

Excavations at the Science Gallery, Boland House, Guy's Hospital, Southwark

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with contributions by

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This article details the results of archaeological investigations undertaken in advance of the conversion of Boland House, Guy's Hospital to the Science Gallery, Guy's Campus, King's College University of London. The site is located in North Southwark within an area of the Thames flood plain that formerly consisted of small prehistoric eyots separated by tidal channels. The archaeological sequence began with Holocene fluvial deposits that contained Mesolithic and Bronze Age flints. During the Roman period the site was located on low-lying ground on the south-east margin of the North Southwark Island with a water channel adjoining the eastern side of the site. Numerous ditches were dug to drain and reclaim land that was susceptible to flooding, but for a period in the 2nd century AD the land was sufficiently dry to allow the construction of a clay-and-timber building and other structures such as animal pens, fence lines and drying racks. At the end of the Roman period the maintenance of flood defences appears to have ended as in c AD 360–80 the site appears to have been subjected to a major inundation. In c AD 367–78 a hoard of seven bronze coins was concealed on the site. In the post-Roman era the site reverted to undeveloped and little utilised marginal low-lying land. From the early 13th century the site lay within the precinct of St Thomas's Hospital. The foundation of the hospital was probably the catalyst for the development of the site, which began in the late 13th century when the area was drained and reclaimed. A large ditch revetted with timbers was dug. By the 15th century this ditch had been infilled and a masonry building constructed over it. A second building was defined by pile foundations and a garderobe and timber-lined cesspit. Fragmentary masonry remains, patches of brick and stone external surfaces, plus soakaways and culverts represented structural development during the 17th century, when the site was part of the refounded hospital. In 1738–9 the eastern portion of the site was developed as part of the outer courtyard of Guy's Hospital, and during the 19th century improvements were made to the disposal of rainwater run-off and sewage evidenced by new culverts, soakaways and surface drainage.

Introduction

A programme of archaeological mitigation was undertaken between 16 December 2016 and 17 February 2017 in advance of the conversion of Boland House, Guy's Hospital to the Science Gallery, Guy's Campus, King's College University of London, Southwark. This programme involved excavating all the archaeological deposits to a depth of 3.5m within the Excavation Area, and the partial excavation of the sequence within the Lift Shaft and Sump after an initial watching brief on the removal of modern overburden (these three trenches were all located inside Boland House) (fig 1). The excavation had been preceded by an archaeological watching brief and an evaluation in 2016. A further phase of watching briefs within the courtyard of Boland House was also carried out during the insertion of service trenches in 2017 and 2018. This report is the synthesis of the results of all the archaeological work undertaken by Pre-Construct Archaeology Limited at the Science Gallery.

The site consists of Boland House, which formed the east wing of the Old Guy's Hospital, and the historic hospital quadrangle. The site lying to the east of Borough High Street is bounded on the north by St Thomas Street, on the east by Great Maze Pond and on the south and west by the wings of Old Guy's Hospital (fig 1). The site area is c 2342m² and is centred on TQ 3281 8010.

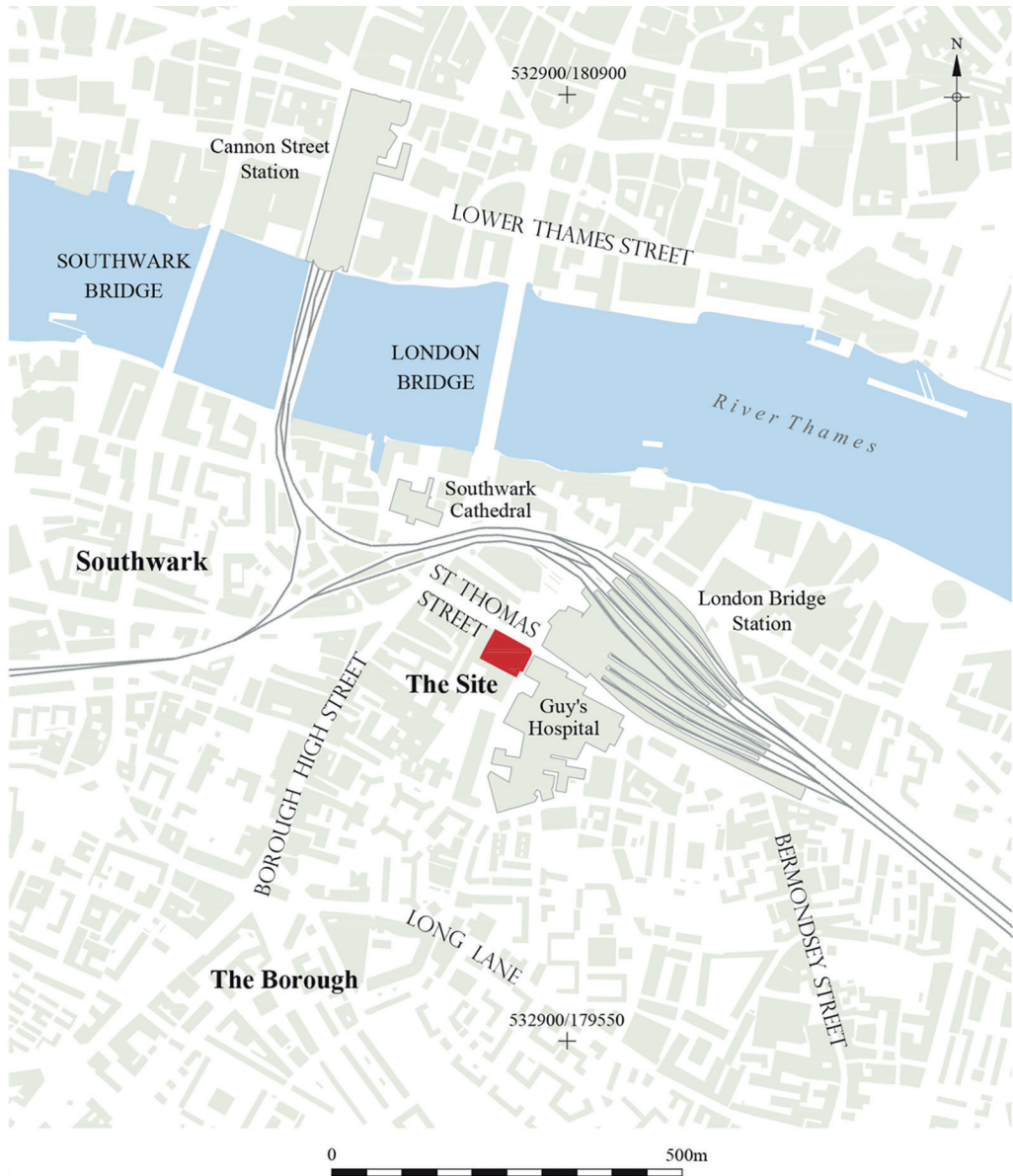


Fig 1 Science Gallery. Site location.

This article uses the Museum of London codes for ceramics and building materials. Complete lists of these codes, their expansions and date ranges are available online.¹ The site archive will be deposited under the unique site code THM16 in the Museum of London Archaeological Archive, Mortimer Wheeler House, 46 Eagle Wharf Road, London N1 7ED, where it may be consulted by prior appointment.

The earlier watching brief (Harris & Moore 2016) demonstrated that approximately 3.5–4m of stratified deposits existed beneath present ground level and above the top of natural geology. The watching brief also showed that there was a noticeable difference in the

composition of the deposits on the western side of the site compared to the east, suggesting that drier land lay to the west and an infilled channel occupied the eastern side of the site. The subsequent evaluation (Fairman 2016) carried out within the basement of Boland House proved that natural deposits were overlain by prehistoric, Roman, medieval and post-medieval deposits. The evaluation findings were also consistent with the proposition of a drainage channel to the east and dry land to the west. The survival of deep archaeological deposits beneath the existing basement slab required a mitigation excavation to be undertaken in the location of the proposed lecture theatre (Excavation Area, the Sump and the Lift Shaft) (fig 2). The subsequent watching briefs (Green 2017; Penades 2018) on the service trenches within the courtyard area revealed fragments of 17th century buildings and 18th and 19th century remains associated with the development of Guy's Hospital.

Drift geology and topography

The site is located approximately 200m to the south of the river Thames, which in the prehistoric period would have been much shallower and wider than it is today. The south bank of the Thames in the Southwark area was characterised by braided channels surrounding low-lying eyots, remnants of the Pleistocene Thames terrace gravels (the Kempton Park Gravels). Typically, the higher ground on the gravel eyots is capped by sandy soils, while lower-lying areas are characterised by a build-up of alluvium. Terrace gravels on the site were encountered between -0.32m OD and -0.38m OD . The low-lying topography of north Southwark means that historically it was very prone to flooding during periods of marine transgression or rising sea levels (Tyers 1988; Sidell 2003).

Archaeological excavations and geotechnical work have established that within north Southwark there are two principal gravel eyots on which Roman Southwark developed, the South Island and the North Island, together covering an area of $c16\text{ha}$ (Knight 2002; Cowan *et al* 2009). The northern island is thought to have extended between Joiner Street, Southwark Bridge Road, Union Street and Southwark Street with the Thames to the north. The site is located within the western edge of Guy's Channel, close to the eastern side of the northern eyot (fig 3).

Period 1: Holocene fluvial deposits

In the excavated areas the terrace gravel was overlain by a sequence of Holocene silty clays and sandy deposits. The top level of this horizon stood at $c 0.56\text{m OD}$. These fluvial deposits probably represent changing river regimes and differences in energy flow level corresponding to periods of marine transgression and regression during the Holocene period (Tyers 1988, 5; Sidell 2003, 300–20). The prehistoric land surface encountered at the Science Gallery is consistent with the palaeosoils at Hunt's House (fig 3 no 5; Taylor-Wilson 2002, 5), $c 70\text{m}$ to the south.

Two possible prehistoric postholes excavated at the Science Gallery (not illustrated) are an indication that at least for some of the time during the prehistoric period the land was sufficiently high and dry to allow at least temporary occupation.

Twenty-three struck flints, eleven debitage fragments and 105 pieces (1.8kg) of unworked burnt flint were found mostly residually in later deposits. The worked pieces were made from a variety of flint types ranging from coarse yellow/grey to fine-grained translucent dark grey flint, some retaining a nodular to weathered nodular cortex. The heterogeneous nature of the flint and condition of the cortex indicates that this material could have been obtained from derived sources such as Pleistocene sand and gravel deposits present within the vicinity of the site. The worked flint is largely undiagnostic and technologically and typologically varied. Some pieces, such as the blade found in a silty sand deposit during the evaluation, are well struck and show characteristics of blade-based production and therefore suggest a Mesolithic to Early Neolithic origin. Other material, such as a possible core tool, is



Fig 2 Science Gallery. Areas of excavation and watching brief.

unsystematically worked, pointing to a Late Bronze Age/Early Iron Age date. The majority of flakes and debitage may be the result of flintworking throughout prehistory and therefore does not necessarily provide an indication of age, as is also the case with the burnt flint (Egberts 2018).

A larger lithic assemblage recovered from Hunt's House showed similar characteristics suggesting a similar date range (Taylor-Wilson 2002, 5). Furthermore, a comparable pattern of finds has been found elsewhere in north Southwark, for instance at King's Head Yard (Kenyon 1959, 112), Guy's Hospital 1982–3 (Swain 1988), 47–67 Hopton Street and 15–23 Southwark Street (Taylor-Wilson 2002, 6–7). At nearby 127–143 Borough High Street a Neolithic arrowhead was also recovered (B Bishop, pers comm).

At Hunt's House there was also evidence for prehistoric agriculture with ard-plough marks scored into the underlying palaeosoil (Taylor-Wilson 2002, 5). Ard marks were also recorded elsewhere in north Southwark at Hopton Street (Ridgeway & Butler 1999, 74, fig 3), Lafone Street (Bates & Minkin 1999), Phoenix Wharf, and Jamaica Road (Bowsher 1991), while at Three Oak Lane an actual wooden ard was recovered (Proctor & Bishop 2002).

In general, the archaeological evidence suggests that the low-lying eyots of north Southwark were widely exploited first by transient hunter-gatherers over 8000 years ago followed by more sedentary agrarian occupation during the Late Neolithic/Early Bronze Age.

Period 2: early Roman 1st and 2nd centuries

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

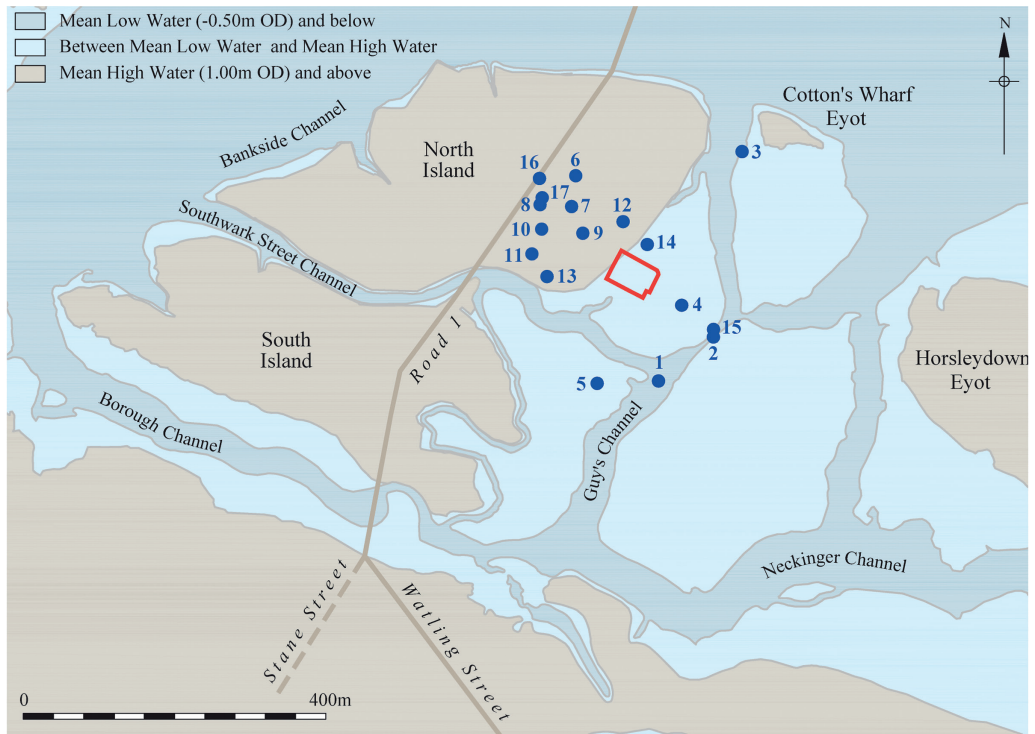
The settlement at *Londinium*/Southwark owed its existence primarily to its location as the lowest point at which the Thames estuary could be conveniently bridged, and was suitable for major port facilities (Cowan *et al* 2009, 170). Its position at the centre of the Roman road network allowed it to act as a transport hub and an entrepot for trade.

The foundation date for Roman Southwark is generally accepted as *c* AD 50–55 (Cowan *et al* 2009, 14; Ridgeway *et al* 2019, 10, 40), while *Londinium* was possibly founded as early as AD 47–8 (Hill & Rowsome 2011, i, 22). Two major roads converged on Southwark and the bridge over the Thames: Stane Street, connecting to the Sussex coast and Watling Street, the route to Kent and Richborough. The two roads probably joined near Borough underground station and then ran to the crossing slightly downstream of the existing London Bridge, on the site of Fenning's Wharf. From *Londinium* roads radiated to the west, north and east.

The site is located to the south-eastern side of the North Island on an area of mud flats that formed part of Guy's Channel (fig 3). The estimated tidal range in the mid-1st century was between a mean low water spring (MLWS) of -0.50m OD and mean high water spring (MHWS) of 1.25/1.50m OD. This range would expose the mudflats at low tide but submerge the ground at the high tide (Cowan *et al* 2009, 11).

The North Island was defined by two watercourses: the Southwark Street Channel to the south and Guy's Channel to the east. The Southwark Street Channel is usually conjectured to lie some 70m to the south of the site, but no trace of this channel was found in the excavations at Hunt's House and it may be that the watercourse lay further to the north and nearer the site than had been thought. Guy's Channel is conjectured to lie some 100m to the east of the site, aligned north-east to south-west and almost parallel to Road 1; it joined the Thames at Cotton's Wharf eyot.

Guy's Channel was first recognised archaeologically in excavations at New Guy's House in 1958 (fig 3 no 1; Marsden 1965). Probably the same watercourse was encountered again at 13–19 Maze Pond (fig 3 no 2; Bird & Graham 1978). In 1975 Guy's Channel was recorded in section on Tooley Street close to its confluence with the Thames (fig 3 no 3; Graham 1988). The channel was again partially excavated close to the site at Philip Harris House, at Guy's Hospital (fig 3 no 4; Taylor-Wilson 1990). In 1997–8 at Hunt's House to the south of the site, the course of Guy's Channel was exposed running across the southern part of the



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|--|--------------------------------------|---|
| 1. New Guy's House, 1958 | 6. 11-15 Borough High Street (BVK11) | 13. Guy's Hospital/St Thomas Street (GHR82) |
| 2. 13-19 Maze Pond | 7. 1-7 St Thomas Street (1STS74) | 14. 21-27 St Thomas Street (STS88) |
| 3. Tooley Street, District Heating System Area G (DHS75) | 8. Borough High Street Sewer (BSE94) | 15. Guy's Hospital / St Thomas Street (GHL89, GHD90 and GHS77) |
| 4. Philip Harris House, at Guy's Hospital (GHL89) | 9. 4-26 St Thomas Street (4STS82) | 16. 22 Borough High Street (22BHS88) |
| 5. Hunt's House (HHO97) | 10. King's Head Yard, 1945 | 17. Main Ticketing Hall Jubilee Line, Borough High Street (BGH95) |
| | 11. White Hart Yard (WHY85) | |
| | 12. 11-15 St Thomas Street (11STS77) | |

Fig 3 Science Gallery. Roman Southwark with other sites mentioned in the text.

excavation area with the undulating sandy bed of the channel recorded at -0.95m OD (fig 3 no 5; Taylor-Wilson 2002, 4).

Development was initially concentrated along the spine of higher ground with ribbon development along Road 1 (Cowan *et al* 2009, 18, fig 5). However, in AD 60/61 *Londinium*/Southwark was destroyed in the Boudican uprising, but despite this destruction the settlement rapidly expanded during subsequent decades (*ibid*, 15).

Excavations at 11–15 Borough High Street (BVK11), *c* 140m to the north-west of the site (fig 3 no 6), recorded a complex sequence of development and occupation set back from Road 1 from the early Roman period. The southern part of this site appears to have initially been occupied by a clay-and-timber building during the 1st century AD, which was superseded by a masonry building during the 2nd century. Of particular significance was the presence of a large masonry building located in the northern part of the site that may represent part of a bath-house positioned to the east of Road 1 and constructed during the late 1st century (Ridgeway *et al* 2019).

The archaeological evidence for occupation along St Thomas Street is less extensive, but excavations conducted at 1–7 St Thomas Street in 1974 demonstrated that Roman masonry buildings were present (fig 3 no 7; Dennis 1978). Further to the west at the Borough High

Street sewer, a 1994 watching brief found evidence of multiple phases of mid-late 1st and 2nd century timber buildings, a late 1st/early 2nd century masonry structure and an *opus signinum* floor (fig 3 no 8; Drummond-Murray *et al* 2002, 25, 59); many of these features were part of the major structures seen at the Jubilee Line Main Ticketing Hall on Borough High Street. Here clay-and-timber buildings destroyed in the Boudican fire were subsequently replaced by a row of masonry buildings, interpreted as shops (fig 3 no 17; Drummond-Murray *et al* 2002, 40–81). Timber buildings dating to the 1st century with 2nd century masonry additions were recorded to the rear of 4–26 St Thomas Street (fig 3 no 9; Cowan *et al* 2009, site 33). Further evidence of masonry buildings set back from the main street frontage have been recorded at King's Head Yard (fig 3 no 10), while evidence of buildings has also been recorded at White Hart Yard (WHY85) (fig 3 no 11; Cowan *et al* 2009, sites 35, 36 & 37).

Traces of Roman buildings have been found near the Science Gallery at 11–19 St Thomas Street (11STS77) and at Guy's Hospital, St Thomas Street (GHR82) (fig 3 nos 12 & 13; Cowan *et al* 2009, sites 28 & 38). Here the development was less intensive and the successive rebuildings found on sites further to the west was absent (Cowan *et al* 2009, 18).

ARCHAEOLOGICAL EVIDENCE: TIDAL MUD FLATS AND DRAINAGE DITCHES IN THE LATE 1ST AND EARLY 2ND CENTURIES (PERIOD 2.1) C AD 50–160

Across the site the earlier prehistoric fluvial deposits were covered by light grey sandy clays, *c* 0.30m thick at a highest level of 0.87m OD, interpreted as the natural build-up of alluvium on tidal mudflats before attempts were made to drain the area during the late 1st century.

In the Excavation Area the mudflats were dissected by a series of linear drainage ditches (fig 4) characterised by steeply sloping sides falling to a slightly concave or flat base, running north-west to south-east and north-east to south-west. All the ditches were infilled with a similar brownish grey sandy clay with occasional fragments of ceramic building material (CBM), chalk and charcoal. The earliest phase comprised three north-west/south-east-aligned ditches. Ditch [1018] was 2.26m long, at least 0.50m wide x 0.24m deep, both its western end and northern side have been removed by later activity. It was truncated to the north by ditch [982] (fig 5) and to the east by a medieval channel. Ditch [982] measured at least 8.34m long, 1.30m wide x 0.59m was also truncated to the east and extended beyond the limits of the excavation to the west. A small copper-alloy box (SF 41), which was probably part of the pommel of the handle of a tool or blade, was found in the ditch. A secondary fill of this ditch contained a fragment of Verulamium Region White ware hooked-flange mortarium with a complete stamp (fig 22 no 1).

