
Rumex	*acetosella*	Sheep's Sorrel	c, g, wa		1
Eleocharis	*palustris*	Common spike-rush	w		1

Table 29 Waterlogged plant macrofossils from Phase 17 Fire horizon in extension to Building 7
Key: w = wet wa = waste land c = cultivated land (incl weeds) g = gardens

Taxon	Fragment count		Comments
	sample <68>	sample <69>	
Quercus sp.	41	20	All frags: mature stem/round-wood. Tyloses present in several frags. Evidence of pre-charring decay insignificant/absent.
Pinus sp.	39	16	All frags: mature stem/round-wood. Evidence of pre-charring decay insignificant/absent.
Indeterminate	2	11	Acute thermal degradation ('vitrified')
Total	**82**	**47**	

Table 30 Wood charcoal from Phase 17 Fire horizon [584] in extension to Building 7

support the inference that some form of conflagration occurred in which very high temperatures were reached. It is unlikely that either of these woods, especially the pine, derived from local supplies. More probably, both were imported from elsewhere having been cultivated specifically for use in construction.

The large concentration of semi-clean grain in the same context therefore suggests a 'catastrophic' event. Items of chaff and some weed seeds are more prone to destruction than grains under stress of fire, resulting in their under-representation. Indeed, the paucity of weed seeds, aside from grasses, and the minimal chaff content, in comparison to the good preservation of the cereal grains, may suggest differential preservation. However, even in these circumstances, a greater number of weed seeds would be expected than has been recovered from this context. Therefore, the assemblage is highly likely to represent a semi-clean if not clean store of barley grain. The abundance of straight grains and the presence of occasional 2-row barley internodes, indicates that hulled 2-row barley was an important crop. It would be incorrect, however, to suggest that it was the main crop, as the plant macrofossil record is biased by a range of anthropogenic and natural factors, such as modes of transportation and deposition, preservation and diagenesis. Finally, although samples <68> and <69> were both obtained from context [584], the assemblage in sample <69> provided considerably fewer weed seeds, although they were far from abundant in both samples. It is possible that the weed seeds in sample <68> were contaminants, which were burnt as they were lying around as waste on the floor of the grain store and prior to final hand sorting. Corncockle (*Agrostemma githago*), for example, produces seeds that require hand sorting due to their large size and abundance in harvested grain crops.

CONCLUSIONS

Several of the practices which had been present in the Roman period (see Branch *et al*, Chapter 3) such as woodland and grassland exploitation, probably for firewood, structures, bedding and animal fodder, animal husbandry, and the utilisation and storage of cereals, appear to have continued into the 17th century, when there is evidence for the 'catastrophic' destruction of a structure possibly used for the storage of grain.

Chapter 7: Discussion of Medieval and Post-Medieval Activity

ROADSIDE DITCHES AND SURFACES

A hiatus in occupation in the area of the site in the immediate post-Roman period was suggested by the complete absence of finds, features or structures dating to the Saxon period. An undated posthole cut into the 'Period II' masonry and the smooth worn nature of the upper surface of the masonry itself was the only evidence of activity between the end of the Roman period and the 11th century. This fits with the general trend of migration to the settlement of *Lundenwic*, situated *c*. 1km upstream in the area now occupied by Covent Garden. The motives for this migration have been much debated, although it seems likely that with the decline of the urban centre the population sought a more rural lifestyle. It is also likely that the large river walls, quays and wharves constructed during the Roman period would have fallen into disrepair by this time and become unsafe, whilst good beaching facilities were still available further to the west (Blackmore 1997, 124; 2002, 278) and the brickearth outcrop situated in the area of Covent Garden would have provided an easily accessible source of raw material for construction (Leary *et al* 2004, 3).

Despite this general trend, however, evidence of continued occupation of the area was recorded slightly further to the west during the excavations at both Baynard's Castle and Peter's Hill. At Baynard's Castle the presence of three sherds of Middle Saxon pottery within a dump covered by the collapsed riverside wall (Hill *et al* 1980, 14–16), might suggest sporadic use of the area near the waterfront, whilst at Peter's Hill a truncated sequence of hearths, stakeholes and surfaces contained chaff-tempered pottery dating from the 5th to 8th century (Williams 1982, 28) which might suggest more permanent occupation of the area.

Bede records that the Bishopric of St. Paul's was established in AD 604 as part of the Augustinian attempts to re-establish Christianity countrywide (Sherley-Price 1979, 104). It is thought that a small church was constructed to the northeast of the site on top of the hill on the site of the present St. Paul's Cathedral, and it is likely that a religious enclave was shortly established in the immediate vicinity. It is possible that the worn surface of the Roman foundations observed at the Salvation Army Headquarters site represent an area utilised to access the religious enclave on the hill from the river and the area of occupation to the west may have grown up around this possible landing stage. If this area were used as access to the river, this may have influenced the later development of the routes of Lambeth Hill and Peter's Hill in this area.

The earliest dated evidence of post-Roman occupation in the area of the site was dated to the mid 11th to mid 12th century. Two roadside ditches represented the earliest evidence of the routes of Lambeth Hill and Thames Street. No evidence of road surfaces dating to this period were found on the site although it is possible that at this early time in the history of Thames Street the Roman masonry of the 'Period II' podium was used as the surface of the road to the east. To the north of the east–west ditch a sequence of inter-cutting pits of similar date was recorded towards the west of the excavation area. The pits were primarily used for the disposal of domestic rubbish and no evidence of structures such as postholes was found. That the pits were dug in an area adjacent to the roadside ditches suggests that at this early time the building that presumably occupied this corner plot was set back from the road and not immediately adjacent to it as later buildings in the medieval and post-medieval period were. The possible robber cut would suggest that building material was required for construction at this time.

The mid 11th- to mid 12th-century date for the first post-Roman activity accords well with the evidence from other sites in the vicinity. The continuation of the east–west road later known as Thames Street further to the west was dated to the 12th century at Baynard's Castle (Hill *et al* 1980, 16–17) whilst Thames Street and Peter's Hill itself were dated to the 11th/12th century at Peter's Hill (Williams 1982, 29). It has been suggested that these streets were laid out as early as the 11th century as part of the process of linking the late Saxon waterfronts at Queenhithe, Dowgate and Billingsgate to the rest of the settlement within the old Roman walls (Dyson 2002, 8–9). The date of the occupation activity at the Salvation Army Headquarters together with the earliest documented mentions of the three churches in the immediate vicinity, St. Peter Paul's Wharf, St. Benet Paul's Wharf and St. Mary Somerset (see Fig. 77), during the 12th century provides further evidence to suggest that this area of the City was formally laid out in the 11th or 12th century. Moreover, once the roads were laid out it would appear that a rapid expansion of the settlement into this quarter of the city took place in the post-Conquest period.

The ruins of Roman masonry may have an influence on the layout on the medieval roads. It is probable that the 11th-century waterfront had not extended much beyond the line of later Thames Street (Dyson 2002, 8–9) and the line of the road itself was influenced by Roman features. To the west at Baynard's Castle the road was on the line

of the Roman riverside wall and could not have been laid until the wall was toppled over, probably sometime between the late 9th century and the Norman Conquest of 1066 and definitely by the time of FitzStephen in the second half of the 12th century (Dyson 1980, 7–10). At Baynard's Castle and Peter's Hill the toppled wall and the *in situ* riverside wall were used respectively as the southern kerb of the road (Hill *et al* 1980, 17; Williams 1982, 29). As suggested above at the Salvation Army Headquarters site it is possible that the southernmost foundations of the 'Period II' complex were utilised as part of the road surface, which later developed into Thames Street. This would certainly account for the smooth and worn surface of the masonry foundations below Booth Lane and may explain the fact that the road was set back and wider in the area of the 'Period II' masonry to reflect its use of the podium part of the masonry. The 'Period II' buildings may also have still been topographical features in the 11th century influencing the locations of north–south roads, Peter's Hill and Lambeth Hill, the former respecting the eastern side of the western temple building and the latter respecting the western side of the eastern temple structure. These may have been the easiest routes available without obstructions caused by substantial Roman ruins, adjacent to but between the large Roman structures. It has been argued that the east–west boundary between the parishes of St. Mary Mounthaw and St. Mary Somerset (see Fig. 77), which were established as late as the 13th century, was made along a length of Roman walling, originally a terrace wall which may have still survived above ground (Schofield 1999, 32).

The excavation revealed that by the 13th century the routes of Thames Street and Lambeth Hill were well established and it is during this period that both roads are first mentioned in the documentary sources, with the former known as the 'street of the Thames' in the Queenhithe area from 1258–1266 and the latter named 'Lamberdeshelle' in 1281 (Harben 1918, 338 & 574). As there was no evidence of pitting of this period adjacent to the west side of Lambeth Hill, it is probable that by this time a building stood immediately adjacent to the roads at the corner of Thames Street and Lambeth Hill. The evidence of rubbish pits would suggest that there was an open area or yard to the west of the corner plot. This yard remained until at least the 15th century as demonstrated by the presence of a barrel well and stakeholes of this date and it is possible that it was not until the extension to the pre-Fire brick building in the 17th century that the yard was built upon. There is documentary evidence that one or both sides of Lambeth Hill were also built up by the 13th and 14th century. Amongst property holdings recorded were those of William Albin, who in *c*. 1281 held a house at "Lamberdeshelle" (Sharpe 1889, 54), Stephen Bernard, a dyer, who in 1306 left to Walter Miles, a fishmonger, his shops near the Thames at one end of "Lambardeshill" towards the "Fishwarf" (Sharpe 1889, 181), William Prodholme who in 1330 held tenements upon Lambardeshull in the parish of St. Mary Magdalen at "Eldefishstrate" (Sharpe 1889, 367), Geoffrey Scott, a fishmonger, who in 1334 left to his wife Joanna his tenement in the parish of St. Mary Magdalen, upon "Lamberdeshell" (Sharpe 1889, 402) and John Tornegold, a merchant, who in 1377 left in his will the leasehold interest in his dwelling house on "Lamberteshulle", together with two tenements he held at Broken Wharf in the parish of St. Mary Somerset (Sharpe 1890, 200).

The increase in the population of the area at this time is suggested by the reclaiming of the riverfront with a series of revetments from the late 12th century and during the 13th century, pushing the land out further into the river (Hunting 1988, 16–25; Ayre & Wroe-Brown 2002). The lanes running down to the river from the south of Thames Street, are known to have developed by the mid 13th century (Dyson 1982, 4) with Trig Lane, a southward continuation of Lambeth Hill, possibly documented as early as 1256 (Hunting 1988, 35).

The resurfacing of the roads at the junction of Lambeth Hill and Thames Street was a continual process between the 13th and 17th centuries. The construction of these roads varied little, with deposits of sandy silt and oyster shell probably deriving from the foreshore being capped by the road surfaces of rammed pebbles and occasional cobbles. The cumulative effect of these resurfacing works was to raise the height of the road by approximately 1.3m, and this sequence of repeated resurfacing is analogous with that recorded at Peter's Hill, where the surface was raised by 1.5m (Williams 1982, 29). The evidence from the road surfaces on the east side of the Lambeth Hill and the evidence of roadside ditches and Building 7 suggest that throughout the pre-Fire history of Thames Street there was always a slight discrepancy in the width of the road either side of Lambeth Hill, with the road set back on its east side, perhaps reflecting the presence of the Roman 'Period II' podium below. The width of both Thames Street and Lambeth Hill can only be conjectured at any given time in their histories. Within the site boundaries only the northern part of Thames Street was seen, whilst the full width of Lambeth Hill was not visible, due to truncation by a large Victorian sewer. If, as postulated, the marker stones found in the 13th-century surface were in the centre of the road, it would suggest a width of *c*. 3.9m (*c*.12ft 9in) for Lambeth Hill. By the period just before the Great Fire the evidence of the building on the west side of the junction and the apparent corner of the road revealed to the east might suggest that the road had been reduced in width to a mere *c*. 2.9m (*c*. 9ft 6in). However, annotations of road widths on John Leake's 'Exact Surveigh of the Fire Area' record widths of 11ft at the north end of Lambeth Hill's junction with Old Fish Street and 12ft at the south at its junction with Thames Street, which was 16ft wide at this point. Whether these measurements reflected real or desired widths is unknown.

The narrow roads and lanes of the City of London were subject to constant wear and tear as the surfaces of gravel and cobbles were only set on soft ground and the constant pressure of iron-shod cartwheels would have caused great damage to the primitive surfaces (Reddaway 1940, 37). The remains of the roads on the site revealed that constant

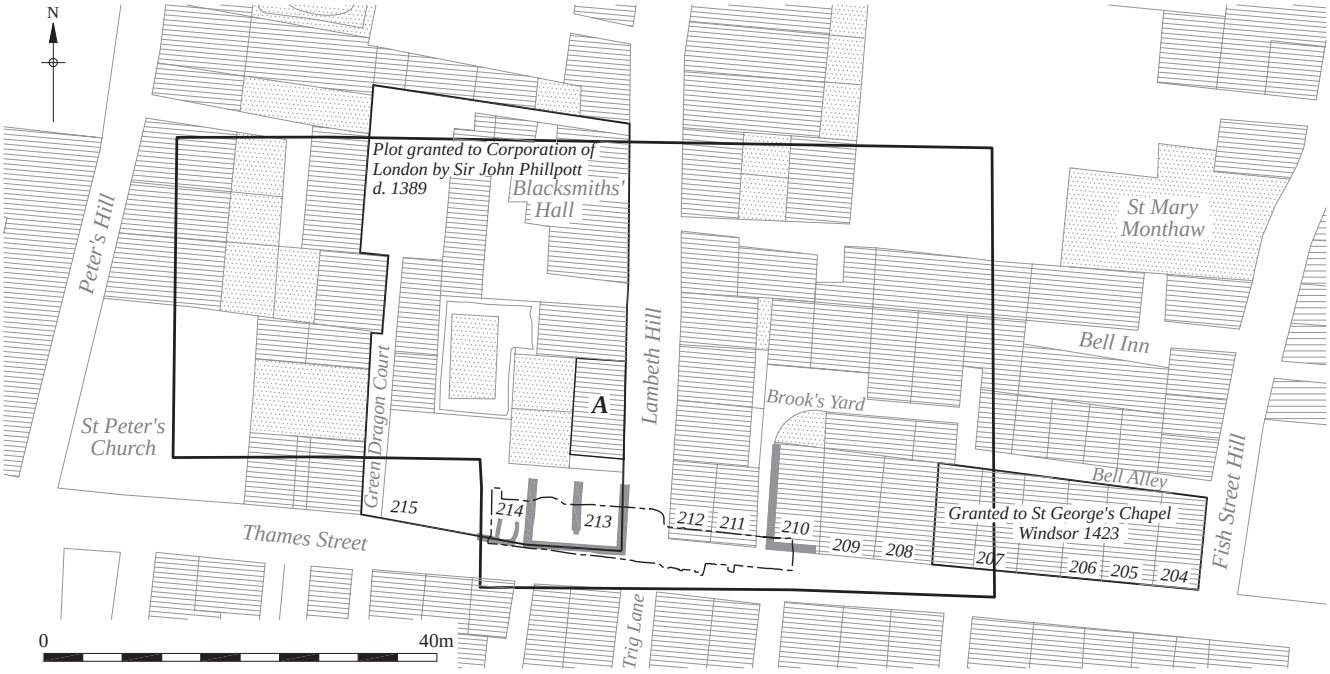
resurfacing with gravel had taken place over several centuries. The presence of a repaired possible cartwheel track was evidence of the often soft and wet nature of the thoroughfares caused by inadequate drainage.