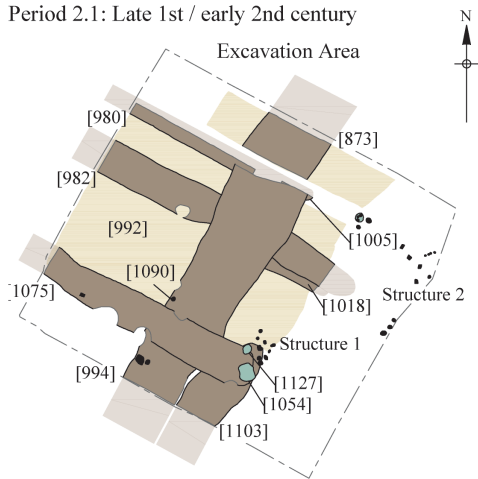
Further to the north a parallel ditch [980]/[1005] was recorded. Overall, the ditch measured 6.63m long, 0.36m wide x 0.30m deep but it was truncated to the north and west.

Set perpendicular to and truncating the ditches described above was a large ditch aligned north-east/south-west [994]/[873]. The feature extended across the entire area and measured at least 10m long, 2.45m wide x 0.48m deep. The cut was inclined to the south falling from 0.50m OD to 0.36m OD. Three postholes recorded along the western edge of the ditch and truncating the upper fill may represent the remnants of a revetment to the ditch or a fence line that superseded the ditch.

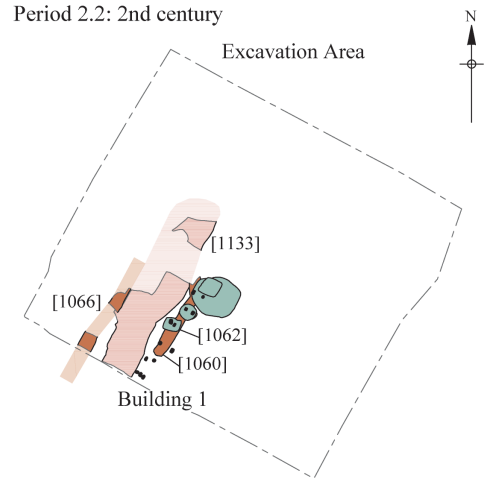
To the east of ditch [994]/[873] the butt end of another ditch aligned north-east/south-west [1103] was excavated. The feature measured 3.0m long, 1.80m wide x 0.51m deep and continued south beyond the limits of the excavation.

The various ditch fills produced 610 fragments of Roman pottery (see Hudak, below and finds discussion), which broadly dates the disuse of the ditches to the Hadrianic to early Antonine periods *c* AD 117–60. The amount of pottery present suggests there was contemporary occupation nearby probably on the higher ground to the west.

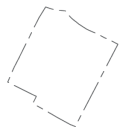
Period 2.1: Late 1st / early 2nd century



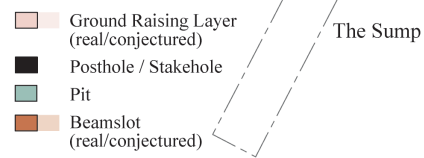
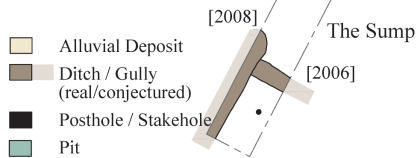
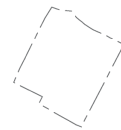
Period 2.2: 2nd century



The Lift Shaft



The Lift Shaft



- Alluvial Deposit
- Ditch / Gully (real/conjectured)
- Posthole / Stakehole
- Pit

- Ground Raising Layer (real/conjectured)
- Posthole / Stakehole
- Pit
- Beamslot (real/conjectured)



Fig 4 Science Gallery. Period 2.1 Late 1st/early 2nd century AD & Period 2.2 2nd century.

Structure 1

In the south-east of the Excavation Area at the north end of ditch [1103] and partly truncating the upper fill of the ditch was a cluster of nine postholes (Structure 1, fig 4). These postholes formed an L-shaped structure 0.70m east–west x 0.90m north–south. Just to the south of this group of postholes were two small pits ([1054] and [1127]). It is uncertain whether these pits were associated with the posthole structure, but they may relate to its dismantling.

Truncating the two pits described above as well as ditches [994] and [1103] was a north-west/south-east-aligned ditch [1075]. The ditch measured 7.70m long, 1.30m wide x \approx 0.50m deep and was truncated to the east and continued beyond the limits of the excavation to the west. The base of the ditch sloped to the east falling from 0.33m OD to 0.23m OD. Finds from ditch [1075] included a fragment of the rim and neck of an unusual small



Fig 5 Science Gallery. Excavating Period 2.1 ditch [982], facing west.

multi-coloured glass jug dated to the mid-1st century. Pottery recovered from its primary fill included a Black-burnished ware plain-rim dish and a bowl (fig 22 nos 2–3).

A further north-west/south-east-aligned ditch [2006] was recorded in the Sump. The feature measured 1.20m long, 0.62m wide x 0.24m deep and was truncated to the west by a north-east/south-west ditch [2008] at least 3.90m long x 0.50m wide x 0.78m deep.

Structure 2

On the east side of the Excavation Area a group of eighteen stakeholes and postholes was recorded (Structure 2, fig 4). All the postholes and stakeholes were truncated from above by a medieval drainage feature. Thus, it is possible that Structure 2 was constructed during the Roman period. All the postholes and stakeholes were characterised by near-vertical sides falling to a pointed base and all were filled with a similar silty sand. The postholes formed an L-shaped structure, possibly an animal pen that extended *c* 3.0m east–west x 3.20m north–south.

STRUCTURAL ACTIVITY AND RENEWED FLOODING (PERIOD 2.2) AD 160–200

Building 1

Unearthed in the south-west quadrant of the excavation area were the probable remains of a building (Building 1) with earth-fast foundations (fig 4).

The earlier drainage ditch [1075] was partially covered by a compacted silty clay [1133] with moderate inclusions of small sub-angular stones and charcoal flecks and fragments. The layer extended 4.64m north–south x 1.26m east–west and was 0.10m thick at 0.68m OD.

This deposit may have been the remnants of a more extensive surface probably deliberately laid down to consolidate the ground and create a level base for construction.

The western edge of make-up layer [1133] was truncated by a north-east/south-west-aligned linear feature with a flat base [1066]/[1068] at least 2.56m long, 0.56m wide x 0.14m deep but was truncated to the north and south. About 1.70m to the east of the feature [1066] a similar parallel feature [1060] measured 2.72m long x 0.40m wide x 0.06m deep. Both features may represent beam slots and the remnants of a timber-framed building (Building 1) that covered an area of at least 3.86m x 2.42m.

On the same alignment and partially truncating slot [1060] was a line of thirteen postholes that extended over 3.24m. The postholes were arranged in pairs except for the southernmost group that was formed by a row of three. Typically, each pair of postholes was set *c* 0.47m apart and the spacing between each pair was *c* 1.20m.

All the postholes were sub-rectangular or rectangular, of similar dimensions ranging from 0.08m x 0.09m to 0.15m x 0.12m with depths of between 0.16m and 0.46m. The postholes had near-vertical sides with pointed bases and were filled by similar silty clay. The postholes may represent a wall line replacing the earlier wall defined by the beam slot [1066]. Four pits truncated the three northern pairs of postholes described above and are likely to represent the dismantling of the structure. From pit [1062] was recovered a lead weight (SF 47) (fig 24 no 11) (see Shepherd, below).

In the Excavation Area all the features described above were sealed by a silty clay deposit, 0.16m thick, sloping gently from west to east falling from 0.82m OD to 0.62m OD, interpreted as alluvium deposited by prolonged flooding (not illustrated). Similar clay deposits were recorded in the Sump and the Lift Shaft. Pottery recovered from these alluvial deposits suggest a deposition date of AD 180–200. The base of a late 1st or 2nd century glass phial was found in these deposits together with a copper-alloy earring (SF 42) (fig 24 no 6), a finger-ring (SF 45) (fig 24 no 7) and a fragment of a glass jug or flagon handle (SF 44), all dated to the 1st or 2nd century AD.

Discussion

It is clear from the excavations at the Science Gallery that a substantial effort was made during the late 1st and early 2nd century AD to reclaim the mudflats on the edge of Guy's Channel by digging a series of linear ditches, which were subsequently infilled with waterlain deposits. Similar features have been found on other sites on the flood plain west of Guy's Channel, for instance at 21–27 St Thomas Street (STS88), immediately to the north of the Science Gallery. On the north side of St Thomas Street, a north–south ditch roughly parallel to Road 1 was found dating to AD 70–100 (fig 3 no 14; Cowan *et al* 2009, fig 7). This was recut in AD 120–60 when several north–south and east–west ditches were added (Cowan *et al* 2009, fig 10). Drainage features were also identified at 11–15 St Thomas Street (11STS77) and Guy's Hospital/St Thomas Street (GHR82) (fig 3 no 15; Cowan *et al* 2009, sites 28, 34 & 38), and at Hunt's House numerous 'rivulets' were recorded (Taylor-Wilson 2002).

Analysis of the pottery suggests that the drainage ditches at the Science Gallery were dug and naturally silted up in rapid succession during the early 2nd century, with the latest one [1075] being infilled towards the middle of the 2nd century. It is apparent that the ditches at the Science Gallery were part of a much more extensive drainage system on the eastern side of the North Island intended to alleviate flooding and reclaim marginal land. A comparison of the early Roman pottery retrieved from 21–27 St Thomas Street and the Science Gallery suggests that there may have been a staggered progression of land reclamation from north to south and an intensification of activity particularly during the period AD 120–60.

Simple post-built structures (Structures 1 and 2) recorded on the eastern side of the Excavation Area suggest that the land was brought into some form of productive use. At

Hunt's House similar structures were interpreted as possible animal pens (Taylor-Wilson 2002, 13), which seems the most probable interpretation for the structures here.

The building remains (Building 1), while ephemeral and fragmentary, are an indication that the earlier land reclamation had been sufficiently successful to allow construction. This is the first evidence for construction on the mudflats to the south-east of the North Island. However, pottery recovered from the beam slots and the pits representing the demolition of the building indicate that it was probably constructed after AD 165 and was in use for only a brief period before the area was subjected to renewed flooding by *c* AD 180.

The findings at the Science Gallery are consistent with the assertion by Cowan that although building development moved eastwards it was never as intense as that along Road 1, reflecting the marginal nature of the area (Cowan *et al* 2009, 18). Until AD 120–60 the margins of Guy's Channel remained a large flood plain, probably occupied only by drainage systems, and even after this period little development took place on the flood plain to the west of Guy's Channel (*ibid* 2009, 73).

At the Science Gallery the scant building remains dated to the late 2nd century were buried under a further accumulation of alluvium, confirming that the area was again subject to prolonged flooding. At Hunt's House alluvial deposits were interpreted as evidence of severe flooding around AD 180 and flood deposits dated to the period AD 170–90 have been recorded to the north of the Science Gallery at 21–27 St Thomas Street. It would appear that despite the fall in sea level during the 2nd century, by AD 200 MHW is estimated to have been as low as 0m OD (Taylor-Wilson 2002, 21), and despite considerable efforts made in Southwark to drain and reclaim land, extensive flooding of the low-lying parts of the south-east of the North Island remained a serious problem in the late 2nd century.

Period 3: Late Roman 3rd and 4th centuries

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

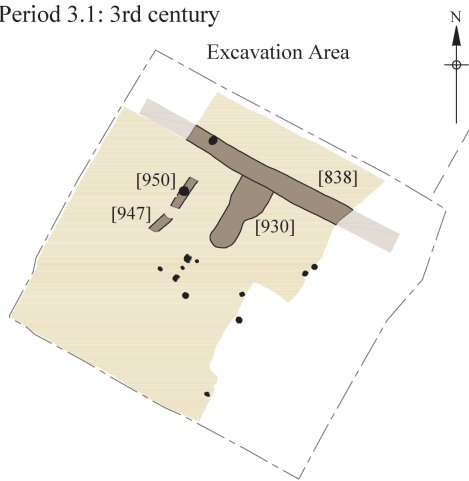
Falling tidal levels within the Thames estuary and declining trade appear to have combined to hasten the end of *Londinium* as a port, and between AD 250 and 270 the wharf (on the north bank of the Thames) was dismantled (Sidell 2003, 302–22, fig 124; Rowsome 2008, 31). The construction of the riverside wall in *c* AD 275 shows how unimportant the port facility had become.

In Southwark falling water levels probably contributed to the silting up of Guy's Channel, so by the mid-3rd century the watercourse had ceased to exist within the confines of Hunt's House although a deep-water channel may have existed further to the east (Taylor-Wilson 2002, 30).

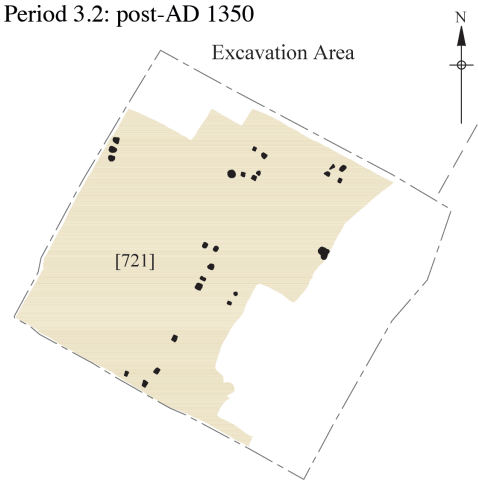
Late Roman period Southwark is characterised by the gradual contraction of the settlement and excavation indicates that there were no buildings in use at the London Bridge station sites after about AD 350. However, one building that does appear to date to this time was at 4–26 St Thomas Street, where a high-status building (Building 7) with associated mosaic and painted wall plaster was recorded (Cowan *et al* 2009, 157–8). There is a concentration of late Roman pottery in the St Thomas Street and Borough High Street area, and this may be an indication that the settlement had contracted to the vicinity of the southern bridgehead (*ibid* 2009, 33).

Often cited as further evidence for the contraction of settlement on the North Island towards the bridgehead are the late Roman burials truncating ground previously built on as, for example, the burials recorded at Guy's Hospital/St Thomas Street (Cowan *et al* 2009, 33). However, these burials could be the result of a change in burial practice and not in themselves an indication of retrenchment of settlement.

Period 3.1: 3rd century



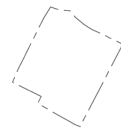
Period 3.2: post-AD 1350



The Lift Shaft

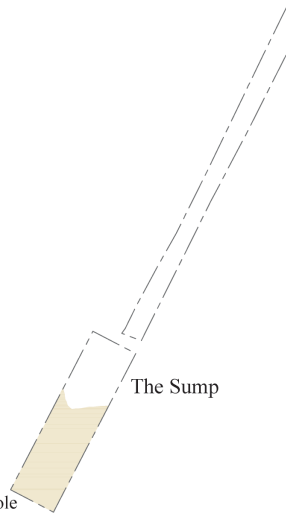


The Lift Shaft



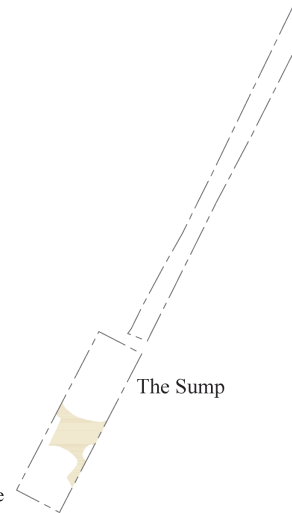
- Alluvial Deposit
- Ditch / Gully (real/conjectured)
- Posthole / Stakehole

The Sump



- Alluvial Deposit
- Posthole / Stakehole

The Sump



0 10m

Fig 6 Science Gallery. Period 3.1 3rd century AD & Period 3.2 post-AD 350.

ARCHAEOLOGICAL EVIDENCE: DITCHES AND POSTHOLES (PERIOD 3.1) *c* AD 200–350

In the Excavation Area the accumulation of alluvium (Period 2.2) was truncated by the digging of another series of drainage ditches and a scatter of postholes (fig 6), forming fence lines or other timber structures.

Ditch [930] aligned south-west/north-east, measured 2.60m long x 1.18m wide x 0.22m deep and terminated in the south but was truncated to the north by ditch [838]. The concave-shaped base inclined to the north falling from 0.60m OD to 0.52m OD.

Approximately 1.30m to the west of ditch [930] another parallel gully [947]/[950] measured at least 2.12m long x 0.30m wide x 0.15m deep, but was truncated to the north and south. The gully was characterised by sloping sides falling to a concave base that inclined to the south falling from 0.71m OD to 0.57m OD. Both the gully and the ditch were filled with similar silty clay from which only residual 1st and 2nd century pottery was recovered.

The northern end of ditch [930] was truncated by another ditch [838] aligned north-west/south-east, measuring 5.92m long, 0.30m wide x 0.37m deep, but was truncated to the north and south (fig 7). The cut had near-vertical sides falling to a flat base that gently inclined to the east falling from 0.44m OD to 0.39m OD. A sequence of silty clays with inclusions of CBM, charcoal and fragments of animal bone filled the ditch. Pottery recovered including sherds of Alice Holt/Farnham ware, Oxfordshire colour-coated ware and Much Hadham ware suggested a deposition date in the second half of the 3rd century (see Hudak below). A fragment of a green/blue glass jug handle was also found in the ditch.



Fig 7 Science Gallery. Period 3.3 ditch [838], facing east.

Alluvial deposits and postholes Period 3.2 post-AD 350

The Period 3.1 features confirm that drainage and reclamation had once again brought the area back into productive use. However, by the later 4th century serious flooding had resumed, evidenced by an accumulation of silty clay alluvium [271], 0.30m thick, containing occasional fragments or chunks of angular rubble, CBM and animal bones. The highest level on this deposit was at 1.06m OD. Similar deposits were also recorded in the Sump at 0.90m OD. Pottery, including a few sherds of Portchester D ware recovered from the alluvium, suggests that this period of inundation started after AD 350.

This alluvium sealed all the earlier ditches and postholes. Alluvium [721] contained a variety of small finds including a cylindrical black and red glass bead (SF 29) unique to Roman Britain, a ceramic lamp (SF 33) (fig 24 no 1), a copper-alloy jug lid in the shape of a duck (SF 37), a copper-alloy left foot (SF 36) (fig 24 no 4), a ceramic gaming piece (SF 46) (fig 24 no 2), a small pellet of 'Egyptian blue' frit used as a paint pigment, a belt fitting (SF 32) (fig 24 no 3), a piece of rolled lead and a few scraps of waste lead. However, the most remarkable find was a fragment of a glass bowl (SF 126) decorated with the engraved portrait of a figure (fig 24 no 8). This is an exceptionally rare piece probably made in the eastern Mediterranean during either the late 2nd or early 3rd century. It would have been a luxury item and can only have come from a very wealthy household or have been part of the accoutrements belonging to a religious or state institution (see Shepherd, below).

Although the thickness of the alluvial deposits confirm sustained and severe flooding it seems that the land was sufficiently dry for the erection of post-built structures, perhaps animal pens (fig 6). Possibly the flooding was seasonal, allowing the area to be grazed intermittently. Also recovered from layer [721] was a hoard of seven late Roman copper-alloy coins, the latest of which date to *c* AD 367–78. The hoard was presumably buried when the area was still accessible (see Andrews, below).

In the Sump, the fill of ditch [2008] (see Period 2.2) and the later Roman overlying deposits [2004] and [2003] were environmentally sampled in a monolith. The samples produced a high concentration of poorly preserved pollen, the assemblages being indicative

of open conditions with plant communities growing on disturbed ground. Damp and/or semi-aquatic conditions are indicated by the presence of limited amounts of alder, grasses and sedges. Limited amounts of tree pollen of alder, hazel, oak and pine were recorded, suggesting a relatively open environment, with small amounts of woodland or hedgerows nearby (see Batchelor *et al*, below).

Discussion

The evidence for the supposed decline of the *Londinium*/Southwark settlement as a major port and urban centre in the later Roman period is not as straightforward as some have postulated. For instance, at Hunt's House a mid-3rd century large timber-lined pit interpreted as an amphorae storage tank (Taylor-Wilson 2002, 23–6) attests to the continued importance of overseas trade and commerce in Southwark. This feature implies that despite falling river levels (which would have hindered navigation) some of the Southwark channels remained in use as port facilities.

At the Science Gallery, the late 2nd century flooding recorded appears to have been followed in the 3rd century by renewed ditch digging probably for drainage and to demarcate land divisions. The erection of post-built structures probably including fence lines and animal pens suggest the land was once again being used for rearing livestock. A similar pattern of land use has been recorded elsewhere on the flood plain including at Hunt's House, 21–27 St Thomas Street and Guy's Hospital/St Thomas Street (GHL89, GHD90 and GHS77) (Taylor-Wilson 2002; Cowan *et al* 2009, 105, 181). The continued vitality of Southwark in the 3rd century is also apparent to the west of the site at 1–7 St Thomas Street (1STS74), 4–26 St Thomas Street (4STS82) and 22 Borough High Street (fig 3 no 16; 22BHS88) where timber-framed structures were replaced in stone (Cowan *et al* 2009).

During the later 4th century, the site was again subject to prolonged flooding. However, the evidence for post-built structures erected during this period suggests that the site was used intermittently or seasonally until at least the end of the 4th century.

ROMAN FINDS

The medium-sized pottery assemblage recovered from the Science Gallery is comparable to those from other sites in the vicinity notably 21–27 St Thomas Street and the Hunt's House excavations. A wide variety of Romano-British and imported fabrics and forms are represented. The most common forms are jars, bowls, then flagons and beakers in that order. Other forms included cups, dishes, mortaria, amphorae and lids as well as *tazze*, castor boxes and crucibles (see Hudak, below). Second century samian dominated the imported fine wares (see Mills, below). The fragmentary and abraded nature of the ceramic assemblage is consistent with flood deposits and land reclamation. The date range of the pottery shows a high frequency of material of late 1st or early 2nd century date (Period 2.1), with a subsequent decrease (Periods 2.2 & 3), reflecting a decline in the density of habitation during the 4th century.

The Roman periods produced a large assemblage of CBM (638 examples weighing 93.22kg); most of the material was fragmentary and abraded consistent with it being redeposited and dumped as waste material on marginal land. There was a remarkably high proportion of flat tile, followed by brick and roof tile with *tegulae* dominating over *imbrices* and a small collection of box flue-tile and tesserae. The majority of the collection dated to the 1st or 2nd century with only a small proportion dated to the later Roman period. This reduction in CBM over the Roman period might suggest a decline in settlement, but the widespread reuse of earlier Roman material in the later Roman period is well known and the use of less durable building materials such as timber and thatch cannot be discounted.

The collection of small finds recovered from the 4th century flood deposits provides some indication of the diverse nature of the inhabitants of Southwark (see Shepherd, below).