Prior to the Great Fire London was a maze of small streets with jettied timber framed buildings projecting over the roadways and creating a fire risk, as flames could easily spread between the top storeys of buildings. Jetties were first documented in London in 1246 in Ironmonger Lane where they were classed as a nuisance (Schofield 1994a, 147). Despite various regulations against the practice jettying continued up to 1666 (Porter 1996, 13–14). Buildings also encroached onto the roads with owners moving their foundations forward each time they were rebuilt. The City had indeed licensed purprestures: private encroachments onto the public highway (Reddaway 1940, 38). The archaeological evidence from the site would suggest that encroachment onto the road was a continual problem. To the west of Lambeth Hill in the 13th century rubbish pits encroached onto the former roadside ditch, whilst to the east there is evidence from postholes that the structures themselves were built into the street.

The area had a mixed character with both tradesmen and high status families present in the vicinity. Fishmongers predominated amongst the trades represented in Thames Street and Lambeth Hill, particularly in the 14th and early 15th centuries. This is reflected in the nearby street names, Old Fish Street Hill to the east and Fish Street to the north. One figure who was a representative of both the fish trade and an elite family was Sir John Phillpott, a fishmonger by trade who owned a large property by 1389 on the west side of Lambeth Hill, which incorporated the corner plot revealed on site on the west side of Lambeth Hill and the north side of Thames Street (Fig. 76). He was distinguished for being Sheriff of London in 1372 and Mayor in 1378. At that time he was responsible for fitting out a fleet to combat piracy in the Thames estuary and was knighted in 1381 for his services to the Crown in the Wat Tyler rebellion. An assemblage of fish bones including cod and plaice but more interestingly a large pike, which suggests a high-status household, was recovered from the 16th-century backfill of a chalk well on the west side of Lambeth Hill (see Armitage, Chapter 6).

Other trades present in the area included merchants, bakers and dyers who were especially prevalent along the waterfront in this area of the City (Blackmore *et al* 2002, 78) with one of the latter trade, a Thomas Kebull, owning a property on the east side of Lambeth Hill before 1423. During the late 16th century Sir John Throgmorton, a member of a family prominent in affairs of state in the reign of Elizabeth had a townhouse, known as Throgmorton House into the early 17th century, which occupied the same plot as Sir John Phillpott's in the 14th century. To the south was medieval Bigod House (Hunting 1988, 29–31) whilst to the north was Blacksmiths' Hall, present from at least 1494 until the Great Fire when it was rebuilt (Weinreb & Hibbert 1983, 163).

A cruciform horse-harness pendant, which would have been suspended from either the breast band or rear strap of the horse (see Gaimster, Chapter 6), was recovered from the 14th-century road and is likely to have been associated with a wealthy horseman travelling to one of the notable houses in the vicinity. A spur decorated with a pattern of lines, dots and lozenges was also likely to have been owned by a prosperous rider. Several other finds reflect the hustle and bustle of a busy street such as horseshoe nails recovered



A Unicorn Inn

Fig. 76 Pre-Fire plan of tenements in the vicinity of site, shown in relation to Building 7 & 8 and plots indicated on Ogilby and Morgan's map of 1676 (scale 1:800)

from a later road surface and a standard type horseshoe found further to the west under the footings of the pre-1666 building.

THE PRE-FIRE BUILDINGS

The remains of the brick-built Building 7, recorded towards the western side of the excavation fronting the west side of Lambeth Hill and the north side of Thames Street, were sited in the same area where the notable Sir John Phillpott had resided three hundred years earlier, as did Sir John Throgmorton later in the 16th century. This building was constructed before the Great Fire of 1666, although the archaeological evidence did not provide a precise date. The east–west wall fronting Thames Street was constructed using bricks made of fabrics current between 1450 and 1700, whilst bricks from the north–south partition wall and floor were made from fabrics which have until recently been thought only to be used from *c*. 1664 onwards. It is now being recognised that the particular fabric was in use earlier, as evidenced at the Stowage, Deptford (Sabel 1998, 89-97) and the evidence from the Salvation Army Headquarters site, where the building was clearly sealed by deposits attributed to the Great Fire, further confirms this (see Brown, Chapter 6). The same brick fabric was used within a wall and floor of an extension to the original building to the west. The latest archaeological features sealed by the main building were generally lacking in datable artefacts, however, a backfilled cesspit contained pottery dated to after 1550. Documentary evidence suggests that the tenement on the west side of Lambeth Hill and the north side of Thames Street was leased to Hugh Bowyer and Joan Plowright in 1629, who also owned the neighbouring tenement, occupied by the Unicorn Inn (see Fig. 76). Bowyer and Plowright covenanted to substantially rebuild the corner tenement (CLRO Grant Book 2) and this redevelopment may correspond to the construction of Building 7. However, as they only had to 'substantially rebuild' the corner plot it is possible that they only made certain alterations to the previous building, such as putting in new internal walls and floors and adding an extension to the west. If so it is possible that the main east–west external wall fronting Thames Street could have originally been built much earlier, perhaps even in the 16th century. Indeed the western part of the wall rested on chalk and stone foundations, which may have been the remains of an even earlier medieval structure.

BREWING AND INNS

The later addition made to the western side of Building 7 appeared to have been constructed in order to house a large barrel or possibly a vat. The extension to the side of the building could represent the conversion of the property for domestic brewing, most probably by Bowyer and Plowright who already owned the Unicorn Inn to the north. Brew houses necessarily required storage areas, and were similar in character to dye houses, using similar vats and troughs (Schofield & Vince 1994, 75). A deposit of barley grains apparently burnt in the Great Fire was also recovered from the doorway of this extension to the building lending further weight to the idea that brewing was being undertaken on the site when the fire struck. It may have been that the Unicorn Inn, which was immediately adjacent to the site to the north up Lambeth Hill, was enlarged to take over the corner plot and as part of this process increased brewing facilities were required to cater for the growth in clientele, thus necessitating the extension for a brewhouse to the west. The pottery assemblage from the Great Fire horizon, which exhibits a preponderance of drinking and serving forms, relative to food preparation or storage vessels, can be paralleled to a number of other assemblages in London thought to represent tavern or inn groups (Pearce 2000, 173–175; Jarrett in prep b) further supports the suggestion that an inn occupied the corner plot on the west side of Lambeth Hill on the eve of the Great Fire.

Inns continued to thrive in the area after the Great Fire with the Bell Inn depicted on the Ogilby & Morgan map of 1676 off Fish Street Hill (C. 30, Fig. 77), one of a multitude of inns known in the immediate vicinity. Part of the large plot originally occupied by Sir John Phillpott was by the late 16th century an inn known as the Green Dragon, with the alley to the west of the Salvation Army Headquarters site called Green Dragon Court (m. 26) on the Ogilby & Morgan map of 1676. Pepys records visiting the inn on the 16th January 1660 but places it on Lambeth Hill, which suggests this may be Building 7, found during the excavations:

> 'Thence we went to the Green Dragon, on Lambeth Hill, ... and there we sang of all sorts of things, and I ventured with good success upon things at first sight, and after that I played on my flageolet, and staid there till nine o'clock, very merry and drawn on with one song after another till it came to be so late.' (Wheatley 1928, vol. I, 19)

To the east of Lambeth Hill the property formerly occupied by Kebull was by 1496–1497 a brewhouse and inn, the latter known as the Key which was leased to Roger Thwaccher, rector of St Nicholas Cold Abbey (SGCW Deeds XV.60.79; XV.60.85). Only fragments of buildings on the east side of Lambeth Hill were revealed on site; these consisted of postholes and a fragment of east–west wall. The brick-built Building 8 fronted Thames Street and lay immediately to the east of Brook's Yard (see Fig. 77, no. 210)

FLOODING

The great depth of the north–south aligned ditch along Lambeth Hill would suggest that it was designed to channel water down the road, presumably as the natural spring line to the north would have caused problems with water drainage especially during periods of heavy rainfall. It is likely that the ditch continued to the south either within a culvert beneath Thames Street or in the earlier medieval

Fig. 77 Ogilby and Morgan's map of 1676 showing the site in relation to the Thames and the three churches of St. Peter Paul's Wharf, St. Benet Paul's Wharf and St. Mary Somerset (scale 1:1250) The extract from the A to Z of Restoration London is reproduced by kind permission of the publishers, Harry Margary at *www.harrymargary.com* in association with the Guildhall Library, London.

period may have been an open ditch which would have required a small bridge for traffic to cross Thames Street.

That water was a continual problem in the area is suggested by the presence of residues over the floor of the extension to the pre-Fire building on the west side of Lambeth Hill which suggested that it had been subject to episodes of flooding during its existence. This led to the floor being raised, which may also have been the motivation for raising the floor in the eastern building at this time. The theme of inundation of the area appears to recur throughout the historic period. Whether the building was being flooded by exceptionally high tides from the river, or whether the drainage systems of the time were still struggling to cope with the runoff from further up the hill is unclear. What is apparent, however, is that buildings constructed upwards of a millennium after the first development of the area were still susceptible to significant inundation in this area of the city.

THE GREAT FIRE OF 1666

The Great Fire of 1666 is known to have devastated this area of London and a layer of silty sand and charcoal, representing a catastrophic burning event, sealed the floor and walls of Building 7. The building was damaged beyond repair and a number of metal finds, such as door hinges recovered from the fire debris lying on the floor, represent the remnants of many of the internal fixtures and fittings destroyed as the fire swept through the building. In the western extension a store of barley grains was also consumed in the flames.

To the east of the building a portion of the contemporary

road surface had fused and partially vitrified, indicating the intensity of the heat in this area. This may have been a relatively localised phenomenon, however, as the 17th-century road surface recorded at Peter's Hill, whilst being sealed by fire debris, showed no signs of vitrification, suggesting that this area had not been exposed to such heat. It might be that a portion of burning building may have collapsed into Thames Street at the Salvation Army Headquarters, therefore exposing this particular area of the road to particularly high temperatures. Certainly the various fire surveys undertaken in the aftermath of the fire make it clear that all the tenements in the area of the site were entirely destroyed.

The fire broke out in Pudding Lane between 1 a.m. and 2 a.m. on Sunday 2nd September and by morning three hundred houses were reported to be on fire. The fire was moving both west and north, and by 8 a.m. had reached the north side of London Bridge and was also moving north from Thames Street. The Diarist Samuel Pepys viewed the scene from a boat near London Bridge on the morning of the 2nd September, and his first impressions paint a stark picture of the ferocity of the fire and the chaos it caused:

> '…So I down to the waterside and there got a boat and through the bridge, and there saw a lamentable fire… Everybody endeavouring to remove their goods, and flinging into the River or bringing them into lighters that lay off. Poor people staying in their houses as long as till the very fire touched them, and then running into boats or clambering from one pair of stair by the waterside to another. And among other things, the poor pigeons I perceive were loath to leave their houses, but hovered about the windows and balconies till they were some of them burned their wings, and fell down…' (Wheatley 1928, vol. V 393).

The fire would have swept through the area of the site early in the morning of Monday 3rd September, reaching Baynard's Castle by 9am and proceeding to destroy the Royal Exchange (Fig. 78). By Tuesday evening the fire had devastated Cheapside and St. Paul's had started to burn; inmates from the Fleet prison were released and organised demolition was started. The wind began to subside on Wednesday and the organised demolition of buildings halted the progress of the fire. By Thursday 6th September after two hundred soldiers were brought in to monitor the fire and put out any outbreaks, the flames had finally been extinguished.

On Friday 7th September Pepys took a boat to Paul's Wharf, just to the southwest of the site, and viewed the devastation, presumably passing close by the smouldering remains of the buildings recorded during the recent excavations:

> '…Up by 5 a-clock and, blessed be God, find all well, and by water to Paul's Wharfe. Walked thence and saw all the town burned, and a miserable site of Paul's church, with all the roofs fallen and the body of the Quire fallen into St. Fayths – Paul's school also – Ludgate – Fleet street – my father's house, and the church, and a good part of the temple the like…' (Wheatley 1928, vol. V 403).