However, the coins found in layer [721] are the first Valentinianic bronze hoard found in the London region and the paucity of coins generally from this period in the London region may indicate a transfer of coin supply and a wider relocation of administrative power away from *Londinium* and the South East towards the West Country.

The animal bone collection from the Science Gallery is dominated by cattle, a characteristic typical of the Roman period, but its small size perhaps reflecting the marginal nature of the site cannot provide any meaningful evidence about food supply and animal husbandry (see Deighton, below).

The evidence for a contraction in the area of Southwark occupied during the late Roman period is corroborated at the Science Gallery by a greater volume of pottery and CBM dated to the late 1st and 2nd centuries. However, it is clear that the North Island and the bridgehead remained a focus for late Roman occupation. At the Science Gallery productive use of the land in the late 4th century was demonstrated by the presence of ceramics and a coin hoard.

Furthermore, the distribution of finds (pottery and coinage) across Southwark does not support notions of an abandoned townscape (Gerrard 2011) but rather may suggest foci of occupation at various locations. Evidence from the Tabard Square temple complex and sites at the junction of Stane Street and Watling Street suggest a focus of settlement here (Gerrard 2011, 190; Killock *et al* 2015; Ridgeway *et al* 2019, 168). Small docks and beaching facilities may have been available around the margins of Southwark's islands and it has been suggested that there was a series of smaller, perhaps discrete but interconnected settlement foci, benefitting from the accessibility of the islands by water transport (Ridgeway *et al* 2019, 169, 178). Future archaeological work promises to further explain a more complicated pattern of settlement in the late Roman era than hitherto might have been envisaged.

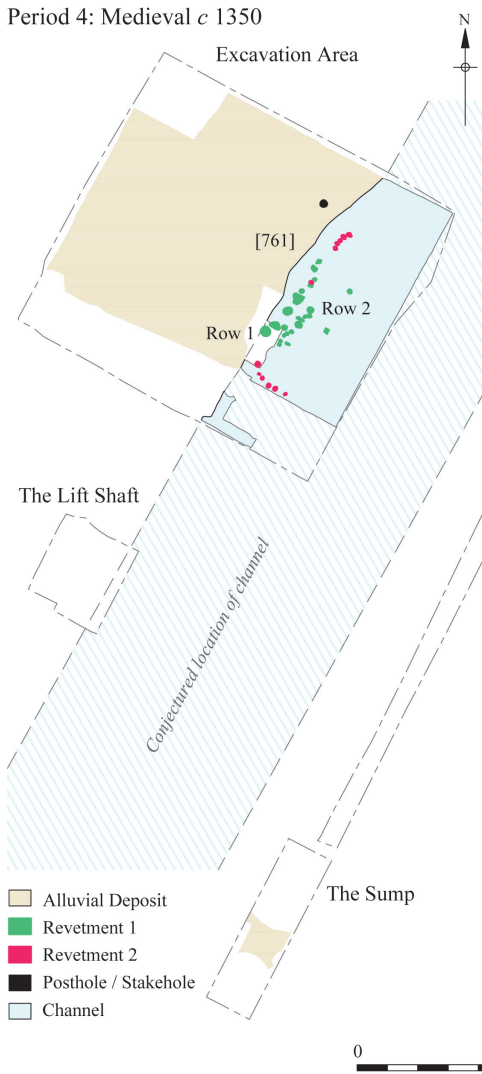
Period 4: medieval 5th/6th century–c 1400

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Exactly when Roman Southwark was abandoned is uncertain owing to the lack of reliable finds dating evidence after c AD 400. Within the area of the former bridgehead there are few finds datable to the 5th or 6th century and little evidence of overseas trade. However, in 2016 a complete North African red slipware oil lamp dating to either the late 4th or 5th century was discovered on the Thames foreshore close to the old Billingsgate Market. It is a Hayes 11A type lamp manufactured in the Carthage area.² A few sherds of 5th or 6th century pottery recovered from New Fresh Wharf (Watson *et al* 2001, 55) and Hunt's House (Taylor-Wilson 2002, 36) imply some activity within the bridgehead area during the Early Saxon period. The Middle Saxon settlement of *Lundenwic* was located 3km upstream in the Strand area (Watson *et al* 2001, 52; Cowie *et al* 2012). The Burghal Hidage of c AD 915 contains the first recorded mention of Southwark as 'the fort or defence work of the people of Surrey' (Watson 2009, 148). The walled Roman city was not reoccupied until the late 9th century, and by the late 10th or early 11th century a bridge existed (Watson *et al* 2001, 57).

By the 11th century, London was an important port and a centre for trade with Flanders, Scandinavia and Normandy. The Domesday Survey of 1086 records an urban settlement at Southwark and the evidence concerning tolls suggests that it was also a port (Watson *et al* 2001, 55–6). At this time, the settlement was probably confined to the bridgehead area (Watson 2009, fig 1). Subsequently, medieval development in Southwark was concentrated along the High Street (known in the 16th century as Long Southwark and now Borough High Street) (Carlin 1998, 18). By the later 12th century the High Street may have been continually built up from the bridge southward to St George's church (Carlin 1996, 22), while low-lying areas that remained prone to flooding were apparently used as pasture and meadow (*ibid.*, 38).

Period 4: Medieval c 1350



Period 5: Late Medieval 1400-1450

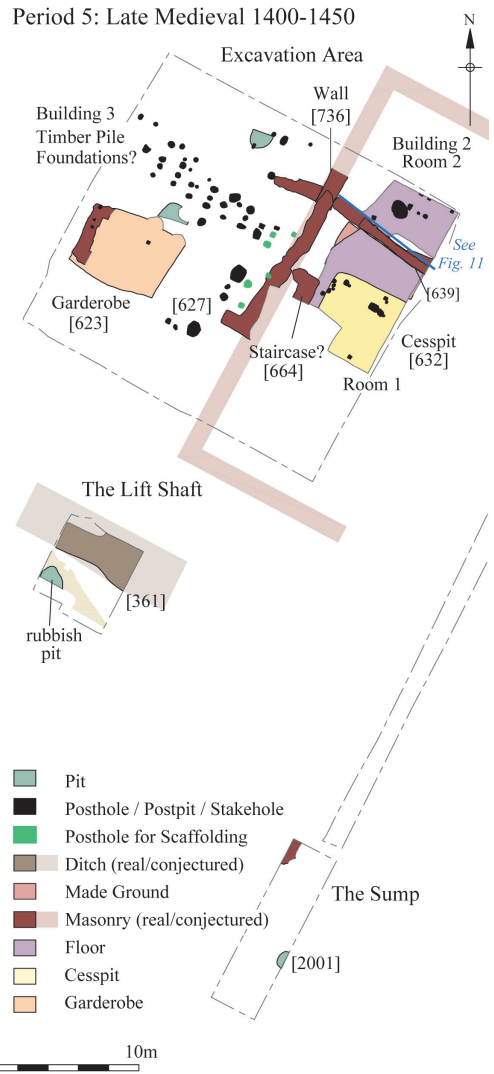


Fig 8 Science Gallery. Period 4 medieval c 1350 & Period 5 late medieval 1400–1540.

ARCHAEOLOGICAL EVIDENCE: ALLUVIUM AND DRAINAGE DITCH (PERIOD 4) C AD 600/700–1400

In the Excavation Area all the late Roman deposits and features were sealed by a 0.25m-thick build-up of silty clay alluvium and a similar deposit was encountered in the Sump. The highest level on this deposit was at 1.44m OD. The only cultural material recovered from the alluvium was residual 1st and 2nd century Roman pottery. Its accumulation may have been connected with a marine transgression that started during the Early Saxon period (Sidell 2003, 323) and the impression is that until the late 13th century the site reverted to tidal mud flats.

Another attempt to reclaim the area started with the digging of a large drainage ditch [761] within the eastern side of the Excavation Area (figs 8 & 9). It measured at least 10.0m



Fig 9 Science Gallery. Period 4 medieval channel [761], facing north, 1m scale.

long x 3.80m wide x 1.71m deep and continued beyond the edges of excavation to the north, south and east. The cut was characterised by steeply sloping sides falling to a flat base. Along the west side of the ditch was a double row of postholes and post pits (Rows 1 and 2). Row 1 to the west extended *c* 3.90m and a parallel alignment Row 2 set 0.50m to the east extended for 1.55m. These postholes are thought to represent a revetment (Revetment 1) along the western side of the channel.

The basal fill of the ditch and the postholes that formed Revetment 1 were covered by a sequence of silty clay deposits, 0.43m thick, which were in turn truncated by a second phase of postholes and revetting (Revetment 2). Covering Revetment 2 was an upper sequence of silty clays. A single fragment of human bone, part of the humerus (mid-distal shaft), was recovered from the ditch together with a number of small finds including a 14th century Flemish jetton (SF 15), a rosary bead (SF 67), a substantial piece of lead sheet (SF 59) probably roofing material from an ecclesiastical building, a copper-alloy mount (SF 21) and a medieval hone stone (SF 14) (fig 28 no 4) (see Gaimster, below).

The moderately-sized pottery assemblage for Period 4 was dominated by Surrey whitewares including Coarse Surrey-Hampshire Border ware and Cheam whiteware with smaller quantities of Mill Green ware and Kingston-type ware. Imports included Dutch redwares including a frying-pan and Siegburg stone ware. The usual range of forms was represented including cooking pots, jugs, bowls, lids and rims. While most of the pottery is dated to the 14th century or later a few sherds of late 13th to mid-14th century date were present in the lower fills of the ditch, although the general lack of pottery dating to before the 14th century is indicative of the marginal nature of the site during this period. A few sherds of London-area early post-medieval redware recovered from the upper fill suggests that the ditch was not completely filled in until the end of the 15th or the beginning of the 16th century (see Sudds, below).

The medieval animal bone assemblage was mostly collected from this ditch and was dominated by cattle, followed by sheep/goat, and then pig with chicken formed 5.7% of the assemblage. Although the assemblage was small it was comparable to other sites in the locality and is consistent with domestic consumption. The presence of rabbit and fallow deer cannot be taken as an indication of affluence because rabbit was becoming increasingly available and poaching could account for venison being occasionally on the table (see Deighton, below).

Large quantities of medieval roofing peg tile were recovered from the site and many of the tiles can be assigned to the 12th and 13th centuries. This material was probably derived from the demolition of local buildings.

An environmental sample from the ditch produced generally well-preserved charcoal fragments from a highly diverse group of taxa. Ecological habitats represented in the charcoal assemblage are wide ranging, suggesting several environments were exploited to obtain fuel for use during the medieval period. Taxa such as oak, hazel, holly, beech, birch and elm can be found in deciduous woodland with some, such as beech and elm, preferring calcareous soils while others are more typically found on acidic soils or are widespread, occurring on a range of soil types. Alder thrives in riparian environments and may have been a common component of the local vegetation prior to concerted efforts in the medieval and post-medieval period to drain the marshland for settlement. Birch, field maple and some of the Maloideae group (hawthorn, apple, pear, whitebeam and rowan) taxa may be indicative of more open vegetation. In addition, many of the trees could have been grown in hedgerows and, in the case of fruit trees such as apple, may have been cultivated in orchards although these are less likely to have been exploited for fuel (see Batchelor *et al*, below).

There was a huge demand for firewood in London and Southwark during the medieval period (Galloway *et al* 1996). To the south of the river fuel may have derived from pockets of woodland stretching down to the Weald and it is likely to have arrived as pre-cut lengths in bundles, referred to as faggots, composed of brushwood or as talwood and billets, comprising larger, heavier pieces of wood typically oak and beech (*ibid*). The mixed charcoal assemblage recovered from the site is consistent with domestic hearth ashes or waste associated with light industry such as bakeries. While oak and beech may have been preferred for the main fuel supply, since both burn exceptionally well (Taylor 1981), the other taxa represented and the prominence of roundwood of varying sizes and maturity certainly supports the evidence for brushwood rather than coppiced wood, which would display more uniformity. It should be noted that the assemblage almost certainly represents an amalgam of fuel waste and may have been derived from multiple sources.

Discussion

The alluvium recorded in the Excavation Area and the Sump represents post-Roman site-wide inundation. The site and the locality appear to have remained marsh or tidal mud flats for most of the medieval period. However, by the late 13th century a major north–south drainage ditch had been excavated. This marked a serious attempt to drain and reclaim the area, which can be connected with the contemporary excavation of similar ditches elsewhere in Southwark. To the south of the site at Hunt's House, drainage ditches aligned east–west are a feature of the later medieval period (1300–1500) (Taylor-Wilson 2002, 38). In 1213–15 when St Thomas's Hospital was refounded on the eastern side of the Borough High Street the site and the surrounding area were incorporated into its precinct (Carlin 1996, 75–6). This refoundation may have been the catalyst for local land reclamation.

As the population of Southwark expanded, more marginal areas were reclaimed and settled. This involved the large-scale embanking, ditching and landfill works by landowners and their tenants (Carlin 1996, 231). Embankments sometimes failed with catastrophic consequences, such as in 1294–5 when floods were recorded that caused damage to St Thomas's Hospital totalling four marks (£2 13s 4d). Manorial officers and courts were responsible for ensuring

the construction and maintenance of embankments by freeholders. Royal commissions *de wallis et fossatis* were also appointed to make periodic inspections and exact repairs from any negligent landlords given the potential impact of flooding on entire communities (*ibid*, 232).

Medieval hospitals were generally established in suburban locations around London and on major roads, so they could provide accommodation for pilgrims and care for the poor and sick (Thomas *et al* 1997, 125). These foundations included a hospital founded in 1101 in the parish of St Andrew Holborn on the road leading to the city from the west; St Bartholomew's in 1123; to the east St Katharine's was founded in 1148 in East Smithfield under the auspices of Holy Trinity priory, which lay immediately inside Aldgate (*ibid*), and St Mary Spital founded in 1197 outside Bishopsgate.

St Thomas's Hospital had its origin in the infirmary of St Mary Overy Priory by London Bridge, founded early in the 12th century and named St Thomas's Spital after the canonisation of Thomas Becket in 1173. After a disastrous fire had destroyed much of the priory in 1212, the hospital was refounded on a new site on the east side of Borough High Street (Carlin 1996, 75–7; Knight 2002, 7). The siting of St Thomas's Hospital on marshy land, on the edge of settlement and beside a main road, is paralleled with other medieval hospitals in London, for instance St Mary Spital priory and St Bartholomew's are also located on land liable to flooding (Thomas *et al* 1997, 90). Presumably the marginal land in these places was readily available and the locations beside the main roads emphasised their role in sheltering travellers, especially pilgrims (*ibid*, 3).

The hospital precinct (fig 12) extended on the south along the northern edge of the King's Head inn and the Maze Pond as far east as the Maze, and on the north ran along a line to the north of St Thomas Street (formerly known as Trenet Lane). The great outer gate of the hospital precinct was at the western end of the street and dated from the foundation of the hospital (Carlin 1996, 22–4).

Period 5: Late medieval 1400–1540

ARCHAEOLOGICAL EVIDENCE: MASONRY BUILDINGS AND CESSPITS (PERIOD 5) 1400–1540

In the Excavation Area overlying the soft fill of ditch [761] (Period 4) was a capping of crushed chalk, silty clay and chalk rubble. These deposits are interpreted as ground consolidation prior to construction of a substantial masonry building (Building 2, figs 8 & 10).

Building 2

To the west of the infilled ditch [761] a north–south wall foundation [736] of randomly-coursed roughly-hewn chalk, flint, ragstone and sandstone rubble bonded with coarse sandy lime mortar at least 6.26m long, 0.68m wide x 0.68m deep was recorded. At the north and south ends of the wall foundation, masonry projecting to the west probably represents external buttresses set *c* 5m apart to strengthen the wall where it supported the principal trusses of the roof. The width and depth of the foundations and the use of external buttresses suggests a building at least two storeys high. Six postholes adjacent and to the west of the foundation [627] may represent scaffolding erected for the construction of the west wall of Building 2.

Opposite the northern buttress and abutting the internal face of the wall foundation [736] was the foundation [639] for an east–west-aligned internal wall. The foundation, which truncated the chalk consolidation layers that capped the earlier ditch, measured 3.80m long, 0.56m wide x 0.99m deep and continued east beyond the edge of the excavation and was built with randomly-coursed, roughly-hewn chalk blocks and incorporated a relieving arch extending to the east (fig 11).

The masonry elements described above represent a building (Building 2) at least 6.26m long x 3.80m wide with at least two ground floor rooms (Rooms 1 and 2). Room 1 to the



Fig 10 Science Gallery. Period 5 Building 2, facing west, 1m scale.

south of the wall foundation [639] measured at least 3.88m north–south x 3.72m east–west. Room 2 to the north measured at least 3.72m east–west x at least 1.41m north–south.

In Room 1, another masonry feature was recorded [664]. The L-shaped foundation consisted of crushed chalk with occasional pieces of Reigate stone ashlar and post-medieval peg tile dated 1480–1900, measured 0.60m wide x 0.95m east–west x 0.93m north–south and was 0.11m deep. The foundation may represent a footing or base for a staircase.

Also, within Room 1, to the south and abutting the foundation [639], a layer of compacted clay with many inclusions of chalk fragments and occasional fragments of CBM and charcoal was recorded at 1.52m OD. A similar deposit was recorded in Room 2 at 1.26m OD. These compacted clays represent beaten earth floor or floor make-up. Pottery and CBM recovered from the ground consolidation layers and floor deposits associated with Building 2 suggest construction in the late 15th or early 16th century.

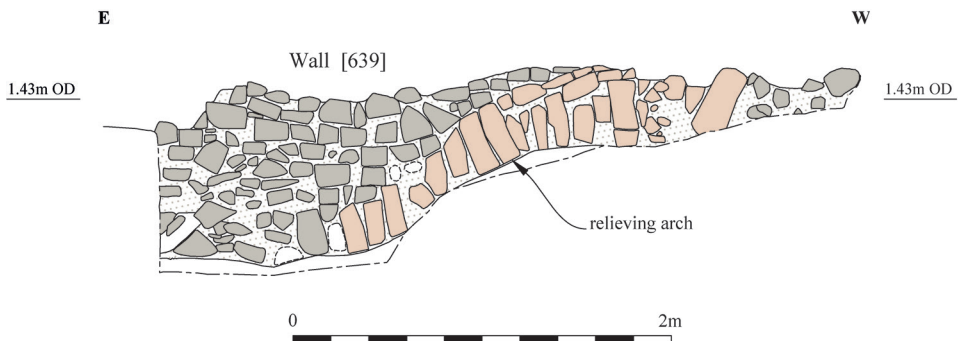


Fig 11 Science Gallery. Period 5 north-facing elevation of wall [639], Building 2.

In Room 1, the beaten earth floor [651] was truncated by a very large sub-rectangular pit [632]), that had vertical sides and a flat base, measuring 2.66m x 2.50m x 1.19m deep and continued beyond the limits of the excavation to the east and was truncated on the south side. Postholes dug into the base of the pit may represent part of a timber lining.

The basal fill of the pit was a silty clay with abundant fragments of charcoal, oyster shell, mortar and chalk. Pottery dating to 1270/1350–1500 and CBM dated to 1480–1700 were recovered from the fill. The pit [632] may represent a cesspit, but if this interpretation is correct then the use of this part of Building 2 as a privy was probably a later conversion for this part of the structure.

In Room 2, truncating the floor layer was a group of stakeholes and a post pit. The stakeholes were characterised by vertical sides tapering to a pointed base and were filled with decayed wood. The stakeholes and post pit may represent timber props perhaps to support the ceiling when Building 2 was in a dilapidated state, or internal partitions.

Building 3

To the west of Building 2 a linear concentration of postholes and post pits may represent a timber pile foundation that supported a masonry superstructure (Building 3). The postholes were grouped into an east–west alignment possibly demarcating the north wall at least 5.83m long with those on a north–south alignment measuring 4.38m in length possibly representing the east wall. These postholes produced a number of sizeable iron nails and a clench bolt (SF 68). These fixings may have been used in the construction of the building possibly suggesting a timber-framed building. Six postholes adjacent and to the west of the foundation [627] may represent part of the eastern wall of Building 3 and possibly its south-eastern corner.

To the south and west of the remains of the two buildings was a large rectangular pit [623] that measured 3.16m x 2.25m x 1.38m deep. Its cut was lined with regularly coursed chalk blocks bonded with a yellowish-brown sandy lime mortar. Four postholes that truncated the base of the pit are thought to represent timbers that supported the construction of the pit lining. Roman residual pottery and medieval peg tile dated to 1240–1450 was recovered from the backfill of the construction cut. The chalk blocks were stained with a residue thought to be cess, which would indicate that the sunken feature was a large garderobe or cesspit. Assuming that postholes adjacent to [627] represent part of Building 3, then this feature was probably internal.

The remains of a chalk foundation aligned north-east/south-west in the Sump suggest that further buildings were extant on the site in the later medieval period.

To the south of the Excavation Area in the Lift Shaft a small portion of a large cut feature [361] was excavated. The cut, aligned east–west, measured 2.66m long x 2.46m wide x 0.78m deep and continued beyond the limits of the excavation to the east, west and north. The cut was characterised by sloping concave sides falling to a concave base that gently inclined to the east. A sequence of silty clay and sandy silts infilled this feature, which was possibly a drainage ditch. Pottery dated to 1480–1600 was found in its upper fill and similarly dated pottery was also recovered from a clay layer to the south.

To the south of the ditch was a possible rubbish pit, measuring 0.86m x 0.51m x 0.38m deep, which was truncated to the south. It was filled with silty clay with inclusions of fragments of oyster shell, CBM and charcoal.

Period 5 produced a small collection of pottery with Surrey whitewares remaining dominant and with a smaller quantity of late London-type ware, early post-medieval red ware and early Surrey-Hampshire Border ware compared with Period 4. Imports included Dutch redware and German stonewares (see Sudds, below).

The Period 5 faunal assemblage was dominated by sheep/goat, followed in abundance by cattle and pig conforming to the normal pattern of domestic waste disposal of this period, a pattern replicated at other sites in the locality. A little surprising was the percentage of chicken at 10.75% when 1–3% might be expected, though this apparent aberration may

simply be an anomaly in a relatively small assemblage. Goose and duck were also present (see Deighton, below).

A particularly interesting find recovered from posthole [476] was a piece of animal bone (SF 10) worked and polished on all four sides, that may be a fragment of inlay (fig 28 no 6) (see Gaimster, below).

Small amounts of early post-medieval Flemish floor tile glazed in yellow and brown were recovered, some examples are particularly early types (1300–1500). While not recovered *in situ* the material does give an indication of some of the flooring material used locally in the buildings of this period.

Discussion

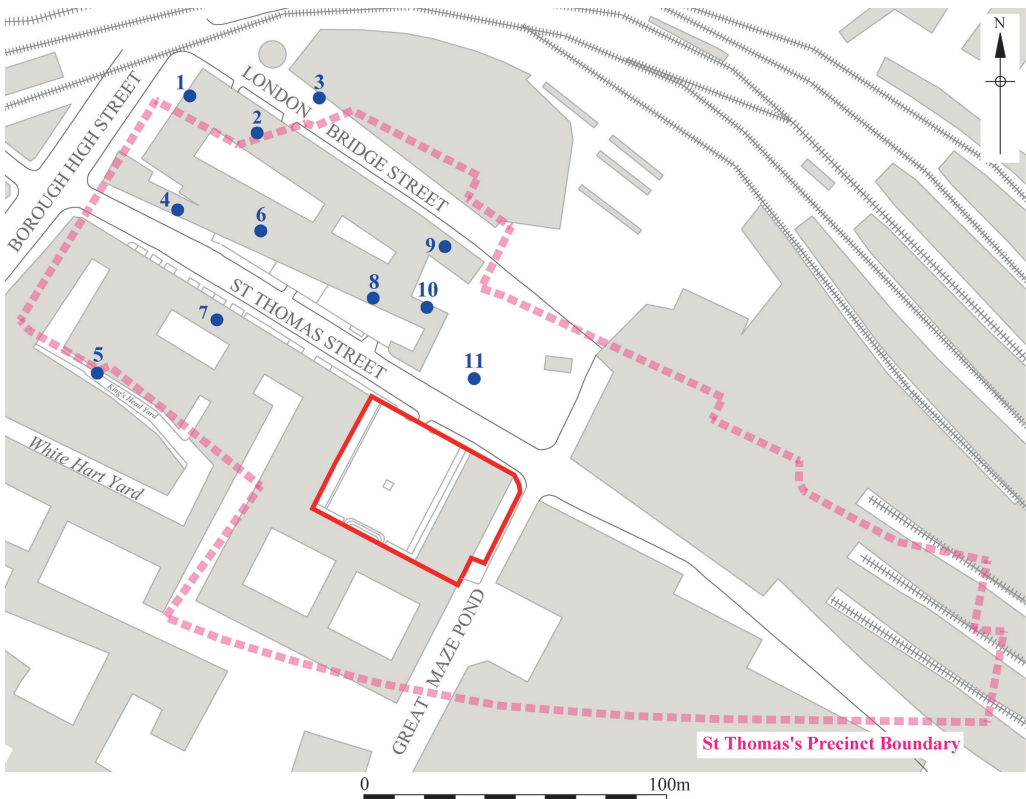
The medieval foundations unearthed at the Science Gallery are directly comparable with other examples recorded in Southwark. In the 21 buildings in the Thameslink excavations attributed to the medieval period the most used building technique comprised trench-built walls constructed from stone (Fairman *et al* 2020). Chalk or ragstone appeared to be the preferred building materials, although flint nodules, greensand and sandstone were also used occasionally. In Southwark, as in the City of London, masonry construction was generally a sign of high-status secular buildings.

The use of relieving arches to build on soft ground or save masonry is paralleled elsewhere in Southwark and London. This form of arched foundation was first used in the City of London during the 13th century (possibly as early as *c* 1220) for both secular and religious stone buildings and was widely used in the 14th and 15th centuries for churches, company halls and high-status private houses until the mid-15th century when brick foundation arches largely took over (Schofield 1995, 137; Schofield *et al* 2018, 287).

Timber pile foundations are also recorded elsewhere in Southwark, for instance in Building LB11 at the Thameslink excavations where pile foundations and plank sills may have supported a superstructure of brick or stone (Fairman *et al* 2020, 103). Immediately to the east of the site at the corner of Great Maze Pond and St Thomas Street, there was a north–south-aligned masonry wall with wooden pile foundations (Dawson 1979). Indeed, these remains may be part of Building 2 identified at the Science Gallery or an associated building.

The buildings identified at the Science Gallery represent further examples of masonry remains thought to be associated with St Thomas's Hospital (fig 12). The church and main hospital buildings were located to the north of Trench Lane (St Thomas Street) (Carlin 1996, 76). Structural evidence of these main hospital buildings includes: a ragstone arched foundation and several brick walls at 20–26 London Bridge Street (LBJ 95 fig 3 no 9; Knight 2002, 7, 28); a stone cellar or undercroft, probably of late medieval date with external buttresses and a relieving arch at 11–19 St Thomas Street (11STS77 fig 3 no 8; Thompson *et al* 1998, 193); and a large chalk foundation at 1–7 St Thomas Street (1STS74 fig 3 no 4; Dennis 1978, 315, 320). Part of a medieval building was recorded at 4–26 St Thomas Street (4STS82 fig 3 no 7; Thompson *et al* 1998, 193). At 11–15 Borough High Street (BVK11 fig 3 no 1) as part of the Thameslink excavations, Buildings BV6 and BV7, the latter of which had large chalk piers and retaining arches, are likely to have also formed part of St Thomas's Hospital (Fairman *et al* 2020).

While further evidence of medieval masonry and occupation have been found at multiple locations around the London Bridge Street/St Thomas Street area including: chalk foundations to the north of the site at 21–27 St Thomas Street (STS88 fig 3 no 11; Thompson *et al* 1998, 218); pitting at 8 London Bridge Street (LOB98 fig 3 no 2; Askew *et al* 1999) and King's Head Yard (fig 3 no 5; Kenyon 1959); a possible medieval wall of St Thomas's church (TAS08 fig 3 no 6; Maloney 2009, 72); two chalk walls at London Bridge Street (LBA95 & LBB95 fig 3 no 3; Knight 2002, 15, 24–5); and structural remains adjacent to 15 St Thomas Street (TOM95 fig 3 no 10; Knight 2002, 31).



- | | | |
|---|-------------------------------------|---|
| 1. 11-15 Borough High Street (BVK11) | 5. Kings Head Yard, 1945 | 9. 20-26 London Bridge Street (LBJ95) |
| 2. 8 London Bridge Street (LOB98) | 6. St Thomas's Church (TAS08) | 10. Adjacent to 15 St Thomas Street (TOM95) |
| 3. London Bridge Street (LBA95 & LBB95) | 7. 4-26 St Thomas Street (4STS82) | 11. 21-27 St Thomas Street (STS88) |
| 4. 1-7 St Thomas Street (1STS74) | 8. 11-19 St Thomas Street (11STS77) | |

Fig 12 Science Gallery. Plan showing the Precinct of St Thomas's Hospital and the location of other sites mentioned in text.

While some medieval urban and suburban hospitals (where space permitted) consisted of buildings arranged around a courtyard or cloister, the internal layout of the buildings within most sites is not well understood, as above-ground structural survival is very limited and most archaeological investigations with hospital precincts produce piecemeal structural evidence. One possibility is that many hospitals such as St Thomas's developed over time without a coherent plan.

Some idea of the extent and layout of the medieval hospital of St Thomas can be appreciated from Faithorne and Newcourt's map of 1658 (fig 13). The hospital church lay on the north side of Trench Lane (now St Thomas Street). The medieval church was demolished when the present church (now deconsecrated) was built in 1702. Interestingly, the nave of the church served as the patients' ward. There are references in 1380 and 1415 to the sick and the poor lying in the 'body of the church' (Carlin 1996, 76). This would have enabled the sick to see the celebration of Mass.

The main conventual buildings formed a rectangle on the south side of St Thomas's church and to the east of the hospital's cemetery. They included a chapter house, cloister, dormer, frater, kitchen and master's lodging and also a larder house and stable (Carlin 1996, 76-7).

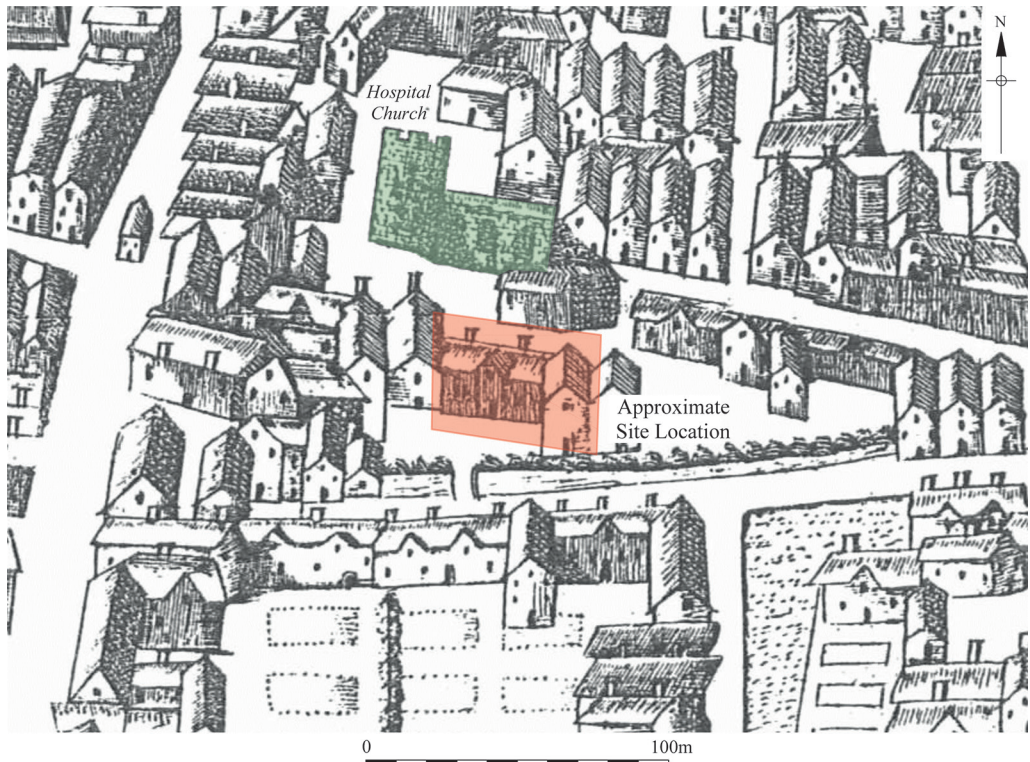


Fig 13 Science Gallery. Newcourt map 1658.

The quadrangular plan was replicated elsewhere, notably at St Mary Spital, St Katharine in East Smithfield just inside Aldgate (founded 1148) and at Ospringe (Thomas *et al* 1997, 101).

It is possible that the medieval buildings at the Science Gallery formed part of the communal buildings associated with the hospital as it has been suggested that the domestic apartments of the Master and Brethren of St Thomas's Hospital from at least 1388 lay approximately under the courtyard and west wing of Guy's Hospital (Dawson 1979, 63).

Interestingly, the abundance of pottery vessels connected with the drinking and serving of alcohol for both Periods 4 and 5 are consistent with the communal dining in a refectory. Furthermore, both buildings were equipped with large cesspits that might suggest communal living. However, many of the buildings within the hospital precinct would have been secular and the ceramic evidence might indicate the presence of a nearby tavern. Another possibility is that the buildings were part of tenements and the large garderobes an indication of multiple occupancy. The presence of a probable rosary bead in Period 4 (fig 28 no 2) is the only possible evidence of piety.

The leasing of parts of the precinct is well documented. In 1386 the master reported that financial need had driven them to admit large numbers of lay tenants to the precinct (Carlin 1996, 80). The lay tenants built houses on vacant plots and set up businesses and workshops. The precinct of St Thomas's Hospital was transformed from the genteel enclave of the 1230/40s, when Archdeacon Luke des Roches kept a house with private chapel and stable, to the hurly-burly of cheap tenements and poor tenants by the 1380s (*ibid*, 48). Some of the tenants were apparently quite disruptive and a visitation in 1387 criticised artisans who

leased property within the precinct for causing so much noise as to disturb the sick from their rest and interrupt church services (*ibid.*, 48, 79).

By the end of the 15th century St Thomas's Hospital had acquired full parochial status and the hospital precinct became the parish of St Thomas the Martyr. The tenants must have numbered in their hundreds as an undated rental of the 1540s records 103 tenements let to lay persons within the close, seventeen tenements within the tenements (subdivided tenements) and 31 gardens (*ibid.*, 97). The hospital also supported its own free school with an endowment of £4 a year (*ibid.*, 83) and in 1536 there was at least one brothel within the hospital precinct (*ibid.*, 224).

During the 15th and early 16th centuries a number of new hospital buildings were constructed including a new chamber with eight beds to be used as a maternity ward for 'unwed mothers' said to have been paid for by Richard Whittington the famous mayor of London (d. 1423). Master Nicholas Bokland (1427–47) complained that hospital revenue was insufficient to repair its buildings (*ibid.*, 81).

While the construction for Building 3 can only be broadly dated to Period 5, the pottery recovered from the Period 4 ditch and the pre-construction levelling layers of Period 5 indicate that Building 2 was probably erected in the late 15th or early 16th century.

In about 1507 the master, Richard Richardson, undertook the last major addition to the hospital buildings, a new ward or almshouse for poor men. Such almshouses were often intended for local residents who through age or infirmity could no longer support themselves. St Thomas's Hospital's lay tenants evidently occupied all the available space within the hospital precinct, as Richardson went to the expense of purchasing an adjacent site for the new almshouse (*ibid.*, 81–2).

The variety of buildings within the precinct of the hospital – religious and secular, communal and private, residential, commercial, and even industrial, plus the presence of masonry and timber-framed buildings – makes the attribution of any particular function to Buildings 2 and 3 impossible.

The fragments of human bone recovered from medieval Period 4 and early post-medieval Period 6 may have been derived from nearby cemeteries that were associated with St Thomas's Hospital. The earliest burial ground probably lay in the vicinity of St Thomas's church (Knight 2002, 9–10). By the time of Morgan's map of 1682 (fig 15), a new churchyard had been established to the south of St Thomas Street. Rocque's map of 1746 (fig 17) shows both this churchyard and a further burial ground south of St Thomas Street and east of New Street.

A number of other sites have provided evidence of cemeteries possibly associated with St Thomas's Hospital. During the Thameslink excavations 16th century burials were found beneath London Bridge station near Stainer Street, which were probably part of a small cemetery associated with the hospital but not attested on the cartographic sources (Fairman *et al* 2020, 112). Other burials probably associated with the hospital have been revealed at sites to the north of St Thomas Street at the East Escape Shaft of the Jubilee Line Extension Project (Knight 2002, 9), with twelve skeletons of 17th century date; New London Bridge House, with three mass graves containing 227 skeletons of 17th century date (Greenwood & Thompson 1992, 420; Bekvalac 2007; Tucker 2007); Fielden House (Coombe *et al* 2017, 29), with 811 burials dating to the mid-17th century to early 18th century; and Stainer Street (Bryan 2013). Additionally, two Purbeck marble grave slabs of probable late 13th to early 14th century date found at 10–18 London Bridge Street may originally be from the chapel of the hospital (Askew *et al* 1999, 44–6). As a hospital operating on the same site for 650 years there would have been many thousands of patients and residents that died and had to be buried in the vicinity. Clearly, many individuals were buried in plots not identified as burial grounds on historic maps.

Period 6: post-medieval 1540–1700

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

During the years between 1536 and 1540, as part of the Reformation, all monastic institutions across England and Wales were closed and their assets and premises seized by the Crown. The last master of St Thomas's Hospital was Dr Thomas Thurleby or Thjirlby, who surrendered the hospital on 14 January 1540. After its suppression St Thomas's was given to the keeping of Sir Richard Long and on 28 April 1543 he received a life grant of the hospital and all its lands. However, the poverty that had prompted the foundation and maintenance of the hospital had not disappeared and in 1546 there was an attempt to revive it, but this plan came to nothing (Carlin 1996, 84–5).

In 1551 Edward VI, citing the 'miserable state of the sick and infirm men lying begging in the public street and places of London and its suburbs to the infection and annoyance of the king's subjects', granted the site and some of the remaining lands of the hospital to the mayor, commonalty and citizens of London with the intent that it be re-established as a combined hospital and poor house. By July rebuilding was under way. The new hospital with its dedication changed to St Thomas the Apostle admitted its first patients on 23 November 1552 (Carlin 1996, 85). It appears that by 1551 the hospital buildings had fallen into a ruinous state as large sums were expended on repairs before its refoundation (Rendle 1878, 130). In addition, the purchase of large numbers of bricks in the late 16th century suggests extensive reconstruction or rebuilding (Dennis 1978, 311). Evidence for repairs or reconstruction could be seen on the Thameslink project at Borough High Street, where the hospital walls had been subject to robbing during the 16th century. Building BV16, possibly dating to the early 17th century, was constructed of a combination of brick, Reigate stone and chalk (Fairman *et al* 2020, 143), and at both 1–7 and 11–19 St Thomas Street the medieval masonry was superseded by brick buildings (Dennis 1978, 315; Thompson *et al* 1998, 193). The medieval hospital was completely rebuilt between 1693 and 1709 and part of the north-western corner of the new building, constructed of brick, was encountered as Thameslink Building BV37 (Fairman *et al* 2020, 212). A brick-built vaulted wall found at 8 London Bridge Street is also likely to have been part of the late 17th–early 18th century hospital (Askew *et al* 1999, 46).

ARCHAEOLOGICAL EVIDENCE: MASONRY BUILDINGS AND SOAKAWAY (PERIOD 6) 1540–1700

In the Excavation Area, the cesspit of Building 2 and the garderobe of Building 3 appear to have gone out of use and to have been deliberately filled in. A group of at least 32 vessels was recovered from the infilling of the garderobe dated to the mid-16th century. The assemblage was dominated by London-area early post-medieval redware and London-area post-medieval slipped redware, occurring as cauldrons and pipkins, including a near-complete pipkin with a metallic glaze, and as carinated bowls and jugs together with at least six Dutch vessels represented by plain and slip-decorated red earthenwares including cauldron or pipkin and chamber-pot forms. Other imports consisted of a tin-glazed storage jar and a sherd from a Siegburg stoneware jug while a medium-sized post-medieval crucible was also present (see Sudds, below). Also recovered from the garderobe was a fine-quality drinking vessel dated to the 16th or 17th century and a fragment of sawn and polished cattle? rib (SF 55) and an iron knife (SF 60). A sample from the fill of the garderobe produced high concentrations of pollen, almost entirely comprised of herbaceous taxa, dominated by pollen from cereals, with grasses, daisies, dandelion and fat hen also commonly recorded. Other herbs included buttercup, carrot family, cornflower (*Centaurea cyanus*), black knapweed and ribwort plantain (*Plantago lanceolata*) with the only shrub taxa recorded being honeysuckle (*Lonicera periclymenum*) and hazel. Carbonised wheat was also recovered (see Batchelor *et al*, below).

Extensive deposits of made-ground covered the footprint of the late medieval buildings (Buildings 2 and 3) (fig 14). The ceramic evidence recovered from these dumped deposits suggests that the buildings were demolished during the mid-16th century. A single fragment

Period 6: Post-medieval 1540–1700



Fig 14 Science Gallery. Period 6 post-medieval 1540–1700.

of human bone (clavicle – right) was also found in the dumped deposits together with a copper-alloy pin with wound-wired head (SF 13) and a domed copper-alloy disc (SF 12) with a decorative concentric pattern of fine raised dots punched from the back. A robber trench against the wall foundation [639] was another indication that Building 2 had been demolished. With no geological deposits of building stone within the London region the salvaging of earlier foundations was common practice throughout the medieval and early post-medieval periods.

A ditch [525] along the western margin of the Excavation Area, which produced a small collection of burnt bread wheat and wild grasses and an uncharred fig seed, may have demarcated a property boundary, but the ground to the east appears to have remained largely open. A small post-built structure of uncertain function represented the only structural development here.

A soakaway/culvert

A soakaway/culvert was excavated in the Lift Shaft (fig 14). The culvert, at least 1.88m long x 0.34m wide x 0.34m deep, was lined with orange unfrosted bricks dated to 1540–1700 and bonded with a soft sandy lime mortar. The culvert fed into a timber-lined soakaway, 1.18m in diameter x 0.54m deep. Silty deposits infilled both the culvert and the soakaway. The ceramic evidence suggests that the feature was constructed in the mid-16th century. The associated pottery was dominated by London-area early post-medieval redware and London-area post-medieval slipped redware consisting of a cauldron, costrel, a jug and bowls and dishes but it also included early Surrey-Hampshire Border whiteware and seven imported Siegburg and Raeren stoneware jugs and drinking jugs (see Sudds, below). Again, the ceramics were largely associated with serving and consuming alcohol and dining.

The fill of the culvert/soakaway produced clay tobacco pipe bowls dated to *c* 1660–80 (see Jarrett, below) and pottery of early 17th century date but included later forms and datable marks indicating it was unlikely to have been deposited prior to the late 17th century. A likely source is one of the houses documented on or in the vicinity of the site by 1658. The pottery from the lower fills consisted largely of London tin-glazed ware and Surrey-Hampshire Border whitewares with smaller quantities of London-area post-medieval redware, Essex-type post-medieval fine redware and Essex-type post-medieval black-glazed redware with imports of Raeren and Frechen stoneware and fragments of a Spanish olive jar. Significant ceramics included a London tin-glazed ware saucer or condiment dish and a storage jar (fig 24 nos 4 & 5). The upper fills produced a similar range of types to the lower fills with multiple cross-joins evident across deposits, but included a Metropolitan slipware rounded bowl with part of a slip-trailed idiom reading ‘... HAVE ... EVER LOVE ...’ (fig 25 no 6). A semi-complete (but fragmented) Midlands purple ware butter pot was also recovered. More of the same vessels from the drain were recovered from the layer above, including further fragments of the butter pot, one with a stamp (fig 25 no 7), and part of an Isabela polychrome maiolica dish from Spain. Also recovered from the culvert/soakaway was a late medieval or 16th century bottle and a 17th century urinal together with a number of small finds including a piece of elephant ivory (SF 7), a twisted copper-alloy finger-ring (SF 4) (fig 29 no 4) with an integral oval bezel, a miniature bone die (SF 61) (fig 29 no 5) and a stone cannon ball of Norwegian ragstone (SF 5) (fig 29 no 6), which was used in a saker, a medium-sized cannon developed in the early 16th century (see Gaimster, below). An environmental sample taken from the fill of the culvert produced sizeable quantities of mineralised seeds including figs, strawberries, brambles, grape, apples/pears and elder (see Batchelor *et al*, below).