AFTER THE GREAT FIRE; REDEVELOPMENT OF THE AREA

In general the response to this devastating event was rapid. Charles II issued a Proclamation on September 13th 1666 in which the proposed specifics of construction of the new city were laid out. These included directions that streets would be widened and that all new buildings would be constructed of brick or stone; the rebuilding commissioners ruled originally for example that Thames Street should be 40ft wide (Porter 1996, 106). In theory the aftermath of the Fire offered opportunities for re-planning, but in practice most properties were rebuilt within precisely the same boundaries as existed before the Fire. However, in Thames Street some small alterations were made in order to widen streets in accordance with the King's Proclamation. Sir Thomas Gearey's property was, for instance, shortened by 3ft at the northeast corner in order to widen Old Fish Street Hill. On the Salvation Army Headquarters site it was seen that the attempt to widen Thames Street had at least been partially successful. On the west side of Lambeth Hill the new building frontage was set back *c*. 1.75m to the north and Thames Street was straightened with the road extending the same distance to the north either side of Lambeth Hill.

In the Act for the Rebuilding of the City of London of 1667 Clause XXXII–XXXIII stipulated: 'That for the prevention of inundations and the easiness of ascent, Thames Street and all the ground between it and the River Thames shall be raised at the least by 3 foot above the surface of the ground as it now lieth' (Milne 1986, 119). Although no post-Fire road surfaces survived on the site, make-up deposits and drains for the new road indicate a raised level of at least 0.50m (1ft 8in) suggesting that, at least on this site, attempts to raise the level of Thames Street were undertaken, although whether this was more due to idleness in spreading around the building and other Fire debris to form a new surface rather than removing it, or an attempt to follow the spirit of the act, is unknown. Pepys recorded the raising of the level of Thames Street on the 19th March 1667:

> '. . .and thence walked all along Thames Street, which I had not done since it was burned, as far as Billingsgate; and there do see a brave street likely to be, many brave houses being built . . .; but the raising of the street will make it mighty fine' (Wheatley 1928, vol. VII, 344)

It has been suggested that up to 4ft of burnt debris was used to raise the ground in the City after the Fire as neither owners or tenants were anxious to transport the debris out of the metropolis (Reddaway 1940, 65). It is documented that the waterfront was raised 3ft and Thames Street was enlarged to take the heavy carts from the wharves. The steep slope up from Thames Street along the various roads and lanes was also partially levelled off from Tower Dock

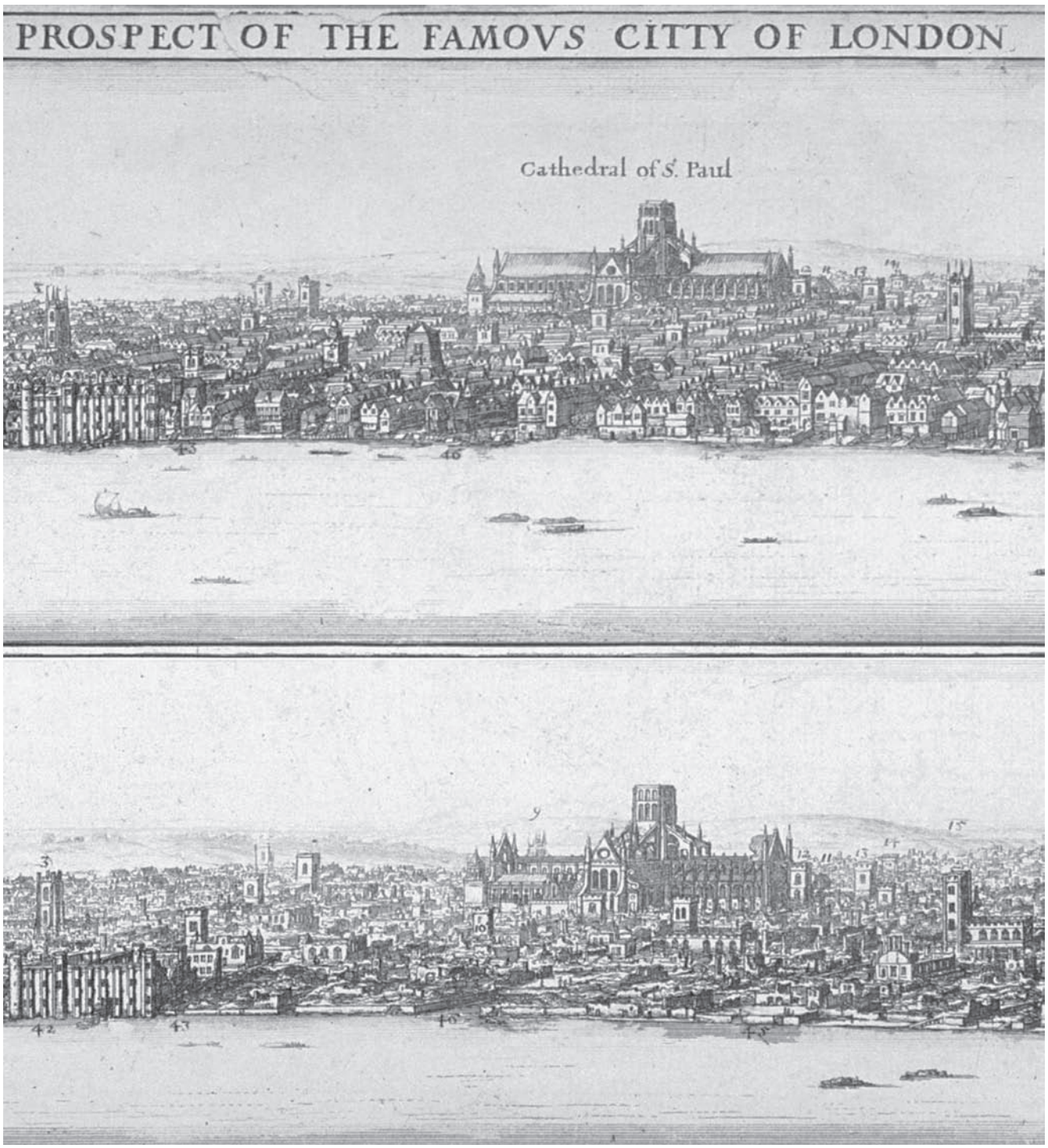
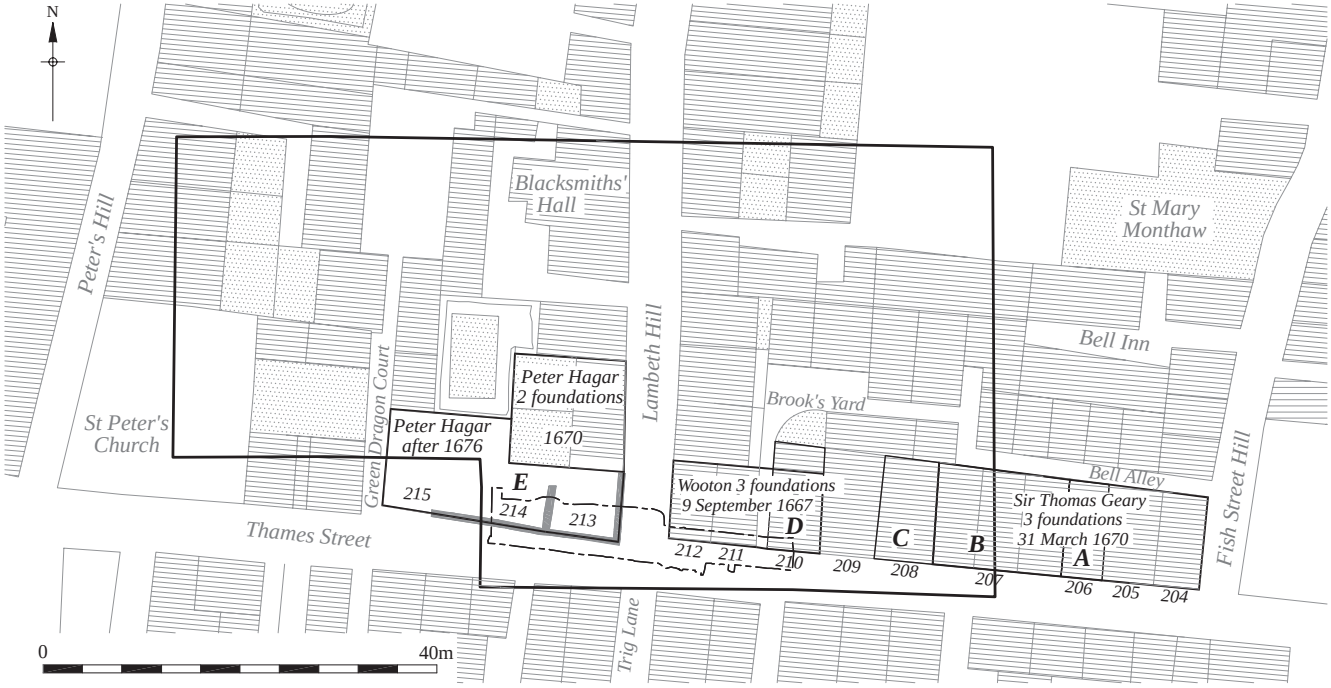


Fig. 78 Wencelaus Hollar's Panorama of London showing the view from the Thames up to St Paul's before (top) and after (bottom) the Great Fire.

in the east to St. Andrew's Hill in the west (Reddaway 1940, 291).

As it had been necessary to raise the floors in Building 7 because of problems with flooding, raising of the street level may have been a popular move. As Clause XVIII of the Act for Rebuilding of the City of London of 1667 stated that 'all common sewers, drains and vaults' were to 'be designed and set out by persons appointed by the Mayor' it is likely that the post-Fire drains revealed on the site were part of this process.

On Thames Street moves to rebuild were afoot within a year. At the corner of the east side of Lambeth Hill and Thames Street nos. 210–212 were surveyed in 1667 on behalf of Wooton for the building of three foundations (Fig. 79). East of Lambeth Hill the large property (nos. 204–207) owned by St. George's Chapel (see Fig. 76) was the subject of a dispute between the owners and the lessee as early as June 1668. The Fire Court ruled that the lessee, the Earl of Anglesey, should pay all arrears of rent and the costs of rebuilding, and that 40 years should be added to the



A The Grapes
B sugar refinery
C The Queen's Head
D The Barleymow
E The White Hart

Fig. 79 Post-Fire redevelopment of tenements in the vicinity of site, shown in relation to Building 9 and plots indicated on Ogilby and Morgan's map of 1676 (scale 1:800)

existing term under the lease (Jones 1970, 182). Rebuilding must have commenced after March 1670 when the Fire Court surveyor undertook a detailed survey of the site for Sir Thomas Gearey, who by that date must have acquired the lease from the Earl of Anglesey.

West of Lambeth Hill the rebuilding of most properties commenced in 1669 and 1670. An exception was the Corporation of London's property fronting Thames Street to the west of Lambeth Hill revealed during the excavation, occupied by Bowyer and Plowright in the earlier 17th century and thought to be a tavern or brew house prior to the fire. There is no fire survey for this property and it is shown as not redeveloped on Ogilby & Morgan's map of 1676. On the east side of Lambeth Hill some of the properties around Labour in Vain Yard were similarly not built upon until the late 1670s or later. The first lease after the Great Fire on the corner plot on the west side of Lambeth Hill was dated 1683 and made to Peter Hagar, a merchant tailor, of the 'plot of land late in the possession of Thomas Breedon and formerly leased to Hugh Bowyer, a brewer, now in the occupation of Hagar, 82ft wide on the frontage to Thames Street' (CLRO Deeds Box 66, no. 20). This might suggest that rebuilding on the site did not therefore take place until the early 1680s.

Building 9, as recorded on this plot during the archaeological investigations, appeared to correspond to the cartographic and documentary evidence. Although little precise dating material was recovered, clay tobacco pipe from the construction cut of the north–south wall was dated to 1680–1710, which confirms an early 1680s date for the rebuilding. The main east wall fronting Thames Street has a wall thickness of two-and-a-half bricks, which represents post-Fire regulations for buildings of the 'second sort' to be constructed fronting 'streets and lanes of note, and the River Thames' (Reddaway 1940, 81; Milne 1986, 118–119). The presence of reused stone including two fragments of worked stone (see Hayward, Chapter 6) within the foundation of the post-Fire brick building would suggest that there was still plenty of building debris lying around and available as late as the 1680s. Locally it appears unusual for rebuilding to have taken so long; 13,200 houses had been destroyed in the Great Fire and it was left to individual owners to rebuild. The process could be slow; by January 1673 the City took a census and revealed that 961 houses had still not been started, 197 of which were in Castle Baynard Ward (Reddaway 1940, 300). However, very few vacant plots are shown on the Ogilby and Morgan map of 1676, which would suggest that there were complex legal problems or other reasons for the late rebuilding of the building on the northwest corner of the junction of Thames Street and Lambeth Hill.

There was little archaeological evidence recovered from the Building 9 to suggest the function of the property in the early 18th century. Equally, documentary evidence indicates that in the post-Fire period no particular trade dominated the life of the area. Fishmongers, prevalent in the 14th and 15th centuries, were now scarcely evident. One new trade was the production of sugar; part of St.

George's Chapel's property was by the 1790s a sugar house or refinery, established within a row of three houses in Thames Street (Fig. 79, no. 207), situated immediately to the east of the excavation area. A 19th-century sugar cone mould recovered during the excavations may have derived from this source (see Sudds, Chapter 6).

Taverns, however, continued to thrive and in 1841 commercial premises on the north side of Thames Street included the Grapes (206), the Queen's Head (208), the Barleymow (210) and the White Hart (213) (Kelly's Directory 1841), the last of which would have been situated in the area of the post-Fire building on the corner of Lambeth Hill and Thames Street (see Fig. 79). Brick foundations dating to the first half of the 19th century are the remains of a building that was occupied by the White Hart in the middle years of the century (see Sudds, Jarrett, Chapter 6). Of particular interest in relation to this was the recovery of a pearlware plate with a central logo of 'WHITE [HART]---- UPPER THAMES STREET' which was recovered from a sewer access pit in the immediate vicinity of the building and a clay pipe stamped 'TAYLOR · WH[ITE HART]' '[UPPER] THAMES STREET' was recovered from a feature in the vicinity. Edmund Taylor was the publican of the White Hart between 1855–1857 (Kelly's Directory, London 1855, 1808, Kelly's Directory, London 1857, 1922), and it would appear that during later works associated with the sewer which had been originally inserted along Thames Street in 1841 some refuse from the White Hart was being used to backfill the sewer access. Pubs were still present in the later part of the century when in 1882 the Old Grapes was occupying the site of the White Hart and the Queen's Head occupying no. 215 (Kelly's Directory 1882).