The soakaway/culvert appears to have gone out of use towards the end of the 17th century. It was probably then that the culvert was capped with a brick paved floor and a floor laid to the north that contained a pinner’s bone (SF 54) (fig 29 no 1), one of three recovered from this phase. Both the brick floors and the soakaway/culvert may have been internal features within a building or a yard.

Building 4

In the south-west of the Courtyard fragmentary masonry remains (Building 4, fig 14) were uncovered. The masonry was constructed with unfroged orange bricks dated to 1600–1700, laid in alternate courses of stretchers and headers bonded with a dark grey ash or lime mortar. The building measured *c* 6.50m wide x at least 2.93m long, continuing to the north-west beyond the area of excavation. A 1.80m-wide fireplace was built against the southern wall of a north-west to south-east-aligned building (Building 4). The *c* 0.50m width of the foundations suggest a building at least two storeys high.

Building 5

To the east of Building 4 were fragments of brick foundations aligned north-west to south-east at least 17.66m in length that may represent the frontage of one or more buildings (Building 5, fig 14).

A culvert

To the rear of Building 4 and south of Building 5 were the remains of a brick-built culvert aligned east–west. Only the top of the arch was exposed and as seen the feature measured 1.40m long x 0.30m wide. Close to the culvert a small patch of paved floor measuring 1.51m north–south x 1.04m east–west survived. It was constructed of unfroged red bricks laid on

edge and paving stones at a level of 3.26m OD and is thought to represent an external yard or alley to the south of Buildings 4 and 5.

The animal bone assemblage recovered from Period 6 is small with approximately equal amounts of cattle and sheep/goat bones. Fallow deer bones were also present. A single cat bone and two dog bones were also noted (see Deighton, below). The assemblage probably represents domestic waste produced by the inhabitants of the adjoining buildings.

Discussion

Period 6 produced the largest assemblage of pottery and provides some further evidence for daily life within the precinct of St Thomas's Hospital both before its dissolution in 1540 and its refoundation in 1552 (see above). The early 16th century pottery from the backfill to the construction cut of the soakaway/culvert probably pre-dates the dissolution of St Thomas's Hospital. The ceramics are notable for pottery forms associated with the serving and consumption of alcohol and perhaps communal dining, a characteristic noted in the medieval pottery assemblage and possibly an indication that conventual buildings associated with the hospital extended as far as the Science Gallery.

While the assemblage of mid-16th century pottery recovered from the garderobe probably post-dates the dissolution of the medieval hospital, determining a likely source for the pottery is confused by the evidence that buildings within the hospital complex were being leased, and furthermore that St Thomas's was re-established as a combined hospital and poor house in 1552 (Carlin 1996, 85). The number of Dutch vessels present might suggest that someone associated with the Low Countries, perhaps either an immigrant or merchant, occupied the site. Dutch immigrants to London and Southwark are documented at this time, settling in a number of locations, sometimes coinciding with higher than typical quantities of Dutch pottery, or as potters themselves (Edwards 1974; Stephenson 1997; Edwards & Stephenson 2002, 174).

Some of the small finds provide evidence of other industrial and craft activities taking place on the site or nearby. Three pinner's bones indicate that pins were made on the site, an activity that was also present at the in the vicinity. Thameslink site at London Bridge station (Gaimster 2020, 484–6). A piece of sawn and polished cattle rib and a fragment of ivory-working waste are suggestive of animal bone working.

During the 17th century there were at least four large fires in Southwark, in 1630, 1667, 1676 and 1689, with the largest occurring in the north of the borough in 1676 (Porter 1994, 3–4, 155; Reilly 1998, 15; Fairman *et al* 2020, 321–2). Newcourt's map of 1658 (fig 13) shows the site before these conflagrations had destroyed much of the medieval heart of Southwark. The site is in a densely developed urban landscape, with Borough High Street shown to the west and St Thomas's Hospital depicted to the north-west. Most of the buildings would have been timber framed. The Southwark fire of 1676 destroyed much of the northern part of Southwark, but a change in wind direction stopped the fire just short of St Thomas's Hospital and it is not known whether the site suffered any damage.

Following the Great Fire of London, the 1667 Parliamentary Act for rebuilding the City of London came into force (Milne 1986, 116–19). The act, which included a requirement to build all new buildings in brick or stone, would have also encouraged the building in brick and stone further afield and notably in Southwark.

The widespread devastation of Southwark by fires during the 17th century, which destroyed many thousands of properties, may have further provided the impetus for brick production. The resultant products were poor quality, clinker-rich purple and maroon bricks, termed post Great Fire bricks (fabrics 3032nr3033; 3032 and 3034), used together with other contemporary fabrics (late Stuart reds (fabric 3046) as well as the reuse to some extent of medieval stone in the buildings form part of the expansive post-medieval structural development of Southwark (K Hayward, pers comm)).

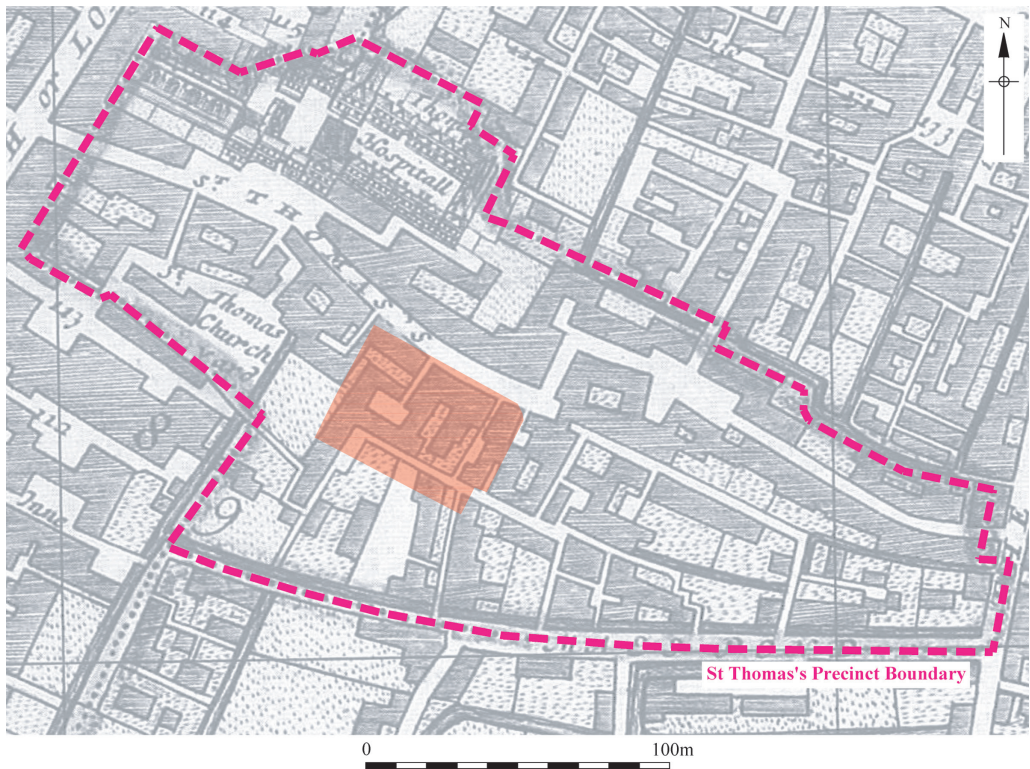


Fig 15 Science Gallery. Morgan's map of 1682.

Although there was no evidence for a conflagration, the large-scale rebuilding of the site during the later 17th century with brick-built multi-storey buildings laid out around narrow courts was probably prompted by one of these fires. The ceramic assemblage from the infilling of the soakaway/culvert is thought to represent a 'house-clearance' in the later 17th century and is further evidence for a 'change' in occupancy.

While the later 17th century pottery is perhaps rather mundane, the quality of the ceramic tobacco pipe bowls reflected in the degree of burnish and milling of the rims might suggest somewhat affluent tobacco smokers in this part of Southwark.

Certainly, the rapid recovery of Southwark after a series of devastating fires is surely a testament to the wealth and vitality of the place. Morgan's map (fig 15) shows the site presumably after extensive post-fire rebuilding. The northern extent of the site is shown as partially incorporating the southern edge of St Thomas's (Street) while the central part of the site is shown to be located above a narrow north-south lane leading from St Thomas Street. Buildings are shown along the frontages of the lane, with an area of open land, possibly a garden, shown at the southern extent. The southern part of the site crosses a junction between the north-south lane, an east-west lane and the northern extent of a second north-south lane. Buildings and open spaces, probably courtyards, fronting onto the junction are present within the southern part of the site.

St Thomas's Hospital prospered during the early 17th century through income from properties that it owned and leased out in London and Southwark. However, the fires of London and Southwark during the 17th century must have destroyed many of these properties and the inevitable loss of rents probably led to a decline in the state of the hospital's finances. Nevertheless, the hospital was rebuilt from 1693 with voluntary subscriptions from wealthy benefactors (Golding 1819, 148), but the new building was not completed until 1732.

Morgan's map of 1682 (fig 15) shows the hospital in its final form as buildings surrounding a series of courtyards just before its rebuilding in 1693. Interestingly, a glass urinal recovered from the soakaway/culvert may have been a medical item from the hospital as such vessels were used in uroscopy.

Despite the rapid rebuilding and spread of urbanisation in the surrounding area the pollen evidence from Period 6 is a reminder that there were still open areas comprising market gardens and orchards, particularly off the main thoroughfares of Borough High Street and St Thomas Street.

Period 7: early 18th century

HISTORICAL BACKGROUND

In 1721 Thomas Guy, a governor and benefactor of St Thomas's Hospital, applied to the governors for the lease of several plots of land to build a new hospital for treating incurables. The site of the new hospital lay on the south side of St Thomas Street to the north of Collingwood Street and west of New Street and had previously been occupied by small plots and a number of houses, the leases of which were owned by William Gabb, Samuel Warburton and others. Guy acquired these leases from them and in 1722 was granted a 999-year lease on the land from the governors of St Thomas's Hospital at an annual rent of £30. Thomas Guy died in 1724 leaving instructions to his trustees that provision might at their own discretion be made to admit ordinary sick persons not deemed to be incurable, thus allowing the new institution to develop into a general hospital similar to St Thomas's. The hospital was finally opened in 1725 (Roberts & Godfrey 1950, 36).

By 1738 the General Court of the hospital considered that additional buildings were required. A lease of the ground between the north front of the hospital and St Thomas Street

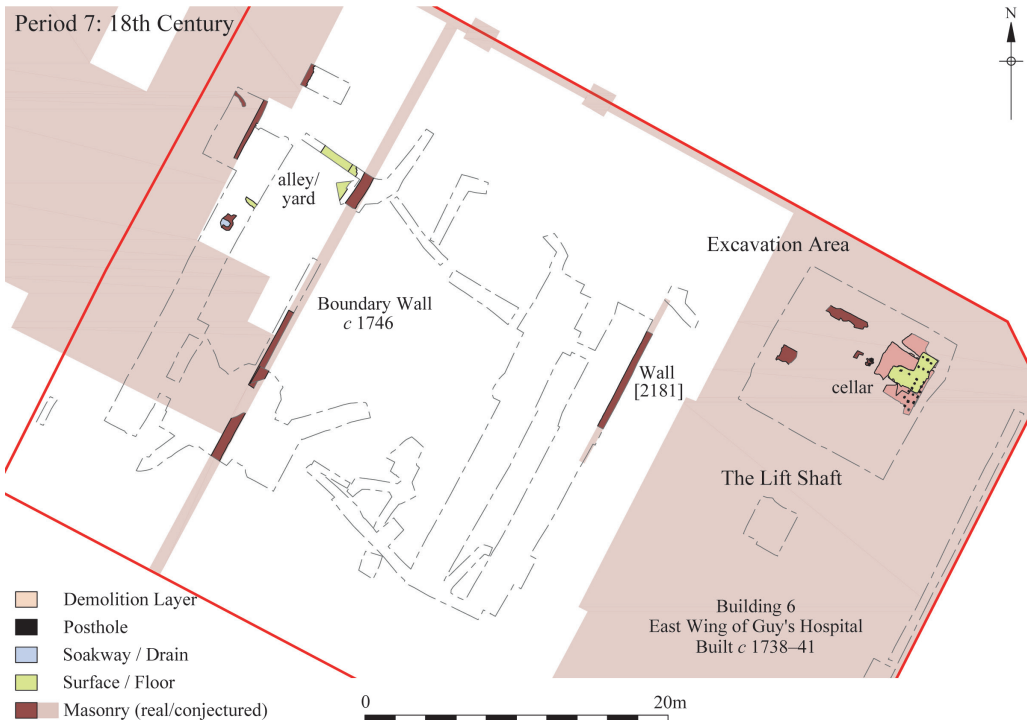


Fig 16 Science Gallery. Period 7 18th century.

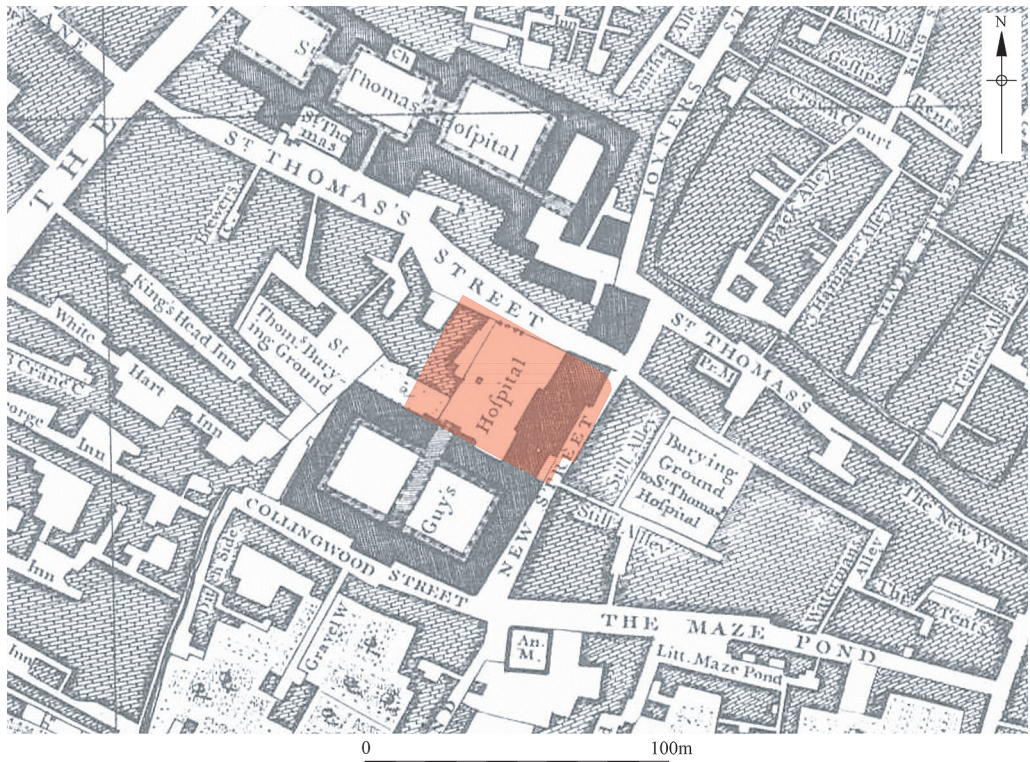


Fig 17 Science Gallery. Rocque's map of 1746.

was acquired from St Thomas's Hospital, which included the site. On part of this acquisition was constructed the new East Wing, designed by James Steer, the hospital surveyor, while the rest of it was laid out as a courtyard. The new block contained a committee room and a chapel. The work was practically completed by 1739, when the statue of Thomas Guy, which had originally been set up in the inner courtyard in 1734, was moved to its present position (Roberts & Godfrey 1950, 37). The new East Wing is depicted on Rocque's map of 1746 (fig 17). During the Second World War the East Wing was destroyed by bombing, subsequently rebuilt in facsimile in the 1960s and is now known as Boland House (see below, Period 8).

The hospital was further enlarged when the west wing, designed by Richard Jupp, was erected in 1774–80 to the west of the courtyard. Horwood's map of 1799 (fig 18) shows the now enlarged Guy's Hospital as a large symmetrical building with two inner courtyards and two later wings projecting northwards around an outer courtyard.

In 1862 St Thomas's Hospital relocated to Lambeth; many of its buildings had already been demolished in the 1840s in advance of the construction of London Bridge station.

ARCHAEOLOGICAL EVIDENCE: GUY'S HOSPITAL EAST WING (PERIOD 7) 1700–50

The archaeological evidence suggests that the buildings of Period 6 were cleared away at the beginning of the 18th century in advance of the construction of the East Wing of Guy's Hospital in the 1730s on the eastern side of the site.

contemporary ground surface to the west and strongly suggests that this floor was within a basement.

The floor and part of the floor make-up were truncated by 22 postholes that together formed an L-shaped structure that was 3.5m north–south with a western return to the north of 1.8m. The postholes may have held timbers that supported the floor above during a later phase of repair.

Unfortunately, the surviving structural remains associated with Building 6 were too fragmentary to provide any details of the ground plan of the new 1730s wing. Within this wing were the Superintendent's House, the Governors' Court Room decorated in the style of William Kent, and the Governors' Committee Room (Roberts & Godfrey 1950, 38). However, Rocque's map of 1746 (fig 17) confirms that these remains formed part of the east wing of Guy's Hospital as it depicts the hospital as a large courtyard building with an east wing extending north beyond the main courtyard, fronting onto New Street (later Great Maze Pond) to the east and St Thomas Street to the north with an open court enclosed to the west by a wall. The remains of this wall were observed in the archaeological investigations within the courtyard 20.74m to the west of Building 6. The north-east/south-west wall was at least 21.30m long (overall) x 0.65m wide x 1.70m high and was built with unfrosted orange bricks, dated to 1700–1800, laid in alternate courses of header and stretcher bonded with soft, grey mortar flecked with chalk. The wall would appear to have formed a boundary that separated the open courtyard of Guy's Hospital to the east and smaller open areas and buildings to the west.

FINDS FROM THE HOSPITAL COURTYARD

Among the finds recovered from the made-ground deposits within the courtyard to Guy's Hospital were some articulated human bones that included most of the right hand, the right wrist and the lower parts of the right forearm (both the ulna and the radius) from a middle–old adult of unknown sex that showed evidence of advanced degenerative joint disease on the second and third fingers. Disarticulated human bone from at least three individuals was also present showing evidence of either pre-mortem amputation or post-mortem dissection (most likely the latter) on several long bones, which would suggest that much if not all of the human bone originated from the 18th century hospital rather than an earlier cemetery. Radiocarbon dating of a sample of the bone produced a date of 1648–1935 cal AD (95.4% probability BRAMS 3509).²

Other finds from the external dumping included a pottery assemblage largely consisting of residual 17th century ceramics, but with a few 18th century tin-glazed vessels and some Staffordshire wares, a small assemblage of clay tobacco pipes dating from 1610–1800, and a small collection of mid-18th century armorial bowls, including the Hanoverian coat of arms and the Prince of Wales's feathers (see Jarrett, below) and a Charles II farthing minted in 1673 (SF 104), which was still legal tender in the early 18th century and may have been lost during this period.

PROPERTIES TO THE WEST OF THE COURTYARD

Located to the west of the boundary wall were patches of an external brick surface dated to the 18th century that may represent a footpath *c* 1m wide at a level of between 3.73m OD and 3.62m OD. Adjacent and to the west of the possible footpath were the surviving remnants of a cobble surface that formed part of a narrow yard or alley at a comparable level (fig 16). The remains of a brick-lined soakaway were also recorded within this alley or yard and it is likely that the soakaway would have drained excess rainwater run-off from buildings to the west (see below) and possibly from surface drains on the yard.

Building 7

A further 8.8m to the west of the boundary wall was another stretch of north-east–south-west wall foundation that measured 4.30m long x 0.58m wide and was truncated to the south and continued beyond the edge of the excavation to the north (fig 16). The foundation was constructed with orange and purple bricks and yellow-faced bricks bonded with a soft grey ash or lime mortar. Approximately 2.5m to the north-east of this wall a second length of wall on the same alignment was uncovered, which consisted of two courses of orange unfrosted bricks bonded with hard grey mortar. The masonry measured 1.52m long x at least 0.38m wide but continued beyond the edges of the excavation to the north, south and west. These walls appeared to represent the frontage of a building to the west of the narrow alley or court (see above) depicted on Rocque's map of 1746 (fig 17).

Period 8: late 18th and 19th centuries

The East Wing stood until the Second World War when it was severely bomb damaged and subsequently demolished. It was replaced in the 1960s by Boland House, which has a facade that matches the surviving West Wing.

ARCHAEOLOGICAL EVIDENCE

The archaeological evidence confirms that the outer courtyard of Guy's Hospital and the east and west wings of the hospital buildings remained largely unchanged during the 19th century. Two new sewers and a soakaway were probably installed during this period and ground level in the courtyard was raised by *c* 0.3m. There was also some evidence for the east wall of the west wing having been refaced or repaired, probably during the 19th century.

The small pottery assemblage from this period included a large component of residual 18th century material including some imported Chinese porcelain. The later 19th century pottery included transfer-printed wares and refined whitewares, but nothing out of the ordinary. An interesting object recovered from the 19th century made-ground was a bone implement carved from a cattle rib (SF 101) (fig 30) that may have been a tool used in shoemaking.

The clay tobacco pipes from this period included a bowl bearing the Hanoverian coat of arms (fig 26 no 3) (see Jarrett, below). The glass assemblage from Phases 7 and 8 included a selection of bottles and phials dated from the late 17th to 19th centuries.

The Roman pottery, by Eniko Hudak

INTRODUCTION

The archaeological investigations yielded a total of 2582 sherds of Roman pottery weighing 42.110kg and representing 41.64 Estimated Vessel Equivalents (EVEs). The assemblage was quantified using the scheme and standard measures as proposed by the Study Group for Roman Pottery (MPRG 2016). Fabrics and forms have been recorded using Museum of London codes (Symonds 2002) extended by other typologies and corpora where more precise dating was available. The assessment reports and the database of the pottery are available for consultation in the archive.