Chapter 8: Conclusions

The archaeological excavation at the Salvation Army Headquarters provided a welcome opportunity to re-examine the site of an earlier investigation, undertaken at a period when in many ways archaeology inhabited a very different world. In the days before PPG16 many potentially highly significant sites were lost to development before any recording at all could be accomplished. It is thus greatly to Peter Marsden's credit that he managed, during what was really no more than an intermittent watching brief, to produce records of such a quality that a story of the site in the Roman period could be told. Although it was difficult to determine the layout of the structures with any precision, a coherent picture of two phases of Roman buildings on site separated by a large-scale terracing with associated monumental foundation work was produced. However, the lack of detailed excavation meant that precise dating of the structures could not be established and the lack of finds was also a hindrance to determining the nature of the structures.

Subsequent, more detailed, archaeological work at the Peter's Hill and Sunlight Wharf sites added to the layout of the 'Period II' complex and for the first time a date could be established for that phase of construction, the very precise date of AD 294 which was obtained from dendrochronological analysis of the timber piles on which the masonry rested. However, nothing new regarding the form of the 'Period I' complex was revealed. The recent excavations provided the last opportunity for a considerable period of time to add to our knowledge of both these complexes. What has this investigation achieved?

It has added considerably to the archaeological evidence in the vicinity. The first evidence of substantial probable 1st-century AD waterfront activity further west than previously found is a major discovery. The evidence that the 'Period I' complex was modified on at least two occasions after its initial construction together with the major find of a well-preserved western apse are of great importance. Perhaps more significantly a chronology for the 'Period I' complex can be proposed with the recovery of a datable timber pile from beneath the eastern apse. A suggested construction date of after AD 165 with subsequent modifications in the AD 230s and the AD 250s allows the complex to be placed into context. The layout of the southern part of the 'Period II' structure on the site has been convincingly determined with the discovery of the best-preserved masonry from the complex as a whole.

The reduction in the level of Booth Lane not only revealed the massive 'Period II' podium but also provided a rare opportunity to investigate a sequence of later road surfaces dating back to the 11th century. Such opportunities are uncommon as the street plan in the City is often little changed from medieval times. Great Fire deposits have been recorded on other sites in the City but few have been published and the opportunity to link the buildings revealed on site to documentary resources both pre- and post-Fire is a welcome addition to the archaeological record. A nice symmetry to the story was provided by the observation of the sewer, which was originally constructed beneath Thames Street in 1841; it was the excavation of the trench for this structure, which revealed for the first time the monumental masonry that survived on the site.

Thus in many ways the site has provided important new findings for the archaeology of the area. However, it can also be seen in some ways as a missed opportunity. The observation of timbers linked to waterfront activity has provided important new evidence, but the fact that they were revealed in small, diverse pile locations has meant that it has been difficult if not almost impossible accurately to determine their nature and more importantly their date. Only tantalising glimpses of what may have survived on site have so far been afforded and only the most general of interpretations could be reached.

The 'Period I' remains observed on site have added to our knowledge of the complex. However, unfortunately they have provided as many questions as answers. The dating of the complex is still sketchy and based on timbers that could well have been reused. No definite date for the construction of the western apse and associated walls could be determined. Although a convincing chronology could be proposed, it is of course subject to debate, only the recovery and dating of timbers underlying the masonry which has been left preserved *in situ* will determine the date of the last phase of the complex with any degree of certainty. It is also unfortunate that the western and eastern elements of the 'Period I' complex remain as isolated entities. The crucial area where the two sets of masonry may have joined was not available for archaeological inspection and it is not possible to definitely state whether the two apses and associated parallel walls were standing at the same time. Re-examination of the eastern apse has demonstrated that it exhibits characteristics that make its interpretation perhaps less convincing than once felt. The more convincing western apse and associated walls obviously survived almost to full height with evidence of a covered niche, however, only a small shallow test pit was excavated along its interior face. Who knows what painted plaster walls or mosaic floors may have survived at a lower level with perhaps even an inscribed plinth?

As the 'Period II' walls on the site were only revealed

during the lowering of Booth Lane, perhaps as much information was recovered as could be with the obvious exception of investigation of the room within the podium.

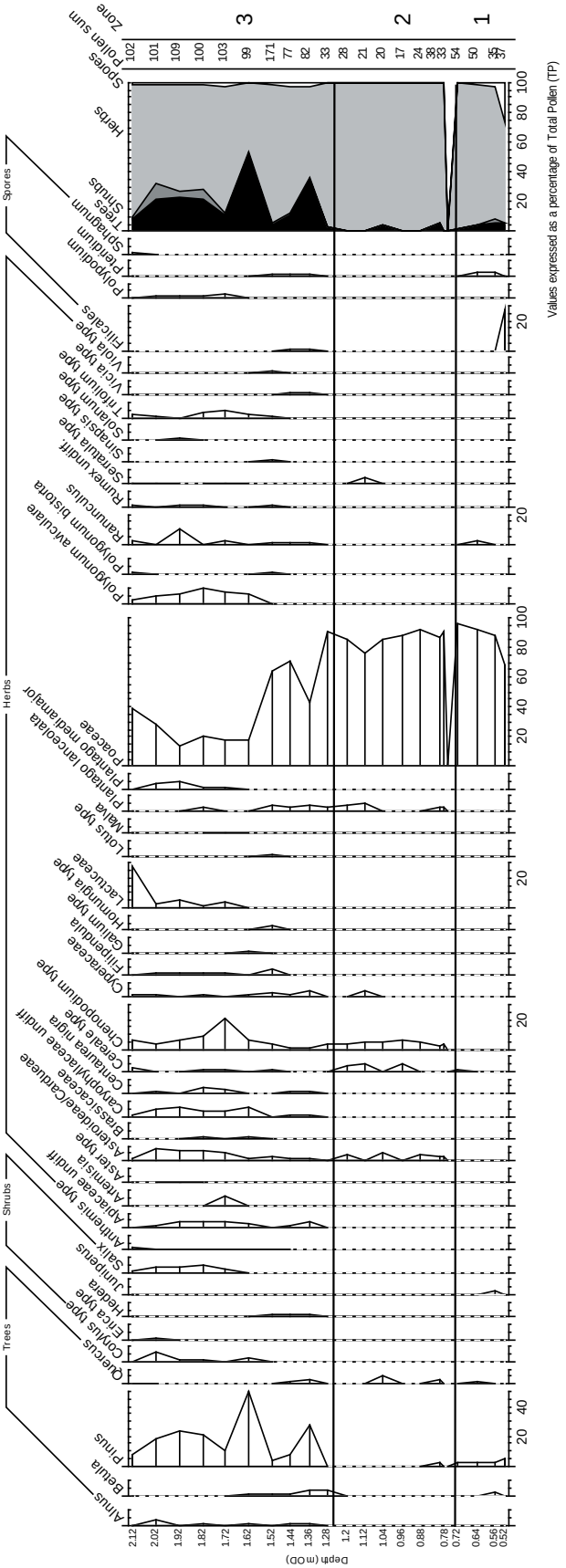
The medieval and post-medieval road surfaces and buildings have provided significant information regarding the settling and development of this area of London after the *Lundenwic* interval, and little more could have been gained that was not achieved on the site.

As it is unlikely that Booth Lane will be reduced in the near future or that the limited remains which survive beneath the southern part of the new development will be observed for a considerable time, there is perhaps a general feeling that although certain information has been forthcoming, a little more could have been achieved.

Perhaps it is now time to reconsider a too-rigid adherence to a policy of preservation *in situ* for its own sake. After all what are the archaeological remains being preserved for? They certainly are not being preserved to be seen by members of the public, as with very few exceptions most remains are carefully reburied. A policy of nibbling away at bits of a site by the excavation of small trenches which make interpretation of features difficult if not impossible and a convincing story of the site very hard to tell, is surely not the only or necessarily the best solution. Preservation *in situ* needs to be tempered with a well thought-out research design, which will at least add something to the archaeological record. If the history of the site is not well known, as was the case on this particular site especially with regard to the 'Period I' complex, proposals to try and rectify this situation should be considered on their merits.

Thus although the Salvation Army Headquarters site can on one hand be seen to have been a successful excavation adding to the archaeological record of the area, it can on the other be seen as a missed opportunity.

APPENDIX 1 POLLEN DIAGRAMS



Appendix 1 Pollen Diagram, Trench P31/32

Pollen grains and spores were identified using the Royal Holloway (University of London) pollen type collection and the following sources of keys and photographs: Moore et al (1991), Reille (1992). Plant nomenclature follows the Flora Europaea as summarised in Stace (1997). The pollen grains and spores were examined using a high power microscope at x400 and x1000 magnifications using phase and interference contrast facilities

RESUMÉ

Agnès Shepherd

Les fouilles archéologiques du site du siège social international de l'Armée du Salut (The Salvation Army) ont permis de retourner sur les lieux d'une ancienne enquête menée par Peter Marsden. Son travail sur ce site pour le compte du Guildhall Museum en 1961-62 avait été très limité par les circonstances de l'époque et consistait d'un certain nombre de tranchées de reconnaissance réalisées sur une longue période. Bien qu'il n'ait visité qu'occasionellement le site et malgré la nature limitée des enregistrements faits lors des fouilles, il a pu toutefois produire une histoire cohérente du site. Ainsi, on a observé deux périodes de maçonnerie monumentale romaine énorme (dénommées ci-après 'Période I' et 'Période II'), la plus antérieure ayant été en effet scellée par une couche épaisse de craie formant les fondations de la structure plus tardive. Cependant, la datation de ces structures s'est avérée problématique (Marsden 1967a).

Dans les années 80 deux fouilles ont été menées par le Department of Urban Archaeology (DUA) du Museum of London à l'Ouest et au Sud du site, à Peter's Hill et Sunlight Wharf. Chacune a permis de bien mieux comprendre ce quartier et en particulier la nature du bâtiment de 'la Période II' que l'on avait constaté s'étendre au-delà du site de l'Armée du Salut tant à l'Ouest qu'au Sud. Tim Williams a produit une synthèse excellente de ce qui a été découvert sur ces deux sites, incorporant le travail de Marsden et quelques observations antérieures datant du début du règne de la Reine Victoria (Williams 1993). L'analyse dendrochronologique des pilots de bois qui soutenaient la plate-forme de craie a fourni une date de 294 Ap J.-C. pour les structures de 'la Période II' qui ont été interprétées comme parties constituantes d'un somptueux complexe administratif abritant les fonctions principales de l'état romain tardif: l'armurerie, le trésor public, la fabrique de monnaie, le réapprovisionnement, des bureaux administratifs, des résidences, des temples et des aménagements collectifs (Williams 1993, 32). Il a été suggéré que les structures de 'la Période I' faisaient partie d'un immense programme de travaux publics dans le quartier Sud-Ouest de Londinium le long de la rive, qui comprenait à l'Est les Termes d'Huggin Hill et probablement un temple et au moins une arche monumentale ou une entrée. Il a été suggéré que la construction de ce complexe date de la fin du 1er ou du début du 2ème siècle et qu'il ait été rénové ou reconstruit au 3ème siècle avant la construction du mur fluvial vers 270 Ap J.-C. (Williams 1993, xi). Cependant, peu de preuves avaient été trouvées pour dater précisément 'la Période I', la structure trouvée par Marsden (Williams 1993, 8).

Les enquêtes archéologiques en 2001-03, bien que limitées dans leur portée, ont été effectuées dans la zone de l'ancienne construction des années 1960. Elles ont révélé que des vestiges de maçonnerie romaine avaient réchappé à la construction des années 60 le long de la partie Sud du bâtiment, comprenant des vestiges encore plus substantiels d'époque romaine, médiévale et post-médiévale situées au Sud sous la ruelle 'Booth Lane'.

Des activités en bord de fleuve datant du 1e siècle sembleraient avoir été indentifiées. Parmi celles-ci se trouvait le seuil en bois de ce qui avait peut-être été un entrepôt. Ces activités suggèrent que le port de Londinium s'étendait déjà bien plus à l'Ouest et bien avant la date supposée auparavant.

La structure en maçonnerie de 'la Période I' précédemment observée par Marsden a été mise à jour, ce qui nous a permis de l'enregistrer plus en détail, de mieux comprendre les techniques de construction utilisées, y compris l'utilisation de bois de coffrage dans les fondations. L'angle extrême d'inclinaison vers le Sud des fondations a confirmé le fait que le bâtiment avait subi des effondrements catastrophiques. De plus, la découverte de cales de consolidation en bois suggère qu'il y avait eu des affaissements et des faiblesses de construction du bâtiment pendant longtemps. La découverte exceptionnelle d'une abside à l'Ouest donnant sur la Tamise s'accordant avec l'abside à l'Est précédemment connue permet de deviner avec plus de certitude le plan de la construction du bâtiment et sa fonction possible. Un élément crucial a été la datation d'un pilot de bois trouvé sous les fondations en maçonnerie de l'abside Est, correspondant aux environs de 165 Ap J.-C. Cette première datation précise de ce complexe nous suggère une date postérieure à celle précédemment proposée pour au moins cette partie du complexe. La datation de pièces de bois de construction provenant de fondations à l'Est et d'une autre structure étrange à l'Ouest suggère des phases de modification et de reconstruction dans les années 230 Ap J.-C. L'abside occidentale et la maçonnerie à l'Ouest faisaient partie d'un programme de reconstruction majeur entre 230 Ap J.-C. et 294 ap J.-C. très probablement dans les années 250 Ap J.-C. et daté d'après l'interprétation de deux autels portant des inscriptions qui avaient été réutilisés dans le mur fluvial à l'Ouest (Hassall 1980, 195-198).

La maçonnerie de 'la Période II' mise à jour sous la ruelle Booth Lane nous informe et permet de mieux comprendre la partie Est des deux temples qui selon Williams occupaient le secteur (1993, 13-32). Cette maçonnerie montre aussi l'énormité de sa construction. La date de 294 Ap J.-C. correspondant au commencement des pilots de fondations a été confirmée par l'analyse d'anneaux d'arbre. Les découvertes du site ainsi que celles provenant du site à Sunlight Wharf au Sud semblent suggérer qu'elles font partie d'un énorme podium d'un temple, mesurant environ 21m sur 8m.

Les vestiges de 'la Période II' était recouverts par une série de surfaces aménagées, de fossés, d'activités d'occupation structurelle et autre datant du 11ème au 17ème siècle le long des rues Thames Street et Lambeth Hill

La dernière surface a signalé le résultat de chaleur extrême causée par le Grand Incendie de 1666, qui avait détruit une construction située au Nord-Ouest de la jonction des deux routes, celle-ci ayant été associée, au moins plus

tard, à une brasserie. La reconstruction après le Grand Incendie a fourni les fondations d'une structure de la fin du 17ème siècle, construite plus au Nord que les édifices précédents, pour tenir compte de l'élargissement de la rue Thames Street. La dernière phase d'activité enregistrée sur le site était les égouts datant du début de l'époque Victorienne. A l'origine, ceux-ci étaient situés au-dessous de la rue Thames Street, dont la construction avait déjà mis à jour les vestiges de l'énorme maçonnerie romaine subsistant dans le quartier.

ZUSAMMENFASSUNG

Sylvia Butler

Die archäologischen Ausgrabungen an der Stätte der internationalen Hauptstelle der Heilsarmee ergaben die Gelegenheit die Szene einer vorherigen Ausgrabung von Peter Marsden nochmals zu besuchen. Seine Arbeit an dieser Stätte für das Guildhall Museum in 1961-62 war durch die Gegebenheiten dieser Zeit ziemlich eingeschränkt und bestand aus einer Reihe von Beobachtungs- und Untersuchungsphasen, die über einen ausgedehnten Zeitraum stattfanden. Trotz seiner unterbrochenen Anwesenheit an diesem Ort und der eingeschränkten Natur der Aufzeichnung war er in der Lage eine kohärente Geschichte für diese Stätte zu präsentieren, eine Geschichte, welche repräsentiert wurde von zwei Perioden von massiver, römischer monumentaler Mauerwerk Errichtung (hiernach als 'Periode I' und 'Periode II' bezeichnet). Die Funde aus der früheren dieser Perioden waren durch ein beträchtliches Kreideplattenfundament aus der späteren Periode wirksam versiegelt worden. Die Strukturen zu datieren war jedoch problematisch (Marsden 1967a).

In den 80er Jahren erweiterten zwei Ausgrabungen durch das Museum of London's Department of Urban Achaeology (DUA) im Westen und Süden der Stätte jeweils bei Peter's Hill und Sunlight Wharf wesentlich das Verständnis über dieses Gebiet der City of London und insbesondere die Art des 'Periode II' Bau-Komplexes, welcher sich hinter der Heilsarmee Stätte zu beiden Seiten nach Westen und Süden ausstreckte. Tim Williams produzierte eine exzellente Synthesis der vorhandenen Funde von diesen beiden Ausgrabungen. Sie schloss Marsdens Arbeit und eine vorherige Untersuchung, die in den frühen Tagen der Regierung von Königin Victoria ausgeführt wurde, ein (Williams 1993). Die dendrochronologische Analyse von Bauholzhaufen, welche die Kreideplattform gestützt hatten, lieferten ein Datum von 294 AD für die 'Periode II' Strukturen. Diese wurden als Teil eines palastartigen Verwaltungskomplexes interpretiert, welcher die 'Hauptfunktionen des spätrömischen Staates beherbergte: Waffen, Staatsschatz, Münzstätte, Vorratslager, Verwaltungsbüros, Wohnquartiere, Tempel und öffentliche Annehmlichkeiten' (Williams 1993, 32). Es wurde vorgeschlagen, dass die 'Periode I' Strukturen Teil eines massiven Programms von öffentlichen Bauarbeiten entlang der Wasserseite im südwestlichen Gebiet von Londinium bildeten, welches das Huggin Hill Badehaus zum Osten und wahrscheinlich einen Tempel und wenigstens einen monumentalen Bogen oder Eingang einschloss. Es wird angenommen, dass der Komplex im späten ersten oder frühen zweiten Jahrhundert errichtet worden ist und sich einer Reihe von Sanierungen oder Neuaufbau im dritten Jahrhundert vor der Konstruktion der Flusswände in ca. 270 AD unterzogen hat (Williams 1993, xi). Es gab jedoch nach wie vor wenige Indizien um die 'Periode II' Struktur, die von Marsden gefunden wurde, präzise zu datieren (Williams 1993, 8).

Die archäologischen Untersuchungen in 2001-03 – obwohl sie in ihrem Ausmaß eingeschränkt waren, wo sie im Abdruck des ehemaligen 1960er Gebäudes stattfanden – zeigten an, dass römische Mauerwerk Rückstände entlang des südlichen Teiles des Gebäudes die 1960er Bauarbeiten überlebt hatten, mit noch mehr beträchtlichen, römischen, mittelalterlichen und nachmittelalterlichen Rückständen unter Booth Lane zum Süden hin.

Unbestätigte Hinweise einer Aktivität an der Wasserseite aus dem ersten Jahrhundert, die in Verbindung mit der Holzschwelle eines möglichen Lagerhauses gebracht wurden, wurden beobachtet und schlagen vor, dass der Hafen des römischen London vielleicht weiter nach Westen ausgedehnt war und dies zu einer früheren Zeit als ursprünglich angenommen. Mauerwerk von der 'Periode I' Struktur, das Marsden vorherig schon entdeckt hatte, konnte freigelegt werden mit detaillierteren Aufzeichnungen und ermöglichten somit ein besseres Verständnis der Bautechniken inklusive der Verwendung von Holzverschalungen in der Gründungssohle. Die Tatsache, dass das Gebäude einem durch eine Katastrophe ausgelösten Einsturz zum Opfer gefallen war, wurde verstärkt durch den extremen Winkel von Neigung zum Süden des Fundamentes hin, und Anzeichen von Ausfachungen, versehen mit Holzkeilen, deuten darauf hin, dass es Erdsenkungen und Gebäudeschwachstellen über einen Zeitraum hinweg ausgeliefert war. Die wesentliche Entdeckung einer zur Themse hinzeigenden, westlichen Apsis, zusammen mit der bereits bekannten östlichen Apsis, ermöglicht eine größere Wahrscheinlichkeit der Bestimmung des Layouts des Gebäudes und seiner möglichen Funktion. Die ausschlaggebende Datierung eines Holzhaufens auf ca. 165 AD, welcher in der östlichen Apsis unter dem Mauerwerkfundament gefunden wurde, ist die erste definitive Zeitbestimmung des Komplexes und schlägt eine spätere Datierung als die zuvor angenommene, zumindest für diesen Teil des Komplexes, vor. Die Datierung von Holz, welches in Fundamenten im Osten aufgedeckt wurde und eine rätselhafte Struktur zum Westen, deuten auf Änderungen und Neubau in den Jahren

um 230 AD hin. Die westliche Apsis und das Mauerwerk zum Westen waren Teil eines wesentlichen Neubau-Programms irgendwann zwischen den 230er Jahren AD und 294 AD, wahrscheinlich in den 250er Jahren AD. Dies basiert auf der Interpretation von zwei beschrifteten Altaren, die wieder verwendet innerhalb der Flussseiten Mauer zum Westen gefunden wurden (Hassall 1980, 195-198).

Das 'Periode II' freigelegte Mauerwerk unter Booth Lane erweitert das Wissen und Verständnis des östlichen der beiden Tempel, welche von Williams (1993, 13-32) angenommen wurden sich in diesem Gebiet befunden zu haben, und zeigt den ungeheuren Ausmaß seiner Mauerwerk Konstruktion an. Eine Datierung des Anfanges der Fundament Anhäufung auf das Jahr 294 AD wurde durch Baumringdatierung bestätigt. Die Funde von dieser Stätte, zusammen mit denen von Sunlight Wharf zum Süden hin, schlagen vor, dass sie Teil eines gewaltigen Podiums eines Tempels sind, welches ca. 21m x 8m misst.

Eine Reihe von metallenen Oberflächen, Strassengraben, strukturellen und anderen Okkupations Aktivitäten datierend auf die Jahre vom 11. bis zum 17. Jahrhundert, bedeckten die Periode II Rückstände auf der Linie von Thames Street und Lambeth Hill. Die letzte Oberfläche zeigt Anzeichen einer extremen Hitze, ausgelöst durch das Grosse Feuer des Jahres 1666, und welches ein Gebäude an der nord-westlichen Seite des Knotenpunktes der beiden Strassen zerstörte. Dieses Gebäude wurde, zumindest zum späteren Zeitpunkt seines Bestehens, mit dem Brauwesen in Verbindung gebracht. Der Wiederaufbau nach dem Grossen Feuer wurde ermöglicht durch das Fundament einer Struktur aus dem späten 17. Jahrhundert, welche weiter zum Norden hin erbaut worden war als vorherige Gebäude, um die Erweiterung der Thames Street zu ermöglichen. Die letzte Phase von aufgezeichneten Aktivitäten an dieser Stätte war die früh-victorianische Kanalisation, welche ursprünglich unter Thames Street verlief, und die Konstruktion welcher erstmalig die massiven römischen Mauerwerk Ruinen, die in diesem Gebiet überlebt hatten, zum Vorschein brachten.

Bibliography

Unpublished sources

CLRO Corporation of London Record Office; leases of Corporation of London property, Grant Books vol.1 onwards, maps and plans.

SGCW St. George's Chapel, Windsor, archives; deeds and leases, Dr. Wilson's Book, surveys late 18th century, Parliamentary survey.

Published works

Alcock, N. W. & Hall, L., 1994. *Fixtures and fittings in dated houses 1567–1763*. Practical handbooks in Archaeology No. 11, Council for British Archaeology; Halifax.

Amorosi, T., 1989. *A Postcranial Guide to Domestic Neo-Natal and Juvenile Mammals*. British Archaeological Reports International Series 533.

Anderberg, A-L., 1994. *Atlas of Seeds: Part 4*. Swedish Museum of Natural History, Risbergs Trycheri AB. Uddevalla, Sweden.

Atkinson, D. R., 1977. 19th century marked pipes from Maverton Road, Bow, East London. *Transactions of the London and Middlesex Archaeological So*ciety 28, 258-268.

Atkinson, D. & Oswald, A., 1969. London clay tobacco pipes. *Journal of British Archaeology Association,* 3rd series 32, 171–227.

Atkinson, D. R. & Oswald, A., 1972. A Brief Guide for the Identification of Dutch Clay Tobacco Pipes found in England. *Post-Medieval Archaeology* 6, 175–182.

Atkinson, T.C., Briffa, K.R. & Coope, G.R., 1987. Seasonal temperatures in Britain during the past 22,000 years, reconstructed using beetle remains. *Nature* 325, 587–592.

Aufderheide A. C. & Rodríguez-Martín C., 1998. *The Cambridge Encyclopedia of Human Palaeopathology*. Cambridge University Press. Cambridge.

Ayre, J. & Wroe-Brown, R., 2002. *The London Millennium Bridge: Excavations of the medieval and later waterfronts at Peter's Hill, City of London, and Bankside, Southwark*. Museum of London Archaeology Service Archaeology Studies Series 6.

Backlund, H. O., 1945. *Wrack Fauna of Sweden and Finland*. Opuscula Entomologica Supplement 5.

Baillie, M. G. L. & Pilcher, J. R., 1973. A simple crossdating program for tree-ring research. *Tree Ring Bulletin* 33, 7–14.

Baker, J. & Brothwell, D. R., 1980. *Animal diseases in archaeology*. Academic Press. London.

Bateman, N., 1998. Public Buildings in Roman London: some contrasts. In: B. Watson (ed.) *Roman London. Recent Archaeological Work*. Journal of Roman Archaeology Supplementary Series 24. Rhode Island, 47–57.

Bateman, N., 2000. *Gladiators at the Guildhall.* Museum of London Archaeology Service. London.

Bateman, N. & Milne, G., 1983. A Roman harbour in London. *Britannia* 14, 207–226.

de la Bédoyère, G., 1999. *The Golden Age of Roman Britain*. Tempus. Stroud.

de la Bédoyère, G., 2001. *The Buildings of Roman Britain*. Tempus. Stroud.

de la Bédoyère, G., 2003. Carausius: Rebel Emperor of Roman Britain. *Practical Archaeology* 7, 20–25.

Bentley, D., 1987. Western Stream reconsidered: an enigma in the landscape. *London Archaeologist* 5, 328–334.

Berggren, G., 1981. *Atlas of Seeds: Part 3*. Swedish Museum of Natural History. Berlings, Arlöv, Sweden.

Betts, I., 1990. Building materials. In: J. Schofield, P. Allen & C. Taylor Medieval buildings and property development in the area of Cheapside. *Transactions of the London and Middlesex Archaeological Society* 41, 39–238.

Betts, I. M., 1993. The building material. In: T. Williams *The Archaeology of Roman London, Volume 3: Public Buildings in the South-West Quarter of Roman London*. Council for British Archaeology Research Report 88, 99–101.

Betts, I. M., 1995. Procuratorial tile stamps from London. *Britannia* 26, 207–229.

Betts, I., 2001. The building materials and geological samples from Fennings Wharf. In: B. Watson, T. Brigham & T. Dyson *London Bridge: 2000 years of a river crossing*. Museum of London Archaeology Service Monograph 8, 228–232.

Betts, I., 2002. The ceramic and stone building material. In: E. Howe *Roman defences and medieval industry: Excavations at Baltic house, City of London.* Museum of London Archaeology Service Monograph 7, 74–81.