There is a wide variety of Romano-British and imported fabrics in the assemblage spanning the entire Roman period in date; however, 2nd century AD fabrics dominate the assemblage. Most of the Roman pottery was recovered from the Roman phases (Periods 2.1–2 & 3.1–2), with a very small number of intrusive sherds in prehistoric contexts (Period 1) and a small amount of residual material in post-Roman phases, which will not be discussed here (table 1: see *Endnote*).

PHASE 2.1: LATE 1ST TO EARLY 2ND CENTURY AD

A total of 800 sherds weighing 16.273kg and representing 16.57 EVEs were recovered from Period 2.1 features (fig 19: see *Endnote*). More than three-quarters of the phase assemblage was contained in the fills of drainage ditches, which yielded a total of 610 fragments of Roman pottery (13.701kg, 13.22 EVEs).

Overall, the period assemblage includes a great variety of fabrics, but is dominated by only four: Verulamium region whiteware (VRW), Black-burnished ware 2 (BB2), Alice Holt Surrey ware (AHSU) and to a lesser extent Highgate Wood C ware (HWC). These together account for 50.9% of sherd count, 45.6% of weight and 51.9% of EVEs, suggesting a Hadrianic–early Antonine date for the period assemblage (Davies *et al* 1994). Amphorae account for over one-quarter of the assemblage weight and, unsurprisingly, are mainly Baetican (BAET) olive oil and Gauloise (GAUL) wine amphora fragments. Fine wares are dominated by samian ware (see Mills, below), and the only Romano-British fine ware present in considerable quantities is London Mica-Dusted ware (LOMI). Fabrics from the 1st century are scarce with only nine sherds, which is not surprising as the area was largely undeveloped until the beginning of the 2nd century AD (Cowan *et al* 2009). There are also a few fragments of late Roman pottery, which are intrusive and most likely the result of later truncation and disturbance of these features.

While VRW is the most commonly occurring fabric by both sherd count and weight, diagnostic sherds are scarce and include a limited range of forms, such as ring-neck and flaring-rim flagons, flat-rim bowls, a single fragment of a *tazza* and mortaria. The secondary fill of ditch [982] yielded joining rim, body, and spout fragments of a VRW hooked-flange mortarium with a complete stamp reading [SPP] retrograde (fig 22 no 1). There is only one other known example of this stamp from the 56–62 Moorgate, City of London, excavations, most certainly from the same die (Hudak 2019) and appears to be of a so far unknown VRW potter (K Hartley, pers comm). The same group also contained a BAET Dressel 20 amphora rim sherd and a samian 5DR18/31 dish each with a graffito (see Tomlin, below).

Black-burnished wares, especially BB2, are represented by a far greater number of diagnostic sherds (4.57 EVEs) including fresh fragments of the complete profile of a BB1 plain-rim dish with complete chamfered base and burnished wavy line decoration, and another of a triangular-rim bowl with acute lattice decoration (fig 22 nos 2–3). Both vessels were recovered from the primary fill of ditch [1075]. This fill also contained the greatest proportion of BB2 of the three groups of drainage ditches of the period. It is not only considerably higher than those of the fills of ditches [873] and [982], but also greater than expected from Hadrianic or early Antonine assemblages of the City (Tomber & Dore 1991, 65; cf Davies *et al* 1994, fig 146), although the relatively small size of the assemblage must be considered. This together with the few fragments of samian ware dated to after AD 130 and AD 140 and the BB2 triangular-rim bowl mentioned above suggest an early Antonine (or later) date to the infilling of this feature.

PERIOD 2.2: 2ND CENTURY AD

A meagre amount of Roman pottery was excavated from Period 2.2 features, only 60 sherds weighing 1.231kg. Over half of the assemblage was recovered from north–south ditch [2008] in the southern area of the site comprising mainly VRW fragments, including the complete profile of a rare form. It is a small cup resembling samian form 6DR27 (cf Davies *et al* 1994, 47, fig 39/204), but with a more splayed rim (fig 22 no 4). A similar example in ring-and-dot beaker fabric from the Jubilee Line excavations (Drummond-Murray & Thompson 2002, fig 66/P112) came from late 1st century land reclamation. However, the few fragments of BB2 and Central Gaulish samian from ditch [2008] date the group to after AD 120, thus the cup could either have a more extended dating or is simply residual.

The remainder of the assemblage is associated with the backfills of the beam slots of Building 1 and the pits associated with its demolition, both of which are dated to after AD 165 by samian fragments (see below). The pottery associated with the demolition of the building and with the underlying ditch confirm the short-lived nature of the structure.

PERIOD 3.1: 3RD TO EARLY 4TH CENTURY AD

Period 3.1 features produced an assemblage of 665 sherds, 9.764kg, 9.78 EVEs (fig 20: see *Endnote*), two-thirds of which were recovered from the various alluvial and ground-raising deposits of the period. These types of deposits are most likely to comprise heavily abraded material including significant amounts of residual material, and indeed 56.7% of assemblage weight in this instance is residual with considerable amounts of AHSU, HWC and VRW. Interestingly, BB2, which is supposed to be the most common fabric from the second half of the 2nd century onwards, falls behind all these fabrics. Nene Valley colour-coated ware (NVCC) dated to after AD 150 and Thameside Kent ware (TSK) dated to after AD 180, appear for the first time and suggest that the flood deposits of the period are most likely of similar date as those of Period III at Hunt's House (Taylor-Wilson 2002).

Of the drainage ditches of the period only [838] yielded greater amounts of Roman pottery with a total of 209 sherds (4.084kg, 3.54 EVEs). The composition of this assemblage is markedly different from that of the alluvial layers. Although there is an amount of residual material (15.4% of weight), late 2nd and 3rd century AD fabrics substantially increased. Oxfordshire whiteware mortaria are the most common fabric by weight excluding amphorae (10.2%, AD 180–400), and Black-burnished ware 1 (BB1) is more frequent than BB2 with 7.8% of the former and only 1.7% of the latter. This is seen from the early to mid-3rd century onwards with the demise of BB2 production (Symonds & Tomber 1991, 71), although BB2 is not significant in the alluvium assemblage either. TSK, a 3rd century AD indicator fabric (Symonds 2005, 103) and Nene Valley whiteware (NVWW) mortaria follow with 6.3% and 4.9% respectively. A small amount of Alice Holt Farnham ware (AHFA) dated to after AD 250 including a rim fragment of a *Camulodunum* 306-type bowl (4C306, fig 22 no 5), and a few sherds of Oxfordshire white colour-coated ware (OXWC, AD 240–400+) and Much Hadham ware including a samian 6DR33 cup imitation (MHAD, AD 200–400+, fig 22 no 6) reinforce the later date of the drainage ditch assemblage and date the renewed episode of water management on site.

PERIOD 3.2: MID–LATE 4TH CENTURY AD

This phase yielded the largest period assemblage of the site with 840 sherds weighing 11.631kg and representing 11.48 EVEs, all except two fragments (0.022kg) were recovered from alluvial layers (fig 21: see *Endnote*). Similarly to the earlier alluvial deposits, this assemblage also includes a substantial amount of residual material (over 58.5% of assemblage weight). The late Roman fabrics of the preceding period are all present in increased quantities, including some late forms, for example BB1 2F13 type jars (fig 22 no 7) and MHAD flagons (fig 22 no 8). Some new fabrics also appear such as Oxfordshire red colour-coated ware (OXRC, AD 270–400+) including type C55, C68, and C75 bowls (Young 1977), three fragments of Portchester D ware (PORD, AD 350–400+), and a single sherd of North African amphora (NAFR, AD 140–400+). As expected from assemblages of this date, AHFA is the most common fabric including a variety of jar and bowl forms and a small rim fragment of a class 8 flagon (Lyne & Jefferies 1979, fig 40/8.14). NVCC follows with a great variety of beakers and some coarseware forms as well as joining fragments of the complete profile of a Castor Box lid with all-over rouletted decoration (fig 22 no 9).

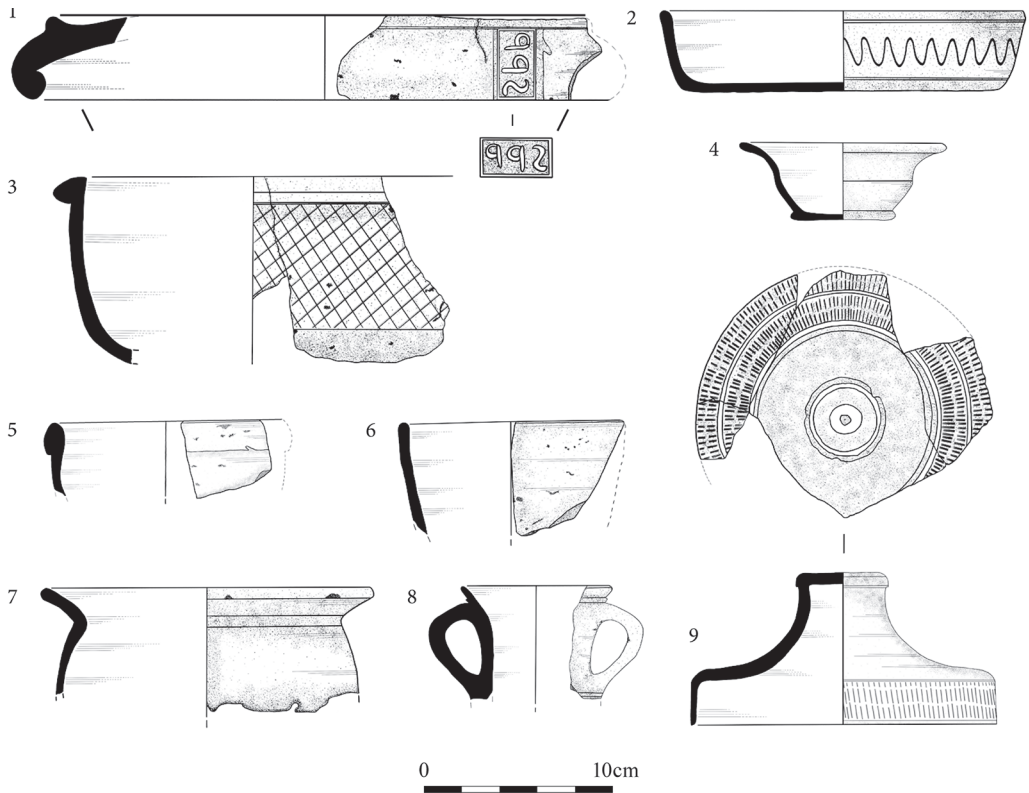


Fig 22 Science Gallery. Selected Roman pottery: 1. [988] VRW 7HOF with stamp; 2. [1074] BB1 5J; 3. [1074] BB2 4H4; 4. [2007] VRW 6A; 5. [837] AHFA 4C306; 6. [260] MHAD 6DR33 imitation; 7. [721] BB1 2F13; 8. [721] MHAD 1E; 9. [721] NVCC 9GL.

DISCUSSION

The Science Gallery assemblage is very similar in size to that of the nearby 21–27 St Thomas Street excavation (Cowan *et al* 2009, site 34; Rayner & Seeley 2009, 210–12), which is also characterised by abraded and mixed sherds. While both assemblages contain pottery dated to between the 1st and 4th centuries AD, the site 34 assemblage contains a more significant 1st century element with Highgate Wood B ware, Hoo Island white-slipped ware, Lyon ware and Central Gaulish glazed ware being well represented, while 4th century fabrics Portchester D and Calcite-gritted wares are absent (*ibid*). This almost staggered difference between the early dating of the two sites could represent the progression of land reclamation in the area between AD 70 and AD 120.

The assemblage also compares well to that recovered from the Hunt's House excavation (Taylor-Wilson 2002; Cowan *et al* 2005, site 69), which also showed an emphasis on 2nd and 3rd century fabrics and a very high degree of residuality (Lyne 2002). *Tazze* and 4C306 fragments, however, are sparse in the Science Gallery assemblage and not as striking as in the Hunt's House assemblage. There, based on the abundance of 4C306 bowls in Guy's Channel and the occurrence of *tazze* and face pots on the site, the presence of a shrine nearby was speculated (Taylor-Wilson 2002, 27). Although there is a very small number of freshly broken complete profiles of vessels deposited in the Period 2.1 and 2.2 ditches, which may or may not be parts of structured deposits, as well as the few fragments of *tazze* and 4C306 bowls, no such interpretation can be assigned to the Science Gallery assemblage.

In conclusion, the rather abraded nature and fragmented state of the pottery assemblage is consistent with material occurring in dump and flood deposits in Roman Southwark. The dating of the pottery is also characteristic of this area of the North Island with repeated flooding and land management events occurring from around AD 100 up to the late 4th century AD (Periods 5–10, Cowan *et al* 2009).

SUMMARY OF THE SAMIAN, by J M Mills

The summary can be found in the online supplement (see *Endnote*).

GRAFFITI, by Roger Tomlin

A description of the marks on a samian dish, a mortarium and an amphora (together with fig 23) can be found in the online supplement (see *Endnote*).

The Roman glass, by John Shepherd

THE ROMAN GLASS ASSEMBLAGE BY TYPE

Only seventeen fragments of glass were recovered from this site. The majority are unidentifiable body sherds and fragments of the ubiquitous square-sectioned prismatic bottle form. Two fragments from identifiable vessels are exceptional and are from vessels not normally encountered on Romano-British sites: these are the green jug fragment decorated with specks of glass in different colours (fig 24 no 1) and a fragment from a wheel-cut and incised vessel with part of a figurative scene (fig 24 no 3).

Other than the cut and incised fragment (fig 24 no 3), all the glass from this site dates to the 1st and 2nd centuries AD. There are no diagnostic fragments of any common late 2nd–4th century AD vessel types. Also of note is the absence of any window glass fragments among this assemblage.

The catalogue and figure 24 can be found in the online supplement (see *Endnote*).

Roman small finds, by John Shepherd

INTRODUCTION

The site produced only 35 small finds of significance, including five iron nails (nos 11–15), an iron spike (no 16) and five items that cannot be classified by function (nos 31–35).

The catalogue describes the objects recovered. It is clear that this group of objects is very disparate in terms of object type and there is no cohesiveness among the assemblage. In fact, the entire assemblage appears to be very mixed in its composition, with no real cohesion whatsoever. Furthermore, even though this is a small group, it contains a number of unusual objects – the black bead with red spiral decoration (no 2), for example, that is likely to be an object that comes from the Pannonian region of the empire, the lead weight with its own weight inscribed into its upper surface (no 9), or the distinctive lamp lid with a cast duck as a finial (no 6).

There is no explanation for this unusual assemblage of objects, found throughout the sequence of the site. It is interesting to note that there are no fragments of copper alloy or bone needles or pins, which are common artefacts in assemblages of Roman date. However, it is unlikely that there has been any intentional selection of the objects that have been recovered from this excavation.

The site assemblage catalogue can be found in the online supplement together with figure 24 (see *Endnote*).

Roman coins, by Murray Andrews

Ten Roman coins were found during the excavations and are described in the catalogue to be found in the online supplement (see *Endnote*).

Three coins from the site are ‘single finds’ deposited individually at different dates, probably as a result of accidental loss, and consist exclusively of low-value denominations struck in copper alloy. All these coins are residual in post-Roman contexts. The earliest, a heavily worn *as* of the mid-1st to mid-3rd centuries (SF 48), is unstratified; the other two both derive from medieval ditch fills, and comprise an indeterminate *antoninianus* dated to AD 260–96 (SF 39) and a contemporary copy of a *nummus* of the House of Constantine dated to AD 346–50 (SF 20). These coins are all typical examples of petty coinage known to have circulated extensively in southern Britain during the Roman period, and have numerous parallels in the large coin assemblages from London Bridge (Rhodes 1991, 185–7) and Tabard Square (Gerrard 2015, 140–1).

Seven late Roman copper-alloy *nummi* found in the horticultural soil [721] constitute a small hoard closing in AD 367–78 and were presumably deposited at this date or shortly thereafter. These coins were too corroded to be identified to the issue level, although all could be broadly dated on the basis of reverse types. The earliest coins in this hoard were struck in the period AD 330–41 under the House of Constantine, and belong to the common *Gloria Exercitus* series, the reverses of which depict two soldiers variously flanking one (SF 38) or two (SF 30) military standard(s). Later Constantinian issues are represented by a single *nummus* of the *Fel Temp Reparatio* falling horseman series, struck for Constantius II in AD 353–60 (SF 25). The four remaining coins, however, are all issues of the House of Valentinian dating to the period AD 364–78: three are of the *Gloria Romanorum* series (SFs 26–27, 31) and depict an Emperor carrying the labarum and dragging a captive slave, while the fourth (SF 34) is of the *Securitas Reipublicae* series, and depicts a winged Victory advancing with a wreath and palm. The near-equal ratio of Constantinian to Valentinianic *nummi* is unusual for a hoard buried in the late AD 360s or 370s (Bland 2018, 107), but may reflect random variation within a small sample; in any case, the date span of the coins parallels certain other Valentinianic bronze hoards from Britain, such as the finds from Amersham, Buckinghamshire (*c.* 1500 coins, dating from AD 330–78; Bland 1997), Kings Langley, Hertfordshire (1550 coins, dating from AD 260–378; Chameroy 1999) and Newton Abbot, Devon (243 coins, dating from AD 330–78; Moorhead 2008).

The Science Gallery find is the first Valentinianic bronze hoard to have been discovered in London and Southwark, and indeed only two other contemporary hoards – a find of two gold *solidi* from Croydon (Bland 2018, 283, no 2643) and another of nine *nummi* from Hammersmith Broadway (PAS LON-B759E6) – are known from Greater London as a whole. These finds are outliers to the core distribution of Valentinianic hoards in Britain, which are otherwise disproportionately frequent in the West Country and noticeably scarce in London and the South East (Bland 2018, 386); moreover, the two London bronze hoards are significantly smaller than their West Country counterparts, several of which contain upwards of 300 coins (Moorhead 2001, 92–3). This pattern of provincial variation is mirrored in the single find evidence. Valentinianic coins accounted for just 5.75% of single finds from Plantation Place (Bowsher 2015), 5.88% from the Vintry (Kelleher & Leins 2008, 170), 6.16% from Parnell Road and Appian Road, Old Ford (Sheldon 1972) and 8.85% from Tabard Square (Gerrard 2015, 141), and are therefore distinctly underrepresented in London, Southwark, and their hinterlands when compared with the British mean of 11.8% (Reece 1995, 183). Conversely, single finds from Gloucestershire, Somerset and Wiltshire are often considerably overrepresented in the Valentinianic period when compared with the British mean (Moorhead 2001, 92). As a small and scarce find of the AD 360s or 370s from Southwark, the Science Gallery hoard therefore fits within a growing body of evidence for a shift in the pattern of provincial coin supply in the Valentinianic period away from London and the South East and towards western Britain, a phenomenon that correlates with broader

shifts in the administrative and economic geography of 4th century Britain (Moorhead 2001, 94–5). However, its presence at the site nonetheless provides corroboratory evidence of a persistent demand for low-value currency in Southwark, if only on a diminished scale, at a period of stereotyped 'urban decline' (Gerrard 2011).

The coin catalogue can be found in the online supplement (see *Endnote*).

The post-Roman pottery, by Berni Sudds (tables 4 and 5: see *Endnote*)

A medium-sized assemblage of post-Roman pottery was recovered from the site, amounting to 1452 sherds, representing some 779 vessels and weighing 44,555g. The pottery dates from the 11th through to the 19th century, although the earliest securely stratified post-Roman assemblages date from the late 13th to mid-14th century. Indeed, the assemblage is reflective of small-scale early and high medieval activity, with more intensive activity suggested from the late 14th century onwards, with late medieval pottery accounting for 20% of the assemblage by sherd count and early post-medieval pottery comprising 77% (table 4). In this respect, the current assemblage is closer to those to the north, west and south at London Bridge Station, Guy's Hospital, Hunt's House and Newcomen Street, than to further east at the Wolfson Wing site and 127–143 Borough High Street, where more significant earlier assemblages were identified, no doubt given their closer proximity to the ribbon development along the High Street (Dawson 1979; Taylor-Wilson 2002; Jarrett 2002; 2014; 2016c; 2017).

More detailed reports on the pottery recovered from each phase of investigation form part of the archive, but a summary of the assemblage by period is presented below, with a focus on a few key groups of interest (Jarrett 2016a; 2016b; Sudds 2018). The majority is in good condition, with little evidence for abrasion and was probably deposited fairly rapidly after breakage. The composition of the pottery is in keeping with the ceramic profile for the London area and more pertinently for Southwark and the immediate locality (see table 5; Jarrett 2002; 2016c; 2017; 2020; Sudds & Jarrett 2009; Seddon 2017).

MEDIEVAL (PERIODS 4 AND 5)

A total of 237 sherds were recovered from deposits attributed to Periods 4 and 5, representing some 177 vessels and weighing over 5kg. This material accounts for 16% of the site total (by sherd count). The presence of a small quantity of early medieval pottery attests to low-level background activity in the earlier medieval period. This is comprised of nine sherds of coarse London-type ware, most of which are residual in later deposits.

The remaining Period 4 pottery was recovered from a recut of the channel (ditch [761]). The earliest well-dated assemblages from the lower fills of this feature date from the late 13th to mid-14th centuries, although pottery of this date was still fairly minimal, suggesting the site is likely to have been peripheral to occupation during this period. These groups include London-type ware, Earlswood-type ware, Harlow sandy ware, Mill Green ware and Coarse Surrey-Hampshire Border ware, the latter group including a highly decorated jug. The later fills of the ditch and of features cut into it also produced some earlier pottery, including London-type ware, Mill Green ware and Kingston-type ware, but are dominated by Coarse Surrey-Hampshire Border ware and Cheam whiteware, with smaller amounts of Late London-type ware, Tudor Green ware and Dutch and Rhenish imports. Pottery of this date occurs in greater quantity, attesting to more intense exploitation in the immediate vicinity, with material probably being disposed of from nearby settlement.

In general, the assemblages from the ditch produced a fairly limited range of forms, being restricted to jugs and jars or cooking pots typical of the period, but nearly two-thirds of the pottery was retrieved from three consecutive fills ([577]; [620]; [819]), among which are a higher portion of drinking-related forms. The earliest fill produced a small group of Coarse Surrey-Hampshire Border ware, but included a large rounded jug dating from

c 1340 to 1500. The upper fills produced larger assemblages, including sherds from the same vessels. These are comprised predominantly of Coarse Surrey-Hampshire Border ware and Cheam whiteware, but also include Siegburg stoneware and a couple of sherds of London-area early post-medieval redware, suggesting they were not finally filled in until the late 15th or even early 16th century. The Coarse Surrey-Hampshire Border ware forms include cooking pots with flat-topped and bifid rims, jugs, bung-hole jugs and bowls and the Cheam whitewares cooking pots and jugs (including biconical types). There are also fragments of a Tudor Green ware lobed cup. The imports are comprised of Dutch redwares, including a frying-pan, and the Siegburg stoneware, represented as a jug and drinking jug. One of the upper fills of ditch [761] also contained a Merida-type micaceous ware costrel.

The combination of bung-hole jars for the storage of beer and wine and jugs for decanting and serving, in addition to drinking jugs and cups, could be indicative of communal drinking. Both in the City and elsewhere in Southwark the predominance of such forms has been taken to indicate the presence of drinking establishments, namely taverns, dating from the 13th to 15th centuries (Goffin 1991; Pearce 2002, 73; 2015, 117, 177–8). Although not as convincing as similar groups in terms of numbers, the combination of forms within these fills certainly suggests drinking formed a key part of the activity undertaken in a nearby building. Considering the location, at some distance from the high street, a tavern would represent an unlikely source for this material, but given that the site falls within the precinct of St Thomas's Hospital, this range of forms types might equally be expected in an institution where large quantities of alcohol and food were served communally. Whether from the communal apartments of the master and brethren, purportedly located in the near vicinity from at least c 1388 (Dawson 1979, 63), or perhaps even from a refectory building within the complex, would be difficult to prove on the basis of what is a relatively modest group, but the additional presence of food preparation and serving forms would certainly be consistent with this interpretation.

The Period 5 pottery derived from dump/levelling layers and the fill of pits and post- or stakeholes. Surrey whitewares remain the dominant type, in a similar range of form types, with a smaller quantity of Late London-type ware and, in the latest deposits, a few sherds of London-area early post-medieval redware and early Surrey-Hampshire Border whiteware. Imports include Dutch redwares, Siegburg stoneware and a few sherds of Langerwehe and Raeren stoneware.

An unusual Cheam whiteware vessel was also recovered from the site, similarly sized and shaped to a money-box but without a coin slit (fig 25 no 1; Pearce & Vince 1988, fig 125.583). The vessel may be a small bottle.

EARLY POST-MEDIEVAL (PERIOD 6)

Over half (56% by sherd count) of the pottery assemblage from the site was recovered from Period 6 features and layers, totalling 809 sherds, from an estimated 306 vessels, weighing over 22kg. There is a significant quantity of pottery dating to the 16th century and an even greater quantity of 17th century date. Of note is a redeposited early 16th century drinking group, probably related to the later life of St Thomas's Hospital and two secular, domestic household groups of mid-16th century and 17th century date.

Early 16th century drinking assemblage

A redeposited early 16th century group of pottery from the backfill ([330]) of a construction cut for soakway/culvert [308] may provide further evidence for communal drinking and eating in the immediate area, and perhaps one of the last related to activity within the precinct of St Thomas's Hospital. The medium-sized assemblage (55 sherds) is dominated by



Fig 25 Science Gallery. Post-Roman pot: 1. Cheam whiteware bottle? [unstratified]; 2. Dutch red earthenware chamber-pot with slip-trailed decoration [538]; 3. Dutch red earthenware lid with slip-trailed decoration [528]; 4. London tin-glazed ware saucer (Orton style D) [316]; 5. London tin-glazed ware storage jar (Orton style A) [311] and [316]; 6. Metropolitan slipware bowl [304] and [309]; 7. Midlands purple ware butter pot with makers stamp [302]; 8. Isabela polychrome maiolica dish [302]; 9. Surrey-Hampshire Border whiteware whistle SF.100 [2124].

London-area early post-medieval redware and London-area post-medieval slipped redware but also includes early Surrey-Hampshire Border whiteware and seven imported Siegburg and Raeren stoneware jugs and drinking jugs. The London-area early post-medieval redware forms include a cauldron, costrel and jug and the London-area post-medieval slipped redwares are represented by bowls, dishes, the latter including a dripping dish.

Garderobe [623]

The backfills of the Period 5 Garderobe [623] produced a medium-sized related group of pottery of mid-16th century date. A total of 32 vessels were retrieved, with the assemblage dominated by London-area early post-medieval redware and London-area post-medieval slipped redware, but also including a number of imports, including at least six Dutch vessels. The local redwares occur as cauldrons and pipkins, including a near-complete pipkin with a metallic glaze, and as carinated bowls and jugs. The Dutch vessels are represented by plain and slip-decorated red earthenwares, and possibly a tin-glazed storage jar with dark-blue band decoration, although a source somewhere else on the Continent is possible for the latter.

The Dutch red earthenwares include cauldron or pipkin forms, but also a complete Dutch red earthenware chamber-pot decorated with double slip-trailed standing arcs to the shoulder (fig 25 no 2). Although a chamber-pot form, the vessel was evidently used for cooking, demonstrating internal wear and residue and external sooting. Typologically, the vessel probably dates to *c* 1550 (Baart 1994, fig 1, 26). Although the Low Countries were producing red earthenware chamber-pots from *c* 1350, the form was not widely adopted

into the repertoire of English potters until the late 16th century, so the use of the form as a one-handed cooking vessel, akin to a cauldron, is perfectly explicable. Indeed, even when the chamber-pot form became widespread, some examples were still used for cooking as they were evidently suited to the job. A lid with slip-trailed decoration was also recovered that is probably of Dutch origin (fig 25 no 3). Interestingly, a similar unsourced slip-decorated lid, potentially from the Low Countries or Germany, was found to the south at Newcomen Street (Jarrett 2017). In addition to the tin-glazed storage jar mentioned above, the only other import is represented by a sherd from a Siegburg stoneware jug. Notably, a medium-sized post-medieval crucible was also recovered, with a slightly sagging base and flaring wall. The latter is vitrified from use but contains no visible residue. A later Hessian crucible was recovered from a late 18th century group of pottery to the south of the site at Hunt's House, taken to indicate the presence of small-scale or artisan metalworking in the vicinity (Taylor-Wilson 2002, 45).

The group post-dates the dissolution of St Thomas's Hospital as a monastic establishment in 1540 but determining a likely source for the pottery is somewhat confused by the suggestion that rooms within the St Thomas complex were being leased out by 1537, and furthermore that St Thomas's was re-established as a combined hospital and poor house in 1552 (Dawson 1979, 63; Carlin 1996, 85). The concentration of Dutch vessels may suggest that an individual with connections to the Low Countries, perhaps either an immigrant or merchant, may have taken up residence nearby. An influx of Dutch immigrants to London is certainly documented at this time, settling in a number of locations, sometimes coinciding with higher than typical quantities of Dutch pottery, or as potters themselves (Edwards 1974; Stephenson 1997; Edwards & Stephenson 2002, 174). A concentration of Dutch pottery was recovered to the south of site at Tabard Square, potentially connected to 'Jan Jonck's house' marked on the earliest known depiction of Southwark of *c* 1542 (Sudds & Jarrett 2009). Jan Jonck may have been an immigrant from the Low Countries and perhaps a prosperous one given that the house is one of the only private dwellings recorded. Interestingly, the only fine-quality post-Roman glass drinking vessel recovered also originates from this feature (Shepherd 2018), although somewhat at odds with the idea that this group may have originated from a wealthy, or at least well-connected household is the additional presence of the crucible.

Backfill of soakaway/culvert [322]/[305]

Drain [322]/[305] produced a large assemblage of pottery, amounting to 506 sherds, representing some 125 vessels, weighing over 13kg. The low number of vessels represented, in relation to sherd count, and multiple cross-joins evident between deposits, suggest this material may have been deposited as part of a clearance episode. The assemblage includes pottery of early 17th century date but includes later forms and datable marks indicating it was unlikely to have been deposited prior to the late 17th century. A likely source is one of the houses documented on or in the vicinity of the site by 1658.

The pottery from the lower fills is dominated by London tin-glazed ware and Surrey-Hampshire Border whitewares with smaller quantities of London-area post-medieval redware, Essex-type post-medieval fine redware and Essex-type post-medieval black-glazed redware. The imports include small quantities of Raeren and Frechen stoneware and fragments of a Spanish olive jar. The Surrey-Hampshire Border whitewares include flared bowls, flanged dishes, porringers and a single costrel and flat-rimmed chamber-pot. The tin-glazed wares include dishes and storage jars with early Wan-li and geometric decoration (Orton style A) and blue- or polychrome-painted geometric and floral decoration (Orton style D) on dishes, bowls, porringers and more rarely saucers or condiment dishes (fig 25 no 4). This material includes a near-complete storage jar decorated with bands, rows of dots, line pyramids and spray motifs and has a large painted 'B' on the base (fig 25 no 5). There

are also plain white glazed chamber-pots, a mug and a dish. The biscuit-fired tin-glazed ware includes a chamber-pot and porringer. The few diagnostic redware forms include a dripping dish and a tall cylindrical jar.

The upper fills produced a similar range of types to the lower fills with multiple cross-joins evident across deposits. London tin-glazed ware and Surrey-Hampshire Border whitewares are still dominant but there are slightly greater quantities of local and Essex redwares. The range of forms is also comparable, if slightly more varied. The redwares include carinated and handled bowls as well as tripod pipkins and the tin-glazed wares further fragments of the saucers or condiment dishes, a plate, posset pot and an ointment pot. There is also a Metropolitan slipware rounded bowl with part of a slip-trailed idiom reading '...HAVE... EVER LOVE...' (fig 25 no 6). Metropolitan slipware vessels were made at Harlow in Essex, primarily for the London market, and arrived in the city in large quantities during the 17th century. The vessels were decorated with slip-trailed designs, with a smaller proportion bearing inscriptions. These tended to be fairly formulaic, having either a religious or more earthly theme, although no exact parallel is forthcoming for the example from the site. A semi-complete (but fragmented) Midlands purple ware butter pot was also recovered.

More of the same vessels from the drain were recovered from layer [302] above, including further fragments of the butter pot, one with a stamp (fig 25 no 7), and part of an Isabela polychrome maiolica dish from Spain (fig 25 no 8). The butter pot stamp is largely illegible, formed of a double circle with a few letters visible. Butter pots were brought under regulation by national laws during the reign of Charles II and stamped with the name of the potter and the weight from 1662, until the act was superseded under William and Mary in 1692 (Egan 1992, 98). Although they were required by statute to be marked in this way, the stamps appear to be relatively rare finds (*ibid*, 97). The Isabela polychrome dish is also a fairly rare find, and dating to the early 16th century, could be residual although may represent an heirloom.

18TH AND 19TH CENTURY (PERIODS 7 AND 8)

By the late 1730s the eastern side of the site was redeveloped as a wing of Guy's Hospital and remained largely unaltered, with the exception of some modest 19th century repairs and improvements, until the mid-20th century. This change in use is reflected in the relatively small assemblage of pottery of this date. Although 25% of the site assemblage by sherd count (325 sherds, weighing 15,651g) was recovered from Periods 7 and 8, the majority of this is residual. The small quantity of 18th and 19th century pottery comprises types well paralleled in London, which by this date, as across much of Britain, includes mass-produced factory-made refined wares and stonewares and utilitarian red earthenwares (table 5). There are few imports, but these include Chinese porcelain bowls and plates with blue-and-white, Imari and famille rose style decoration. The base and lower body of a non-locally produced syrup-collecting jar, associated with the refining of sugar, was also recovered. The vessel has a fine micaceous redware body with clay pellets in the fabric. Isolated finds of this nature are often found on sites in close proximity to the Thames, with two sugar-refining vessels found to the south at Hunt's House (Taylor-Wilson 2002, 45). Residual finds of note among these later deposits are a 17th century olive-glazed Surrey-Hampshire Border whiteware whistle (fig 25 no 9, SF 100 [2124]; Pearce 1992, fig 45.428 and 429) and a Westerwald chamber-pot with a moulded lion passant surrounded by *Blauwerk*, a salt glaze with added cobalt blue ([2230]).

Clay tobacco pipes, by Chris Jarrett

INTRODUCTION

A total of 297 fragments of clay tobacco pipes are recorded in the assemblage consisting of 140 stems, seven mouthpieces and 150 bowls, with a date range of *c* 1610–1800, 22 of which

are maker-marked and only four bowls have moulded decoration consisting of late 18th century armorial designs. The bowl types were classified according to Atkinson and Oswald (1969), while the 18th century examples are according to Oswald (1975) and prefixed with either AO or OS in order to distinguish the different typologies. Further, a new addition to the *c* 1660–80 dated shapes is according to Higgins (2016). The clay tobacco pipes were quantified and catalogued according to the guidelines proposed by Higgins (2017). The extent of milling of the 17th century bowl rims is recorded in quarters and the quality of burnish was also noted.

Details of the assemblage can be found in the online supplement together with figure 26 (see *Endnote*).

The post-medieval glass, by John Shepherd

THE POST-MEDIEVAL GLASS ASSEMBLAGE

Thirty-one fragments of vessel glass from post-medieval contexts were identified. As expected, the majority come from the distinctive and very common ‘English’ wine bottle, in thick olive-green glass (sixteen) and cylindrical-bodied pharmaceutical or cosmetic phials (five). The most complete examples of both the bottle and pharmaceutical forms date from the late 17th or 18th centuries.

One possibly earlier fragment is represented here; the pushed-in base of a small bottle (fig 27) in a glass suffering from surface decomposition that is consistent with an earlier 15th or 16th century date.

Also of note is the rim of a urinal, a form that first appears in the 13th or 14th century for use in uroscopy, although Noël-Hume suggests they might have had other uses (see Noël Hume 1957, 106 and also Charleston 1964, 150–1 for a discussion of this form). This example, however, is in a glass metal consistent with the late 17th or 18th centuries.

The case bottle, represented by three fragments, is a form that could be stored efficiently in crates as were the Roman square-sectioned prismatic bottles of the 1st and 2nd centuries. They were used not only for long-distance in-transit storage but also in travelling apothecary and cosmetic sets. The form is well known – see examples from Canterbury (Shepherd 1990, fig 81, no 251; 1995, 1252, no 520), Basing House, Hampshire (Charleston 1971, 70, no 65 and base fragments nos 53–8).

A single very small spherical glass bead and six fragments of cylinder blown window glass were also recorded.

The post-Roman metal and small finds, by Märit Gaimster with Murray Andrews (coin and jetton)

In total, around 75 individual post-Roman metal and small finds were recovered from the excavations, the vast majority from late medieval and early modern contexts (Gaimster 2018). With a large proportion consisting of iron nails and undiagnostic metal fragments, this report focuses on a selection of identifiable and significant finds that are discussed here by period.

MEDIEVAL (PERIODS 4 AND 5)

Of particular interest is a copper-alloy jetton struck for Louis de Mâle, Count of Flanders, in 1346–84 (SF 15; not illustrated). Used primarily as ‘reckoning counters’ for arithmetic

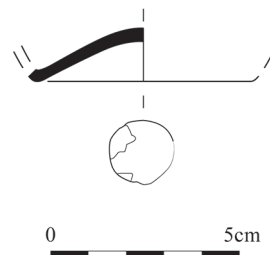


Fig 27 Science Gallery. Post-Roman glass: fragment from the base of a Period 6 bottle [323], 13th–16th century.



Fig 28 Science Gallery. Medieval small finds: 1. roofing lead (SF 59); 2. bone bead (SF 67); 3. copper-alloy mount (SF 23); 4. portable hone of Norwegian ragstone (SF 14); 5. iron clench bolt (SF 68); 6. possible fragment of bone inlay (SF 10).

calculations, jettons are commonly found in late medieval and early post-medieval contexts in London and Southwark and reflect the expansion of numeracy at a time of intense commercial development. The Science Gallery specimen has intrinsic interest as a scarce example of a Flemish jetton from a late medieval context; most jettons used in England during the 14th and 15th centuries were made either in England or France, and indeed just

two Low Countries jettons of the mid–late 14th century were recorded among the Thames foreshore finds described by Mitchiner (1988, 30).

The jetton was recovered from the fill of pit [835] where it was associated with 15th century pottery. Other finds from the same context include the fragment of substantial lead sheet mount, probably roofing lead from an ecclesiastical building in the vicinity (fig 28 no 1: SF 59) and a bone bead (fig 28 no 2: SF 67). The bead is quite substantial and although it is of a conical shape, the irregular base suggests it may be the remaining part of a globular bead that has split along the centre. This bead is almost certainly from a rosary, and the wear polish across the break indicates it remained on the rosary, perhaps with the other half having fallen off. Rosary beads were frequently made of bone, drilled out from bone panels (cf Egan & Pritchard 1991, fig 107; Spitzers 1997). A further characteristic late medieval object is a flat circular copper-alloy mount with an internal rivet, from the fill of ditch [761] (fig 28 no 3: SF 23). Mounts of varying shapes, usually of copper or lead/tin alloy, were used lavishly on belts, girdles, straps and other leather accessories in the 14th and 15th centuries (cf Egan & Pritchard 1991, 162–246; Willemsen 2012). Their prolific use had largely gone out of fashion by the early 1500s (Egan & Forsyth 1997, 219). Also likely to be medieval is a slender narrow hone of Norwegian ragstone, retrieved from the fill of a Period 8 posthole in this area (fig 28 no 4: SF 14). Hones of this imported fine-grain stone occur in London by the 10th century and dominate the London market into the 1300s (Pritchard 1991, 155). They frequently occur as small portable hones, formed by a long narrow bar that was pierced for suspension from the belt (cf Ellis & Moore 1990, fig 264 no 2956).

Besides these objects, it is of interest to note that the postholes associated with Building 3 produced the remains of some very substantial iron nails, with minimum lengths varying from 150 to 230mm. These finds also included a complete clench bolt (fig 28 no 5: SF 68). Just to the east of this building, a series of smaller postholes, possibly for scaffolding associated with Building 2, produced a thin tapering sliver of animal bone, worked and polished on all four sides and may be a fragment of inlay (fig 28 no 6: SF 10).

EARLY POST-MEDIEVAL (PERIOD 6)

The earliest finds from Period 6 contexts are associated with the demolition of Buildings 2 and 3. They include three pinner's bones, with one from the floor/surface make-up in the Lift Shaft trench and two from backfills of garderobe [623] and in the Excavation Area (fig 29 no 1: SF 54 and 56–57). Two of the pinner's bones were associated with pottery from the early to mid-16th century, and all three are likely to relate to activities associated with St Thomas's Hospital and its precinct. Manufactured from the end of cattle metapodials, these simple tools reflect the manual production of fine copper-alloy pins from the late medieval period until pin manufacture was mechanised in the late 18th century (MacGregor 1985, 171). All pinner's bones follow the same pattern with the working end coarsely faceted and provided with vertical or oblique grooves that facilitated holding the pins to file their points. The examples from the Science Gallery are interesting in the light of recent discoveries relating to pin-making in the area, and the character of pin manufacture in the early modern period. Further east from the site, at the corner of the now-covered Stainer Street, two pinner's bones were recovered from finds contexts dating from the late 15th to mid-16th centuries; two further pinner's bones from the same area, found in deposits dating from 1550 to 1650, may be residual or represent continuous pin sharpening at this site or property (Gaimster 2020). While copper-alloy pins were in high demand, used in large numbers to fasten clothing such as ruffs and headdresses, it seems clear that English pin-makers could not satisfy the demand and documentary sources indicate that the vast majority of pins used in the 15th and 16th centuries were imported from the Netherlands (Egan & Forsyth 1997, 222). Notably, pinner's bones have been found on other sites of religious houses where they may indicate a focus of pin manufacture in monastic contexts (Egan 2005, 138; 2011, 259; Gaimster in prep). By



Fig 29 Science Gallery. Early post-medieval small finds: 1. pinner's bones (SF 54 and 56-57); 2. bone implement of cattle-sized rib (SF 55); 3. iron knife (SF 60); 4. copper-alloy finger-ring (SF 4); 5. bone dice (SF 61); 6. cannon ball of Norwegian ragstone (SF 5); 7. ivory-working waste (SF 7); 8. ivory cutlery handle (SF 103); 9. embossed copper-alloy disc (SF 12).

the late 17th century, there may be evidence of an actual pin-making workshop near Tenter Alley just to the north of the Science Gallery site. Here numerous pins, including unfinished examples, were uncovered along with tools such as iron shears for cutting the wire (Gaimster 2020, 484–6). However, while pinner's bones were recovered from other locations in the area, none came from this specific location, suggesting that sharpening the pins would have been outsourced as a cottage industry (cf Peaucelle & Manin 2006, 13–14).

Among other early finds from this period are a bone implement and an iron knife blade, both from the backfill of garderobe [623]. The bone implement consists of a cattle-sized rib cut at a slight angle (fig 29 no 2: SF 55); the surfaces of the rib display polish from use and handling, especially at the cut end, which suggests this was a simple tool of unknown function. The iron knife is of a simple tang-hafted form with a long parallel-sided blade (fig 29 no 3: SF 60). It lacks the bolster, an integral expansion between the blade and the tang, that was introduced on knives in the later Tudor period (Moore 1999, 296).

A second group of finds come from the fills of soakaway/culvert [322] in the Lift Shaft trench, where they were associated with a large quantity of late 17th century pottery that may represent a household clearance assemblage. The finds include a twisted copper-alloy finger-ring with an integral plain oval bezel (fig 29 no 4: SF 4) and a minute bone dice (fig 29 no 5: SF 61). Despite its small size, it is marked with the regular layout, found on dice from the Roman period onwards, of numbers on opposing faces equalling seven. The numeral layout corresponds to Potter's variant 16 and fits well with the increasing conformity of dice from the 16th century onwards (Egan 1997, 3–4). In stark contrast to this small object is a cannonball of Norwegian ragstone (fig 29 no 6: SF 5). The size of the shot (3.5in (90mm); weight 2lb 4oz (1021g)) indicates it was used in a saker, a medium-size cannon that was developed in the early 16th century. Sakers were used widely during the English Civil War (Blackmore 1990, 85; cf Portable Antiquities Scheme PAS ID: WREX-DC1313). A piece of ivory-working waste (fig 29 no 7: SF 7) reflects the wider accessibility of elephant ivory with the opening of direct trade routes in the 17th and 18th centuries (MacGregor 2001, 378). The piece consists of the sawn-off outer surface from a segment of a large tusk with a diameter of *c* 130mm. Another piece of elephant ivory waste is known from a site at Stoney Street, to the west of Borough High Street (Fairman *et al* 2020, 131), in a context dating from the late 16th century, a period that sees the first traces of elephant ivory working in England (Riddler 2009). Across the Thames, at Tower Hill, substantial amounts of 17th century ivory-working waste have been excavated, together with unfinished products in the form of cutlery handles and combs (Hutchinson 1996, 134–41; Whipp 2006, 48–50).