Betts, I. M., 2003. Stone and ceramic building materials In: C. *Cowan Urban development in north-west Roman Southwark; Excavations 1974–90*. Museum of London Archaeology Service Monograph 16, 105–119.

Betts, I., Black, E. W. & Gower, J., 1997. *A Corpus of Relief-Patterned Tiles in Roman Britain*. Journal of Roman Pottery Studies vol. 7.

Biddle, M., 1990. *Object and Economy in Medieval Winchester*. Winchester Studies 7ii, Artefacts from Medieval Winchester. Oxford.

Blackmore, L., 1997. From Beach to Burh: new clues to entity and identity in Seventh- to Ninth-Century London. In: G. De Boe & F. Verhaeghe (eds.) *Urbanism in Medieval Europe. Papers of 'Medieval Europe Brugge 1997' Conference 1*. Zellik, 123–132.

Blackmore, L., 2002. Further discussion of the pottery. In: J. Ayre & R. Wroe-Brown *The London Millennium Bridge: Excavations of the medieval and later waterfronts at Peter's Hill, City of London, and Bankside, Southwark*. Museum of London Archaeology Service Archaeology Study Series 6, 90–91.

Blackmore, L., Gray, L. & Goodburn, D., 2002. Trade and Industry. In: J. Ayre & R. Wroe-Brown *The London Millennium Bridge: Excavations of the medieval and later waterfronts at Peter's Hill, City of London, and Bankside, Southwark*. Museum of London Archaeology Service Archaeology Study Series 6, 78–80.

Blagg, T., 1980. The sculptured stones. In: C. Hill, M. Millett & T. Blagg *The Roman Riverside Wall and Monumental Arch in London*. London and Middlesex Archaeological Society Special Paper 3, 125–193.

Blagg. T., 1996. Monumental Architecture in Roman London. In: J. Bird, M. Hassall & H. Sheldon (eds.) *Interpreting Roman London. Papers in memory of Hugh Chapman.* Oxbow Monograph 58. Oxford, 43–47.

Böcher, J., 1988. *The Coleoptera of Greenland.* Meddelelser om Grönland Bioscience 26.

Boessneck, J., 1969. Osteological Differences between Sheep (*Ovis aries* Linné) and Goat (*Capra hircus* Linné). In: D. Brothwell & E. Higgs (eds.) *Science in Archaeology*. Thames & Hudson. London, 331–358.

Boswijk, G. & Tyers, I., 1996. *Dendrochronological spot dates for 268 timbers from Regis House (KWS94), City of London, Bull Wharf (BUF90 & UPT90), City of London, Bellamys Wharf (BEY95), Rotherhithe, Battle Bridge Lane (BAB95), Southwark, Formula Hotel (BAFH95), Barking, London Bridge Station B (LBB95), Southwark, Three Quays House (LTS95), City of London, Parliament Sq Shaft (PLQ95), Westminster, and 148-160 St John St (SJO95), Clerkenwell*, ARCUS Rep, 258.

Bowestead, S., 1999. *A revision of the Corylophidae (Coleoptera) of the West Palaearctic region.* Muséum d'histoire naturelle Geneve. Geneva.

Bradley, T., 2004. *Assessment of an archaeological excavation and watching brief at the Salvation Army International Headquarters, 99-101 Queen Victoria Street, London EC4, City of London*. Pre-Construct Archaeology Ltd unpublished report.

Bragdon, K., 1988. Occupational differences reflected in material culture. In: M. Beaudry (ed.) *Documentary Archaeology in the New World*. Cambridge, 83–91.

Bridger, C. J., 1984. The *Pes Monetalis* and the *Pes Drusianus* in Xanten. *Britannia* 15, 85–98.

Brigham, T., 1990. The Late Roman Waterfront in London. *Britannia* 21, 99–183.

Brigham, T., 1998. The port of Roman London. In: B. Watson (ed.) *Roman London. Recent Archaeological Work*. Journal of Roman Archaeology Supplementary Series 24. Rhode Island, 23–34.

Brigham, T., Watson, B., Tyers, I. with Bartkowiak, R., 1996. Current archaeological work at Regis House in the city of London (part 1). *London Archaeologist* 8, 31–38.

Brigham, T. & Woodger, A., 2001. *Roman and Medieval Townhouses on the London Waterfront: Excavations at Governor's House, City of London*. Museum of London Archaeology Service Monograph 9.

Brigham, T. & Watson, B., forthcoming. *Excavations at Regis House, City of London*. Museum of London Archaeology Service Monograph.

Brodribb, G., 1987. *Roman brick and tile*. Alan Sutton Publishing. Gloucester.

Bronk Ramsey, C., 1995. Radiocarbon Calibration and Analysis of Stratigraphy: The OxCal Program. *Radiocarbon* 37 (2), 425-430.

Bronk Ramsey, C., 2001. Development of the Radiocarbon Program OxCal. *Radiocarbon* 43 (2a), 355-363.

Brothwell, D. R., Dobney, K. & Ervynck, A., 1996. On the Causes of Perforations in Archaeological Domestic Cattle Skulls. *International Journal of Osteoarchaeology* 6, 471–487.

Brown, G. & Killock, D., 2004. Tabard Square. *Current Archaeology* 192, 540–547.

Brown, J., 2004. Building Material Assessment. In: T. Bradley *Assessment of an archaeological excavation and watching brief at the Salvation Army International Headquarters, 99–101 Queen Victoria Street, London EC4, City of London*. Pre-Construct Archaeology Ltd unpublished report, 163-181.

Brunning, R., 1996. *Waterlogged Wood*. English Heritage Standards Guide.

Buckland P.I. & Buckland P.C., 2003. Bugs Coleopteran Ecology Package Website [Online]. [Date accessed]. Available from WWW: http://www.bugs2000.org/

Burch, M. & Hill, J., 1988. *Excavations at Cannon Street Station*. Museum of London archive report.

Butler, J., 2000. *An Archaeological Watching Brief at 49–52a Bow Lane, City of London, London EC4*. Pre-Construct Archaeology Ltd unpublished report.

Butler, J., 2001. *An Evaluation at the Salvation Army International Headquarters, 99–101 Queen Victoria Street, City of London, London EC4*. Pre-Construct Archaeology Ltd unpublished report.

Carroll, M., 2001. *Roman, Celts & Germans. The German Provinces of Rome*. Tempus. Stroud.

Carruthers, W., 2001. The charred plant remains, 99-106. In: J. Butler The City Defences at Aldersgate. *Transactions of the London and Middlesex Archaeological Society* 52, 41–111.

Carruthers, W., forthcoming. Plant remains. In: A. Douglas An excavation at 5–27 Long Lane, London Borough of Southwark, London SE1. *Transactions of the London and Middlesex Archaeological Society*.

Casey, P. J., 1994. *Carausius and Allectus: The British usurpers*. Batsford. London.

Charities Commission 1899. *Endowed Charities*. Charities Commission (in SLSL). London.

Clark, J., 2000. Late Saxon and Norman London: thirty years on. In: I. Haynes, H. Sheldon & L. Hannigan (eds.) *London Under Ground, the archaeology of a city*. Oxbow. Oxford, 206–222.

Cohen, A. & Serjeantson, D., 1996. *A manual for the identification of bird bones from archaeological sites*. Archetype Publications Ltd. London.

Cowie, R., 2000. Early and Middle Saxon archaeology in the London region. In: I. Haynes, H. Sheldon & L. Hannigan (eds.) *London Under Ground, the archaeology of a city*. Oxbow. Oxford, 175–205.

Crowley, N., 2005. Building materials. In: B. Yule *A prestigious Roman building complex on the Southwark waterfront. Excavations at Winchester Palace, London, 1983–1990*. Museum of London Archaeology Service Monograph 23, 90–100.

Crummy, P., 1980. The Temples of Roman Colchester. In: W. Rodwell *Temples, Churches and Religion in Roman Britain*. British Archaeological Reports British Series 77, 243–283.

Cunliffe, B., 2000. *Roman Bath Discovered*. Tempus. Stroud.

Dalton, J. N. (ed.), 1957. *The Manuscripts of St George's Chapel, Windsor Castle, Windsor*: Dean and Canons of St George's Chapel in Windsor Castle.

Davey, N. & Ling. R., 1982. *Wall-painting in Roman Britain*. Britannia Monograph Series 3.

Davies, B., Richardson, B. & Tomber, R., 1994. *The Archaeology of Roman London Volume 5. A dated corpus of early Roman pottery from the City of London*. Council for British Archaeology Research Report 98.

Dimes, F. G., 1980. Petrological report. In C. Hill, M. Millet & T. F. C. Blagg *The Roman Riverside Wall and Monumental Archway in London. Excavations at Baynard's Castle, Upper Thames Street, London 1974–76.* London and Middlesex Archaeological Society Special Paper 3, 198–200.

Dobney, K. & Reilly, K., 1988. A method for recording archaeological animal bones: the use of diagnostic zones. *Circaea* 5.1, 79–96.

Drewett, P., 1976. The Excavation of the Great Hall at Bolingbroke Castle, Lincolnshire, 1973. *Post-Medieval Archaeology* 10, 1–33.

von den Driesch, A., 1976. *A Guide to the Measurement of Animal Bones from Archaeological Sites*. Harvard University Press. Cambridge, Massachusetts.

von den Driesch, A. & Boessneck, J. A., 1974. Kritische Anmerkungen zur Wiederisthoherberechnung aus Längenmassen vor- und frühgeschichtlicher Tierknocken. *Saugetierkundliche Mitteilungen* 22, 325–348.

Drummond-Murray, J. & Thompson, P. with Cowan, C., 2002. S*ettlement in Roman Southwark. Archaeological Excavations (1991–8) for the London Underground Limited Jubilee Line Extension Project.* Museum of London Archaeology Service Monograph 12.

Drury, P. J., 1984. The Temple of Claudius at Colchester Reconsidered. *Britannia* 15, 7–50.

Dyer, C., 1994 reptd. 2000. *Everyday Life in Medieval England*. Hambledon and London. London and New York.

Dyson, T., 1978. Two Saxon land grants for Queenhithe. In: J. Bird, H. Chapman & J. Clark (eds.) *Collecteana Londiniensia: studies in London archaeology and history presented to Ralph Merrifield*. London and Middlesex Archaeological Society Special Paper 2, 200–215.

Dyson, T., 1980. Documentary survey of the London Riverside wall in the medieval period. In: C. Hill, M. Millett & T. Blagg *The Roman Riverside Wall and Monumental Arch in London*. London and Middlesex Archaeological Society Special Paper 3, 7–10.

Dyson, T., 1982. Documentary Survey. In: G. Milne & C. Milne *Medieval waterfront development at Trig Lane, London*. London and Middlesex Archaeological Society Special Paper 5, 4–9.

Dyson, T., 2002. Medieval and post-medieval development of the waterfront – the City. In: J. Ayre & R. Wroe-Brown *The London Millennium Bridge: Excavations of the medieval and later waterfronts at Peter's Hill, City of London, and Bankside, Southwark*. Museum of London Archaeology Service Archaeology Studies Series 6, 8-10.

Egan, G., 1998. *The Medieval Household. Daily Living c.1150–c.1450*. Medieval Finds from Excavations in London 6. HSMO. London.

Egan, G. & Forsyth, H., 1997. Wound Wire and Silver Gilt: changing fashions in dress accessories *c*.1400–*c*.1600. In: D. Gaimster and P. Stamper (eds.) *The Age of Transition. The Archaeology of English Culture 1400–1600*. The Society for Medieval Archaeology Monograph 15. Oxbow Monograph 98. Exeter, 215–238.

Egan, G. & Pritchard, F., 1991. *Dress Accessories c.1150–c.1450*. Medieval finds from excavations in London 3. HMSO. London.

English Heritage, 1998. *Dendrochronology: guidelines on producing and interpreting dendrochronological dates*. English Heritage.

Frere, S., 1974. *Britannia*. Cardinal. London.

Frere, S., 1984. *Verulamium Excavations Volume 3*. Oxford University Committee for Archaeology Monograph No. I.

Gaimster, D., 1997. *German Stoneware 1200–1900*. British Museum Press. London.

Gale, R. & Cutler, D., 2000. *Plants in Archaeology*. Westbury/ Royal Botanic Gardens, Kew. Otley/London.

Gillam, J. P., 1976. Coarse Fumed Ware in North Britain and Beyond. *Glasgow Archaeological Journal* 4, 57–80.

Goodall, H., 1984. The Metalwork. In: J. P. Allan *Medieval and Post-Medieval Finds from Exteter, 1971–1980*. Exeter Archaeological Reports 3. Exeter City Council and the University of Exeter, 337–348.

Goodburn, D., 1991a. A Roman timber-framed building tradition. *Archaeological Journal* 148, 182–204.

Goodburn, D., 1991b. Wet sites as archives of ancient landscapes. In: J. M. Coles & D. Goodburn (eds.) *Wet site excavation and survey*. Wetlands Archaeology Research Project, Museum of London and Nautical Archaeological Society. Exeter and London, 51–53.

Goodburn, D., 1995. From Tree to Town. In: T. Brigham , D. Goodburn, I. Tyers & J. Dillon A Roman timber building on the Southwark waterfront, London. *Archaeological Journal* 152, 33–59.

Goodburn, D., 1998a. Romano-Celtic Boat Building and the Romanisation of Landscape and Boatbuilding Practice. In: P. Pomey & E. Rieth. *Construction Navale Maritime et Fluviale*. Proceedings of the International Symposium on Boat and Ship Archaeology 7. CNRS, 171–176.

Goodburn, D., 1998b. The death of the Wildwood and the birth of woodmanship in SE England. In: C. Bernick (ed.) *Hidden Dimensions*. University of British Columbia Press. Vancouver, 130–138.

Goodburn, D., 2001a. Wooden Remains as an Archaeological Resource: Some Insights from the London Wetlands. In: S. Rippon (ed.) *Estuarine Archaeology: the Severn and beyond.* Archaeology of Severn Estuary 11 (special issue). Exeter, 187–196.

Goodburn, D., 2001b. The Roman and post-Roman timber technology. In: T. Brigham & A. Woodger *Roman and medieval townhouses on the London waterfront*. Museum of London Archaeology Service Monograph 9, 78–85.

Goodburn, D., 2003. Timber. In: T. Bradley *Assessment of an archaeological excavation and watching brief at the Salvation Army International Headquarters, 99–101 Queen Victoria Street, London EC4, City of London*. Pre-Construct Archaeology Ltd unpublished report, 183–194.

Goodburn, D., 2005. The wood. In: F. Seeley & J. Drummond-Murray *Roman pottery production in the Walbrook valley. Excavations at 20–28 Moorgate, City of London, 1998-2000*. Museum of London Archaeology Service Monograph 25, 191–197.

Goodburn, D., forthcoming. New light on aspects of Roman woodwork from Regis House. In: T. Brigham & B. Watson *Excavations at Regis House, City of London*. Museum of London Archaeology Service Monograph.

Goodburn, D., in prep. The timber. In: J. Hill & P. Rowsome *Roman London and the Walbrook stream crossing: excavations at 1 Poultry and vicinity 1985-96*. Museum of London Archaeology Service Monograph

Goudswaard, B., Undated. *Romeinse Maasbrug*. Bulletin 2, Leaflet.

Grant, A., 1982. The use of tooth wear as a guide to the age of domestic ungulates. In: B. Wilson, C. Grigson & S. Payne (eds.) *Ageing and Sexing Animal Bones from Archaeological Sites*. British Archaeological Reports British Series 109, 91–108.

Griffiths, N., 1995. Harness pendants and associated fittings. In: J. Clark *The Medieval Horse and its Equipment*. Medieval Finds from Excavations in London 5. HSMO. London, 61–71.

Grigson, C., 1982. Sex and age determination of some bones and teeth of domestic cattle: review of the literature. In: B. Wilson, C. Grigson & S. Payne (eds.) *Ageing and Sexing Animal*

Bones from Archaeological Sites. British Archaeological Reports British Series 109, 7–23.

Grimes, W. F., 1968. *The Excavation of Roman and Medieval London.* Routledge & Kegan Paul. London.

Halstead, D. G. H., 1993. Keys for the identification of beetles associated with stored products - II. Laemophloeidae, Passandridae and Silvanidae. *Journal of Stored Product Research* 29, 99–197.

Halstead, P., 1985. A study of mandibular teeth from Romano-British contexts at Maxey. In: F. Pryor, C. French, D. Crowther, D. Gurney, G. Simpson & M. Taylor (eds.) *Archaeology and Environment in the Lower Welland Valley Volume 1*. East Anglian Archaeology. Report 27, 219–224.

Hambleton, E., 1999. *Animal Husbandry Regimes in Iron Age Britain: a comparative study of faunal assemblages from British Iron Age sites*. British Archaeological Reports British Series 282.

Hammond, P., 1989. Help! *Society for Clay Pipe Research Newsletter* 22, 37–38.

Hansen, M., 1987. *The Hydrophiloidea (Coleoptera) of Fennoscandia and Denmark.* Fauna Entomologica Scandinavica 18. Scandinavian Science Press. Leiden.

Harben, H. A., 1918. *A Dictionary of London*. London

Harcourt, R. A., 1974. The Dog in Prehistoric and Early Historic Britain. *Journal of Archaeological Science* 1, 151–176.

Hassall, M., 1980. The inscribed altars. In: C. Hill, M. Millet & T. Blagg *The Roman Riverside Wall and Monumental Arch in London*. London and Archaeological Society Special Paper 3, 195–198.

Henig, M., in prep. *Corpus Signorum Imperii Romani. 1.10 Great Britain. London and the South-East.* Oxford University Press. Oxford.

Higgins, D. A., 2003. The clay tobacco pipes. In: D. Wood & J. Munby The Historical development of Somerset House: an archaeological investigation. *Transactions of the London and Middlesex Archaeological Society* 54, 97–100.

Hill, C., Millett, M. & Blagg, T., 1980. *The Roman Riverside Wall and Monumental Arch in London. Excavations at Baynard's Castle, Upper Thames Street, London 1974–76.* London and Middlesex Archaeological Society Special Paper 3.

Hill, J. & Rowsome, P., in prep. *Roman London and the Walbrook stream crossing: excavations at 1 Poultry and vicinity 1985–96*. Museum of London Archaeology Service Monograph.

Hillam, J., 1986. *Tree-ring dating in the City of London: the Bridgehead sites and the dating of the Roman harbour*. Ancient Monuments Laboratory Report, 4794.

Hillam, J., 1993. Tree-ring dating of oak timbers from Peter's Hill and Sunlight Wharf. In: T. Williams *The Archaeology of Roman London Volume 3. Public Buildings in the South West Quarter of Roman London.* Council for British Archaeology Research Report 88, 95–99.

Hillman, G., 1981. Reconstructing crop practices from charred remains of crops. In: F. G. W. Jones & M. G. Jones *Pests of Field Crops* (2nd ed.). Arnold. London.

Hobhouse, H. & Saunders, A. (eds.), 1989. *Good and Proper Materials – The fabric of London since the Great Fire*. The London Topographical Society.

Holmes, E. F., 1988. Sewing Thimbles. *Finds Research Group 700–1700, Datasheet* 9.

Horseman, V., Milne, C. & Milne, G., 1988. *Aspects of Saxo-Norman London I: building and street development near Billingsgate and Cheapside*. London and Middlesex Archaeological Society Special Paper 11.

Hunting, P., 1988. St Paul's Vista. Lep Group PLC. London.

Isings, C., 1957. *Roman glass from Dated Finds.* Groningen/ Djakarta.

Jarrett, C., in prep a. The clay tobacco pipes. In: C. Pickard, C. Jarrett & C. Phillpotts The transformation from village life to urban sprawl at Fulham Island, London Borough of Hammersmith. *Post-Medieval Archaeology.*

Jarrett, C., in prep b. The post Roman pottery. In: G. Brown & C. Pickard *Excavations at Borough High Street, Southwark*. Pre-Construct Archaeology Monograph.

Jennings, S., 1981. *Eighteen centuries of pottery from Norwich*. East Anglian Archaeology 13.

Jones, F. G. W. & Jones, M. G., 1981. *Pests of Field Crops* (2nd ed.). Arnold. London.

Jones, P. E. (ed.), 1966. *The Fire Court. Calendar to the Judgements and Decrees*. Vol.I. London.

Jones, P. E. (ed.), 1970. *The Fire Court. Calendar to the Judgements and Decrees*. Vol.II. London.

Keene, D. & Harding, V. (eds.), 1985. *A Survey of Documentary Sources for Property Holding in London before the Great Fire*. London Record Society 22.

Kelly's *Directory of London* 1841.

Kelly's *Directory of London* 1855.

Kelly's *Directory of London* 1857.

Kelly's *Directory of London* 1882.

Kerling, N. J. M. (ed.), 1973. *Cartulary of St Bartholomew's Hospital*. St Bartholomew's Hospital. London.

Kerney, M. P., 1999. *Atlas of the Land and Freshwater Molluscs of Britain and Ireland.* Harley Books. Colchester.

Koch, K., 1989a. *Die Käfer Mitteleuropas. Ökologie 1*. Goecke & Evers. Krefeld.

Koch, K., 1989b. *Die Käfer Mitteleuropas. Ökologie 2.* Goecke & Evers. Krefeld.

Leary, J. with Brown, G., Rackham, J., Pickard, C. & Hughes, R., 2004. *Tatberht's Lundenwic, Archaeological excavations in Middle Saxon London*. Pre-Construct Archaeology Monograph 2.

Lewis, M. J. T., 1966 *Temples in Roman Britain*. Cambridge University Press. Cambridge.

Lignereux, Y. & Peters, J., 1999. Elements for the retrospective diagnosis of tuberculosis on animal bones from archaeological sites. In: G. Pálfi, O.Dutour, J. Deák & I. Hutás *Tuberculosis Past and Present*. Golden Book Publisher Ltd/Tuberculosis Foundation, 339–348.

Ling R., 1985. *Romano-British Wall Paintings*. Shire Archaeology.

Luff, R., 1993. *Animal bones from excavations in Colchester, 1971–85*. Colchester Archaeological Trust Ltd.

Lyman, R. L., 1994. *Vertebrate Taphonomy*. Cambridge University Press. Cambridge.

Lyne, M. A. B., forthcoming a. The Pottery. In: L. Ladle *Excavations at Bestwall Quarry, Wareham.* Dorset Natural History & Archaeological Society Monograph.

Lyne, M. A. B., forthcoming b. *Excavations in Alice Holt Forest 1977–79.*

Lyne, M. A. B. & Jefferies, R. S., 1979. *The Alice Holt/Farnham Roman Pottery Industry.*, Council for British Archaeology Research Report 30.

MacDonald, K., 1992. The domestic chicken (*Gallus gallus*) in Sub-Saharan Africa: a background to its introduction and its

osteological differentiation from indigenous fowls (Numidinae and *Francolinus* sp.). *Journal of Archaeological Science* 19, 303–318.

Malcolm, G. & Bowsher, D. with Cowie, R., 2003. *Middle Saxon London: Excavations at the Royal Opera House 1989–99.* Museum of London Archaeology Service Monograph 15.

Maloney, C. with de Moulins, D., 1990. *The Archaeology of Roman London Volume 1. The upper Walbrook in the Roman period*. Council for British Archaeology Research Report 69.

Marsden, P., 1967a. The River-side Defensive Wall of Roman London. *Transactions of the London and Middlesex Archaeological Society* 21, part 3, 149–156.

Marsden, P., 1967b. Archaeological Finds In The City Of London, 1963–4. *Transactions of the London and Middlesex Archaeological Society* 21, part 3, 189–221.

Marsden, P., 1975. The Excavation of a Roman Palace Site in London, 1961–1972. *Transactions of the London and Middlesex Archaeological Society* 26, 1–102.

Marsden, P., 1980. *Roman London.* Thames & Hudson. London.

Marsden, P., 1994. *Ships of the port of London first to the eleventh centuries AD*. English Heritage. London.

Mayer, J. J. & Brisbin, I. L., 1988. Sex identification of *Sus scrofa* based on canine morphology. *Journal of Mammalogy* 69 (2), 408–412.

Mays, S. & Taylor, G. M., 2003. A First Prehistoric Case of Tuberculosis from Britain. *International Journal of Osteoarchaeology* 13, 186–196.

Meiggs, R., 1982. *Trees and Timber in the Ancient Mediterranean World*. Oxford University Press. Oxford.

Merrifield, R., 1965. *The Roman City of London.* Ernest Benn Ltd. London.

Merrifield, R., 1983 *London, City of the Romans.* Batsford. London.

Merrifield, R. 1996. The London hunter-god and his significance in the history of Londinium. In: J. Bird, M. Hassall, & H. Sheldon, (eds.). *Interpreting Roman London. Papers in memory of Hugh Chapman.* Oxbow Monograph 58. Oxford, 105–113.

Miller, P. & Saxby, D., 2007. *The Augustinian priory of St Mary Merton, Surrey: Excavations 1976–90*. Museum of London Archaeology Service Monograph 34.

Millet, M. & McGrail, S., 1987. The Archaeology of the Hasholme Logboat. *Archaeology Journal* 144, 69–155.

Milne, G., 1985. *The Port of Roman London.* Batsford. London.

Milne, G., 1986. *The Great Fire of London*, Historical Publications Ltd. Hertfordshire.

Milne, G., 1990. King Alfred's plan for London? *London Archaeologist* 6, 206–207.

Milne, G. (ed.) 1992. *From Roman Basilica to Medieval Market*. HMSO. London.

Milne, G., 1995. *Roman London*. English Heritage & Batsford. London.

Milne, G., Battarbee, R., Straker, V. & Yule, B., 1983. The London Thames in the mid first century. *Transactions of the London and Middlesex Archaeological Society* 34, 19–30.

Milne, G. & Milne, C., 1978. Excavations on the Thames Waterfront at Trig Lane, London, 1974–76. *Medieval Archaeology* 22, 84–104.

Milne, G. & Milne, C., 1982. *Medieval Waterfront Development at Trig Lane, London*. London and Middlesex Archaeology Society Special Paper 5.

Milne, G. & Milne, C., 1985. A Building in Pudding Lane Destroyed in the Great Fire of 1666: Excavations on the Peninsular House site, 1979–80. *Transactions of the London and Middlesex Archaeology Society* 36, 169–182.

Monaghan, J., 1987. *Upchurch and Thameside Roman Pottery. A ceramic typology for northern Kent, first to third centuries A.D*. British Archaeological Reports British Series 173.

Moore, P. D., Webb, J. A. & Collinson, M. E., 1991. *Pollen Analysis* (2nd Ed.). Blackwell. Oxford.

Morales, A. & Rosenlund, K., 1979. *Fish Bone Measurements.* Steenstrupia. Copenhagen.

de Moulins, D., 1990. Environmental Analysis. In: C. Maloney with D. de Moulins *The Archaeology of Roman London, Volume I. the Upper Walbrook Valley in the Roman Period.* Council for British Archaeology Research Report 69. London, 85–115.

Murdoch, T. (ed.), 1991. *Treasures & Trinkets: Jewellery in London from pre-Roman times to the 1930s*. Museum of London.

Murray, D. H., 1977. Some Coleoptera captured in Hampshire and Somerset. *Entomologist's Monthly Magazine* 112, 52.

Nayling, N., 1990. *Dendrochronology Report; Bucklersbury (BUC87*). Museum of London EAS Dendrochronological Report, 01/90.

Nayling, N., 1991. Summary of the Tree-Ring Analysis, 187. In: D. Goodburn A Roman timber-framed building tradition. *Archaeological Journal* 148, 182–204.

Nooijen, C., 2004. Small Finds Assessment. In: T. Bradley *Assessment of an Archaeological Excavation and Watching Brief at the Salvation Army International Headquarters, 99–101 Queen Victoria Street, London EC4*. Pre-Construct Archaeology unpublished report, 251–256.

Ortner, D. J., 1999. Paleopathology: Implications for the history and evolution of tuberculosis. In: G. Pálfi, O. Dutour, J. Deák & I. Hutás *Tuberculosis Past and Present*. Golden Book Publisher Ltd/Tuberculosis Foundation, 255–261.

Orton, C., 1982. Pottery evidence for the dating of the revetments. In: G. Milne & C. Milne *Medieval Waterfront Development at Trig Lane, London*. London and Middlesex Archaeology Society Special Paper 5, 92–99.

Ostkamp, Sebastian, 2006. Faience uit de werkplaats van Quirijn Aldertsz en zijn vrouw Engeltje Kleijnoven, vondsten uit een beerput van het voormalige bedrijfsterrein van de "De Porcelyne Fles" in Delft, in: H. Clevis & S. Ostkamp (eds.) *Assembled Articles* 3, 185-242.

Oswald, A., 1975. *Clay pipes for the Archaeologist*. British Archaeological Reports British Series 14.

Paterson, I., 1998. *Salvation Army, 101 Queen Victoria Street, Geotechnical Desk Study*. Ove Arup & Partners unpublished Manuscript.

Payne, S., 1973. Kill-off patterns in sheep and goats: The Mandibles from Aşvan Kale. *Anatolian Studies* 23, 281–303.

Payne, S., 1985. Morphological Distinctions between the Mandibular Teeth of Young Sheep, *Ovis*, and Goats, *Capra*. *Journal of Archaeological Science* 12, 139–147.

Pearce, J., 2000. A late 18th-century inn clearance assemblage from Uxbridge, Middlesex. *Post-Medieval Archaeology* 34, 144–186.

Pearce J., 2007. An assemblage of 17th century pottery from Bombay Wharf, Rotherhithe, London SE16. *Post-Medieval Archaeology*, 41 Part 1, 80-99.

Perrin, J. R., 1999. *Roman Pottery from Excavations at and near to the Roman Small Town of Durobrivae, Water Newton, Cambridgeshire, 1956–58*. Journal of Roman Pottery Studies 8.

Perring, D., 1991. *The Archaeology of London: Roman London.* B.A. Seaby Ltd. London.

Perring, D. & Roskams, S., 1991. The *Archaeology of Roman London Volume 2. Early Development of Roman London west of the Walbrook.* Council for British Archaeology Research Report 70.

Pevsner, N., editor Cherry, B., 1981. *The Buildings of England. London Volume I: The Cities of London and Westminster*. Penguin Books. Harmondsworth.

Pickard, C., Jarrett, C. & Phillpotts, C., in prep. The transformation from village life to urban sprawl at Fulham Island, London Borough of Hammersmith. *Post-Medieval Archaeology*.

Porter, S., 1996. *The Great Fire of London*. Sutton. Stroud.

Post Office, 1889. *Post Office London Directory for 1889.*

Price J. & Cottam S., 1998. *Romano-British Glass Vessels: a handbook.* Council for British Archaeology Practical handbook in Archaeology 14. York.

Pringle, S., 2002. The building materials. In: J. Drummond-Murray & P. Thompson with C. Cowan *Settlement in Roman Southwark. Archaeological excavations (1991–8) for the London Underground Limited Jubilee Line Extension Project.* Museum of London Archaeology Service Monograph 12, 151–161.

Pringle, S., 2006. Early box flue tiles from London. *London Archaeologist* 11, 124–129.

Pringle, S., in prep. The building material. In: C. Cowan, L. Wheeler & A. Westman *Roman Southwark: origins, development and economy.* Museum of London Archaeology Service Monograph.

Pritchard, F., 1986. Ornamental stonework from Roman London. *Britannia* 17, 169–190.

Prummel, W. & Frisch, H.-J., 1986. A guide for the distinction of species, sex and body size in bones of sheep and goat. *Journal of Archaeological Science* 13, 567–577.

Pryor, S. & Blockley, K., 1978. A 17th-century Kiln Site at Woolwich. *Post-Medieval Archaeology* 12, 30-85.

Rackham, O., 1976. *Trees and Woodland in the British Landscape*. Dent. London.

RCHME, 1928. Royal Commission for Historical Monuments (England), *London Vol. III: Roman London.* HMSO. London.

Reddaway, T., 1940. *The Rebuilding of London after the Great Fire*. Jonathan Cape. London.

Reille, M., 1992. *Pollen et Spores d'Europe et d'Afrique du Nord*. Laboratoire de Botanique Historique et Palynologie. Marseille.

Richardson, B., 1986. Pottery. In: L. Miller, J. Schofield & M. Rhodes *The Roman Quay at St Magnus House, London*. London and Middlesex Archaeological Society Special Paper 8, 96–138.

Rodwell, W., 1980. *Temples, Churches and Religion in Roman Britain*. British Archaeological Reports British Series 77, 243–283.

Rowsome, P., 2000a. The Huggin Hill baths and bathing in London: barometer of the town's changing circumstances? In: J. Delaine & D. E. Johnston (eds.) *Roman Baths and Bathing Part 2: Design and Context*. Journal of Roman Archaeology Supplementary Series 37 Part 2, 262–277.

Rowsome, P., 2000b. *Heart of the City. Roman, Medieval and Modern London Revealed by Archaeology at 1 Poultry*. English Heritage & Museum of London Archaeology Service.

Sabel, K., 1998. The building materials assessment. In: D. Divers *An assessment of archaeological excavations at the Greenwich Reach Development, The Stowage, London Borough of Greenwich.* Pre-Construct Archaeology Ltd unpublished report.

Salway, P., 1998. *Roman Britain*. Oxford University Press. Oxford.

Schofield, J., 1994a. *Medieval London Houses*. Yale University Press. New Haven & London.

Schofield, J., 1994b. Saxon and Medieval Parish Churches in the City of London: A Review. *Transactions of the London and Middlesex Archaeological Society* 45, 23–145.

Schofield, J., 1999 (3rd ed.). *The Building of London from the Conquest to the Great Fire*. British Museum Publishing. London.

Schofield, J., Allen, P. & Taylor, C., 1990. Medieval Buildings and Property Development in the Area of Cheapside. *Transactions of the London and Middlesex Archaeological Society* 41, 31-195.

Schofield, J. & Lea, R., 2005. *Holy Trinity Priory, Aldgate, City of London.* Museum of London Archaeology Service Monograph 24.

Schofield, J. with Maloney, C. (eds.), 1998. *Archaeology in the City of London 1907–91: a guide to records of excavations by the Museum of London.* The Archaeological Gazetteer Series Volume 1, Museum of London.

Schofield, J. & Vince, A., 1994. *Medieval Towns.* Leicester University Press. London.

Schweingruber, F. H., 1991. *Anatomy of European woods*. Swiss Federal Institute for Forest, Snow and Landscape Research. Birmensdorf.

Seeley, F. & Drummond-Murray, J., 2005. *Roman pottery production in the Walbrook valley: excavations at 20–28 Moorgate, City of London, 1998–2000*. Museum of London Archaeology Service Monograph 25.

Sharpe, R. R. (ed.), 1889–90. *Calendar of Wills proved and enrolled in the Court of Husting, London, 1258–1688*. London.

Sherley-Price, L. (trans.), 1979. Bede, *A History of the English Church and People*. Penguin Classics. Harmondsworth.

Shepherd, J., 1998a. *The temple of Mithras, London: excavations by W. F. Grimes and A. Williams at the Walbrook*. English Heritage. London.

Shepherd, J. (ed.), 1998b. *Post-war Archaeology in the City of London 1946–72: a guide to records of excavations by Professor W F Grimes held by the Museum of London.* Museum of London.

Silver, I., 1969. The ageing of domestic animals. In: D. Brothwell & E. S. Higgs (eds.) *Science and Archaeology*. London, 283–302.

Smith, T. P., 2001. The medieval and post-medieval building material. In: T. Brigham & A. Woodger *Roman and medieval townhouses on the London waterfront: Excavations at Governor's House, City of London*. Museum of London Archaeology Service Monograph 9, 125–128.

Sparks, B. W., 1961. The ecological interpretation of Quaternary non-marine mollusca. *Proceedings of the Linnean Society of London* 172, 71-80.

Stace, C., 1997. *New Flora of the British Isles (2nd ed).* Cambridge University Press. Cambridge.

Stow, J., 1994 edition. *Survey of London.* Alan Sutton Publishing. Dover.

Straker, V., 1987. Carbonised cereal grain from first century London: a summary of the evidence for importation and crop processing. In: P. Marsden *The Roman Forum Site in London: discoveries before 1985.* HMSO. London, 151–155.

Stuiver M., Reimer, P. J., Bard, E., Beck, J. W., Burr, G. S., Hughen, K.A., Kromer, B., McCormac, G., van der Plicht, J. & M. Spurk, M., 1998. INTCAL98 Radiocarbon Age Calibration, 24000-0 cal BP. *Radiocarbon* 40 (3), 1041-1083.

Sykes, N., 2004. The Introduction of Fallow Deer to Britain: A Zooarchaeological Perspective. *Environmental Archaeology* 9 (1), 75–84.

Symonds, R., 2002. *Recording Roman Pottery: a description of the methodology used at Museum of London Specialist Services (MoLSS) and Museum of London Archaeology Service (MoLAS).* Unpublished Museum of London Archaeology Service document.

Symonds, R. P. & Tomber, R. S., 1994. Late Roman London: an assessment of the ceramic evidence from the City of London. *Transactions of the London and Middlesex Archaeological Society* 42, 59–100.

Symonds, R. P. & Wade, S., 1999. *Colchester Archaeological Report 10: Roman pottery from excavations in Colchester, 1971–86*. Colchester.

Tatton-Brown, T., 1974. Excavations at the Customs House Site, City of London, 1973. *Transactions of the London and Middlesex Archaeological Society* 25, 117–219.

Tatton-Brown, T., 1986. The topography of Anglo-Saxon London. *Antiquity* 60, 21–30.

Tebble, N., 1966. *British Bivalve Seashells.* British Museum (Natural History). London.

Teichert, M., 1975. Osteometrische Untersuchungen zur Berechnung der Widerristhöhe bei Schafen. In: A. T. Clason (ed.) *Archaeozoological studies*. Elsevier, 51–71.

Thompson, A., Westman, A. & Dyson, T., (eds.), 1998. *Archaeology in Greater London 1965–90: a guide to records of excavations by the Museum of London.* The Archaeological Gazetteer Series Volume 2, Museum of London.

Tyers, I., *Unpublished Dendrochronological Spot Date*, report 573s ARCUS, University of Sheffield.

Tyers, I., 1995. Dendrochronology and Growth Rate Analyses of The Timbers. In: T. Brigham, D. Goodburn, I. Tyers with J. Dillon. A Roman timber building on the Southwark waterfront, London. *Archaeological Journal* 152, 63–69.

Tyers, I., 2000. *Archive report on the tree-ring analysis of Roman timbers from Number 1 Poultry, City of London*. ARCUS report, 517.

Tyers, I., 2001a. *Dendrochronological spot-dates of samples from the Salvation Army Headquarters, 101 Queen Victoria Street (QUV01), City of London*. ARCUS report, 575o.

Tyers, I., 2001b. *Interim report on the tree-ring analysis of timbers excavated at Guildhall, City of London*. ARCUS report, 518.

Tyers, I., 2002. *Dendrochronological spot-dates of samples from 12 Arthur Street (AUT01), City of London, EC4*. ARCUS report, 534i.

Tyers, I., 2003. *Dendrochronological spot-dates of samples from Tokenhouse Yard (THY01), City of London, EC2*. ARCUS report, 573t.

Tyers, I. & Hibberd, H., 1993. *Dendrochronology, wood identification, and wattle analysis for the Fleet Valley developers report*. Museum of London Archaeology Service Dendrochronological report, 03/93.

Vince, A. G., 1985. The Saxon and Medieval Pottery of London: A Review. *Medieval Archaeology* 29, 25–93.

Vitruvius. *The Ten Books of Architecture*. Trans. M. Hicky-Morgan 1974. Dover Publishing. New York.

Watson, B., 2007. Reviews. LAMAS 44th Annual Conference of London Archaeologists 17 March 2007: Recent work. *London and Middlesex Archaeological Society Newsletter* 120, 9–12.

Watson, B., Brigham, T. & Dyson, T., 2001. *London Bridge; 2000 years of a river crossing*. Museum of London Archaeology Service Monograph 8.

Weinreb, B. & Hibbert, C., 1983. *The London Encyclopaedia*. MacMillan. London.

Wheatley, H. B., (ed.) 1928. *The Diary of Samuel Pepys*. G. Bell & Sons Ltd. London.

Wheeler, A., 1979. *The Tidal Thames The History of a River and its Fishes*. Routledge & Kegan Paul. London.

Williams, T., 1982. St Peter's Hill. *Popular Archaeology* 4 (1), 24–30.

Williams, T., 1993. *The Archaeology of Roman London Volume 3. Public Buildings in the South West Quarter of Roman London.* Council for British Archaeology Research Report 88.

Wilmott, T., 1982. Water supply in the Roman City of London. *London Archaeologist* 4, 234–242.

Wilson, D. R., 1980. Romano-Celtic Temple Architecture: How much do we actually know? In: W. Rodwell *Temples, Churches and Religion in Roman Britain*. British Archaeological Reports British Series 77, 5–30.

Wroe-Brown, R., 1999. The Saxon origins of Queenhithe. *Transactions of the London and Middlesex Archaeological Society* 50, 12–16.

Young, C.R., 1977. *The Roman Pottery Industry of the Oxford Region*. British Archaeology Reports British Series 43.

Yule, B., 2005. *A prestigious Roman building complex on the Southwark waterfront: Excavations at Winchester Palace, London, 1983–90.* Museum of London Archaeology Service Monograph 23.

Index

D

E

F

G

H

I

Q

R

S

T

U

V

W

Z