Two residual objects recovered from the courtyard area also date from the 17th century. They are a copper-alloy farthing of Charles II, minted in 1673 (SF 104: not illustrated) and an ivory cutlery handle (fig 29 no 8: SF 103). With a diamond-shaped section and a slightly bulbous end, it has close parallels in other 17th century cutlery handles (cf Thompson *et al* 1984, fig 51 no 36); it was associated with pottery dating from 1630–1700. An unusual object, finally, is a domed copper-alloy disc from a dump layer in the Excavation Area (fig 29 no 9: SF 12). The disc has a decorative concentric pattern of fine raised dots, punched from the back, which contrasts with four very roughly punched holes inside its parameter suggesting a secondary use as a mount. The disc was associated with pottery dating from 1340–1500, so it is possible that it is residual or represents the reuse and adaptation of an older object.

19TH CENTURY (PERIOD 8)

The only object of interest retrieved from Period 8 was a flat spatula-shaped bone implement carved from cattle rib (fig 30: SF 101). The implement has parallels in so-called *lissoirs*, traditional shoe-makers' tools used to smooth in the uppers before gluing or nailing the shoe, and to burnish the leather of the uppers (cf Choyke 2006).

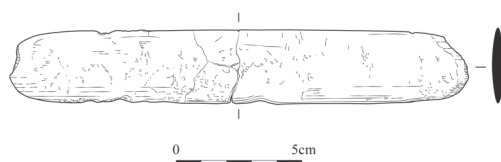


Fig 30 Science Gallery. 19th century small finds: bone implement of cattle rib, possibly a shoe-maker's tool (SF 101).

Animal bones, by Karen Deighton (tables 8–10: see *Endnote*)

INTRODUCTION

A total of 536 fragments of animal bone was hand collected from a range of features and deposits uncovered from the site. Material was recovered from six periods as follows: Period 2.1–2 & 3.1–2 Roman, Period 4 medieval, Period 5 late medieval, Period 6 1540–1700, Period 7 18th century and Period 8 19th century. Following assessment (Deighton 2016) of bone from all phases the following report summarises bone assemblages from Periods 2, 3, 7 and 8 and concentrates on Periods 4–6 where findings were more plentiful.

METHOD

The material was first sorted into recordable and non-recordable fragments, and bones with fresh breaks were reassembled. Identification was aided by Schmid (1972) for large mammals and Lawrence and Brown (1974) for small mammals. Sheep/goat distinction follows Boesneck (1969).

The following were recorded for each element: context, anatomical element, taxa, proximal fusion, distal fusion, side, burning, butchery, pathology and erosion. Ribs and vertebrae were recorded as horse, pig, dog, sheep size or cattle size but not included in quantification as their multiple numbers introduce bias. Recording of fusion follows Silver (1969). Recognition and recording of butchery is after Binford (1981). Recording of sexing data for pig canines follows von den Driesch (1976). The material was recorded on an Access database.

CONDITION OF BONE

Fragmentation was high with 29.5% of bone less than 25% complete, some of which was the result of heavy-handed butchery techniques. Evidence for butchery, mostly chopping, was observed on 156 bones. Canid gnawing was noted on nineteen bones.

SUMMARY OF ROMAN PERIODS 2.1–2 & 3.1–2

Animal bones were present in four sub-phases. The assemblages are fairly small and are limited to common domesticates, but appear to show dominance of cattle throughout the Roman period, which is not unusual as beef was the most common meat consumed in Roman Britain (Maltby 2017). Unfortunately, owing to the small amount of bone per phase, it is not possible to trace temporal changes during the period. Comparisons with other work in the area (eg Rielly 2019) are limited due to the small size of the current assemblages; however, a dominance of cattle is also seen at 199 Borough High Street (Locker 1988) and a comparable limited range of taxa for the early Roman period is observed at Thameslink sites (Rielly 2019). The small size of the assemblage possibly reflects the nature of activity here during the Roman period with land reclamation and flooding events and finally settlement contraction.

THE TAXA PRESENT

Table 7 Taxa by period (fragment count)

Period	3.1	3.2	3.3	3.4	4	5	6	7	8	Total
Cattle	50	4	29	22	46	19	36	9	2	217
Cattle size	7		1	7	14	5	20	4		58
Sheep/goat	6		2	4	26	29	42	5	3	117
Sheep size					5	3	14	2		24
Pig	5		3	2	16	17	26	2	1	72
Horse					1	1				2
Dog		1	1		2		2		1	7
Cat							1			1
Fallow deer					1		1			2
Rabbit					1	2	2			5
Chicken	1				7	9	4	1		22
Chicken size				1	1		1			3
Goose						2				2
Duck						1				1
Indeterminate bird					1		2			3
Total	69	5	36	36	121	88	151	23	7	536

MEDIEVAL AND POST-MEDIEVAL (PERIODS 4–6)

Period 4 (medieval 1270–1400)

The majority of the bones were recovered from ditch [741] and pit [835] with concentrations seen in [577] fill of pit [835] and [761] fill of ditch [741]. A small quantity of bone was also recovered from ditch [1020].

The assemblage was dominated by cattle, followed by sheep/goat, then pig. Fusion data for sheep/goat and cattle show a variety of ages, which may be due to the limited data available, and therefore no kill-off pattern can be discerned. However, a mature sheep of 6–8 years was noted (see table 8). Epiphyseal fusion data suggests pigs were predominantly young adults implying animals were slaughtered when they reached an optimum weight. This is to be expected for a taxon with no secondary products; however, the paucity of data renders the interpretation cursory. Only one male pig canine was noted therefore no male:female kill-off ratio can be established to confirm the suggestion generally made that more males are selected for slaughter than females in order to maintain breeding stock.

Butchery is seen predominantly on cattle bones although it is interesting to note that a butchered horse femur was noted in [741] dated 1350–1500. The knacker of horses for feeding to hounds was known by the later date here (Wilson & Edwards 1993); however, some association with craft/industry should not be ruled out. Further non-food domesticates are represented by two dog humeri from separate contexts. The estimated shoulder height calculated from the greatest length of the dog humerus from [735] is 0.31m and suggests an animal of similar size to a modern fox terrier.

The range of taxa and body parts encountered together with the heavy butchery suggests the assemblage to be domestic waste, which is consistent with the area being marginal land at

this time. Cattle body parts are apparently dominated by upper forelimb, which could imply that meat was arriving at households already jointed.

The presence of fallow deer bone in context [834] in pit [835] could suggest high status, although this is not necessarily so given the prevalence of poaching (Sykes 2007). Rabbit from a fill [577] dated to 1400–1500 of pit [835] was by this date becoming more common and no longer a food indicative of affluence (Sykes & Curl 2010).

The only poultry noted was chicken, which represented 5.7% of the assemblage. Although one juvenile chicken bone was noted this is insufficient evidence for the domestic production of poultry/eggs.

Period 5 (late medieval) (1400–1500)

Concentrations of bones were seen in [520], a fill of the possible timber-lined pit [632], thought to be a possible cesspit, in Room 1 of Building 2. The remaining material came from postholes [490] and [626] and dump layers [720] and [722].

The assemblage is dominated by sheep/goat and sheep size fragments, followed by cattle then pig. Fusion data for the major domesticates show no clear pattern of ages possibly due to the limited amount of data. Toothwear data are insufficient to clarify the situation; for cattle it is restricted to a mandible indicating a mature animal, a single ovicaprid mandible indicates an animal of 4–6 years and for pigs two mandibles indicate a young adult and an animal of around 6 weeks. Sexing data for pigs is restricted to one male canine.

Chicken represented 10.75% of the assemblage (with one juvenile noted) and small amounts of goose complete the poultry present. Once again a solitary juvenile chicken bone is not enough to confirm backyard production.

Non-food domestic taxa are represented by a horse metacarpal from [720], which interestingly appeared to have been butchered; however, this is insufficient to conclude whether this is evidence for craft/industry. Wild/game taxa are represented by small numbers of rabbit and possibly duck. Once again domestic waste is suggested as an origin for the assemblage, which is largely constant with ground consolidation activity during this phase.

Period 6 (1540–1700)

Bones were recovered from dump layers, the fill of chalk-lined pit [623] and a robber trench and a sequence of drain [322] fills.

The assemblage has roughly equal numbers of sheep/goat and cattle, although this could be an artefact of the small size of the assemblage. For cattle where fusion data are available juveniles apparently predominate, whereas for sheep a small amount of ageing data implies the consumption of mutton. Finally, fusion data for pigs suggest the usual consumption of mostly juveniles. One neonatal pig bone is present; however, this is not enough information to confirm the backyard breeding attested to by Carlin (1996) for this period.

Dog and cat represent non-food domesticates and poultry is restricted to chicken. Fallow deer is also present (see above Period 4) and, together with rabbit, represent game for the period.

The assemblage possibly represents waste associated with buildings here at this time. Whether this is domestic or associated with industry is unclear as the presence of a cat mandible [326] and two dog bones [322] could be indicative of the fur trade and furthermore a pinner's bone was recovered from [330].

Periods 7 (18th century) & 8 (19th century) summary

Material was recovered from the fill of a construction cut (Period 7) and a dump layer (Period 8). A limited number of domestic taxa were present. This material can be interpreted as a background scatter.

CONCLUSION

Although the medieval and post-medieval assemblages are small, they appear to conform to a pattern witnessed at other contemporary Southwark sites. For example, the dominance of cattle seen during Period 4 is mirrored at Stoney Street, London Bridge Station and Bedale Street together with similar ranges of poultry wild/game and non-food taxa (Rielly 2020). The relative increase in cattle at the expense of sheep/goat during Period 6 is also noted at London Bridge Station for the period 1550–1700.

Table 11 Percentage of major domesticates by period

Phase	4	5	6
Cattle	48.4	25.6	33.3
Sheep/goat	27.4	39.2	38.9
Pig	16.8	23	24.1
Chicken	7.4	12.2	3.7

Again, the evidence for butchery noted on horse bones from Periods 4 and 5 although unusual is not without parallels in Southwark as it was also noted from medieval levels from the Thameslink site at London Bridge Station (Rielly 2020).

The increase in veal is noted as a trend for post-medieval urban sites, because of the increase in dairy farming and the replacement of oxen with horses for agricultural draft and traction, seen at London Bridge Station (Rielly 2014) and Tabard Square (Rielly 2009) in the post-medieval levels, is possibly seen in the apparent predominance of juvenile (unfused) cattle bone at the Science Gallery Period 6. However, this assertion needs to be treated with caution due to the small amount of data available and the fact that it relies on fusion data and not the more accurate toothwear data.

One unusual feature of the later medieval assemblage is the number of chicken bones. Chicken represented 10.75% of the assemblage or 12.1% of the major domesticates, which appears much higher than proportions seen at Thameslink sites where chicken was typically 1–3% of the assemblage (Rielly 2020).

Environmental archaeological analysis report, by Rob Batchelor, Lucy Allott and Tom Hill

The following samples were taken for environmental archaeological investigation: (1) monolith sample <18> through Roman fill [2007] of ditch [2008] and dump deposits [2004]/[2003]; (2) charcoal sample <12> from fill [577] of medieval pit [835], and (3) sediment from fill [607] and wall [657] of 18th–19th century cesspit/garderobe [469]. Pollen and charcoal analysis of the samples was undertaken using standard methodologies (Batchelor *et al* 2019).

RESULTS AND INTERPRETATION OF THE POLLEN ANALYSIS

The results of the pollen analysis are shown in table 12 (see *Endnote*).

Fill [2007] of Ditch [2008] and dump deposits [2004]/[2003]

Pollen was recorded in high concentrations in a poor state of preservation in the two samples from monolith <18>. The assemblages are characterised by high values of herbaceous taxa, dominated by dandelions (Lactuceae), grasses (Poaceae) and fat hen (*Chenopodium* type), with carrot family (Apiaceae), daisies (Asteraceae), buttercup/water crowsfoot (*Ranunculus* type), pinks (Caryophyllaceae), black knapweed (*Centaurea nigra*), brassica (*Sinapis* type) and sporadic

occurrences including plantain (*Plantago lanceolata*), sorrel (*Rumex acetosa/acetosella*), clover (*Trifolium* type), meadowsweet (*Filipendula* type) and thistle (*Cirsium* type). Aquatic taxa were absent and only a small number of spores were found from a few ferns, (*Filicales*), polypody (*Polypodium vulgare*) and bracken (*Pteridium aquilinum*). Low values of tree and shrub pollen were also recorded, including most commonly alder (*Alnus*), hazel (*Corylus* type), oak (*Quercus*) and pine (*Pinus*). Microcharcoal fragments were abundant and parasite eggs absent.

The assemblages are indicative of open conditions and plant communities growing on disturbed ground. Damp and/or semi-aquatic conditions are indicated by the presence of alder, grasses and sedges, but these are of limited extent. Any woodland was either of limited extent, representative of hedgerows, or growing at a distance from the site. No inferences can be made about health from the absence of parasite eggs.

Cesspit/garderobe [469]

Pollen was recorded in high concentrations in the fill of the feature (context [607]) but was almost absent from the walls (context [657]). The assemblage from context [607] was almost entirely comprised of herbaceous taxa, dominated by pollen from cereals, with grasses, daisies, dandelion and fat hen also commonly recorded. Other herbs included buttercup, carrot family, cornflower (*Centaurea cyanus*), black knapweed and ribwort plantain (*Plantago lanceolata*). The only shrub taxa recorded were honeysuckle (*Lonicera periclymenum*) and hazel. Aquatics, spores and parasite eggs were absent. Charcoal was recorded in moderate concentrations.

The taxa recorded are largely represented by cereals and their associated weeds (eg cornflower, knapweed, grasses and dandelion), and provides some insight into the diet of the inhabitants of the site during the 18th and 19th centuries. No inferences can be made about health, however, from the absence of parasite eggs.

RESULTS AND INTERPRETATION OF THE CHARCOAL ANALYSIS

Ninety-eight of the charcoal fragments were assigned to a taxonomic identification with two unidentifiable bark fragments also noted. Anatomical structures observed in the charcoal fragments are consistent with the following taxa:

Fagaceae *Fagus sylvatica* L. – beech

Quercus L. sp. – oak

Betulaceae *Betula* sp. L. – birch

Alnus sp. L. – alder

Corylus avellana L. – hazel

Maloideae a sub-family including *Crataegus* sp. – hawthorn; *Malus* sp. – apple; *Pyrus* sp. – pear; *Sorbus* spp. – whitebeam, rowan. These taxa are anatomically similar and one or more may be represented in the assemblage

Aquifoliaceae *Ilex aquifolium* L. – holly

Aceraceae *Acer campestre* L. – field maple

Ulmaceae *Ulmus* sp., – elm

The assemblage was highly diverse and nine taxa or groups of taxa were recorded. Oak wood was the most frequently identified taxon by both fragment count (65) and weight (17.92g), followed by beech (nine frags/3.45g) and Maloideae group taxa (five frags/5.03g). The remaining taxa were relatively equally represented by both fragment counts and weights (table 13: see *Endnote*). Roundwood was moderately common, providing 29% of the assemblage and various sizes from small twigs or branches to larger branch or small stem wood were noted. Complete roundwood fragments of alder, hazel and one oak displayed fewer than fifteen growth rings and measured <2cm in diameter. In the Maloideae and field maple assemblage ring counts were higher, ranging between 20 and 35 rings, although the

overall diameter of these pieces was similar to those with fewer growth rings. This suggests they represent slower-grown, more mature wood. None of the beech roundwood fragments provided ring counts and, based on their ring curvature, they all appear to derive from larger roundwood, perhaps branches or small stems.

Ecological habitats represented in the diverse charcoal assemblage are wide ranging, suggesting several environments were exploited to obtain fuel during the medieval period. Taxa such as oak, hazel, holly, beech, birch and elm can be found in deciduous woodland with some, such as beech and elm, preferring calcareous soils while others are more typically found on acidic soils or are widespread occurring on a range of soil types. Alder thrives in riparian environments and may have been a common component of the local vegetation prior to concerted efforts in the medieval and post-medieval period to drain the marshland for settlement. Birch, field maple and some of the Maloideae group taxa may be indicative of more open vegetation. In addition, many of the trees could have been grown in hedgerows and, in the case of fruit trees such as apple, they may have been cultivated in orchards although these are less likely to have been selected for fuel.

During the medieval period fuel came into London from woodlands in close proximity to the city or from slightly further afield along the Thames (Galloway *et al* 1996). To the south of the river the supply may derive from pockets of woodland stretching down to the Weald and is likely to have arrived as pre-cut lengths in bundles, known as faggots, which were composed of brushwood (*ibid*) or as talwood and billets that comprised larger, heavier pieces of wood typically oak and beech (*ibid*). The mixed assemblage is consistent with domestic fuel waste or waste associated with relatively small or light industries such as bakeries. While oak and beech may have been preferred for the main fuel supply, since both burn exceptionally well (Taylor 1981), the other taxa represented and the prominence of roundwood of varying sizes and maturity certainly supports the evidence for brushwood rather than coppiced wood, which would display more uniformity. The absence of coal further supports the interpretation of domestic or small industrial use as coal was becoming increasingly preferred for heavier industrial purposes for which a steady heat was required. It should be noted that the assemblage within pit fill [577] almost certainly represents an amalgam of fuel waste deposited in the pit and may derive from multiple hearths or other fires that could have been used for several purposes.

Conclusion

The archaeological investigation at the Science Gallery has confirmed the existing topographical model of the area, with the site being situated in a marginal location on the eastern edge of an eyot, consisting of tidal mud flats on the western edge of Guy's Channel. The expansion of Roman Southwark during the late 1st or early 2nd century was reflected by an attempt to first drain and then utilise the area. Despite falling river levels this attempt was not successful and by the late 4th century the area was being flooded again probably due to rising river levels. No further attempts were made to reclaim the area until the late 13th century, activity that was probably connected with the establishment of St Thomas's Hospital. This reclamation attempt was successful and by the 15th century the drainage ditch had been infilled and built over, confirming that later river defences had been constructed further east and by the mid-17th century this stretch of Guy's Channel had been completely infilled. The function of the medieval buildings constructed on the site is uncertain, the presence of cesspits imply they were residential, but it is not possible to determine whether its occupants were part of the hospital's staff or residents or some of the hospital's tenants. As with all monastic institutions this hospital closed during the Reformation and it was one of a small minority of London hospitals that was quickly refounded to provide social care, so the site remained hospital property until 1738, when it was acquired by Guy's Hospital, which continues to provide medical care today.

NOTES

- 1 Museum of London Roman pottery codes (2014) <https://www.mola.org.uk/roman-pottery-codes>; Medieval and post-Roman pottery codes <https://www.mola.org.uk/medieval-and-post-medieval-pottery-codes>; Roman ceramic building material fabric codes. <https://www.mola.org.uk/roman-ceramic-building-material-codes>; Medieval and post-medieval ceramic building materials fabric dating codes <https://www.mola.org.uk/medieval-and-post-medieval-ceramic-building-materials-fabric-dating-codes> (all accessed November 2020).
- 2 Bristol Radiocarbon Accelerator Mass Spectrometry Facility: BRAMS-3509 Uncalibrated date 206 ± 25 BP; calibrated date 1648–1935 cal AD (95.4% probability) (calibration was performed using OxCal software v4.3.2 and the IntCal13 atmospheric calibration curve).

Endnote

The figures, tables, reports and catalogues listed below are available on the Archaeology Data Service website: <https://doi.org/10.5284/1000221>

Select *Surrey Archaeological Collections* volume 104 and the files are listed as supplementary material under the title of the article.

FIGURES

- 19 Science Gallery. Quantification of the Period 2.1 assemblage.
- 20 Science Gallery. Quantification of the Period 3.1 assemblage.
- 21 Science Gallery. Quantification of the Period 3.2 assemblage.
- 23 Science Gallery. Roman graffiti: 1. Rim sherd of a samian dish (Dr. 18/31) with 'IIX' [988]; 2. Rim sherd of a white-slip (VRW) mortarium with '(librae) VI (unciae) IIII' [260].
- 24 Science Gallery. Roman small finds and glass: 1. Ceramic 'factory' lamp SF 33 [721] no 5; 2. Ceramic gaming piece fashioned from a pot base SF 46 [721] no 8; 3. Copper-alloy pelta-shaped mount SF 32 [721] no 17; 4. Copper-alloy foot from a small stand SF 36 [721] no 7; 5. Copper-alloy lid of a small lamp SF 37 [721] no 6; 6. Part of a penannular copper-alloy earring SF 42 [2004] no 3; 7. Copper-alloy finger-ring with spiral bezels SF 45 [2004] no 4; 8. Cut and incised figure decorated glass vessel SF126 [721] glass no 3; 9. Black and red cylindrical glass bead SF 29 [721]; 10. The trefoil rim of a small polychrome glass jug SF 127 [1074] glass no 1; 11. Lead weight with incised mark for 23 ounces SF 47 [1061] no 9.
- 26 Science Gallery. Clay tobacco pipes: 1. AO5 bowl with eight spoke relief stamp, layer [2159]; 2. AO24/OS27 America export type bowl with part of a stamp, layer [2230]; 3. OS22 armorial bowl with Hanoverian Coat of Arms initialled N A, layer [2164]; 4. OS22 armorial bowl with the Hanoverian Coat of Arms and the Prince of Wales's feathers, layer [2231]. Scale 1:1, stamp 2:1.

TABLES

- 1 Distribution of the Roman pottery per site periods.
- 2 Quantification of samian from Periods 2, 3.1, 3.2 and 3.3 by production centre (fabric).
- 3 The maximum number of vessels identified to a specific vessel form by production centre (fabric). All are Dragendorff forms unless stated otherwise.
- 4 The pottery by period (sherd count, ENV and weight).
- 5 Quantification of the assemblage by ware type (sherd count, ENV and weight)
- 6 Initialled 18th century bowls.

- 8 Mandibular tooth eruption and wear.
- 9 Fragment counts of taxa from pit [632].
- 10 Animal bone (by fragment count) from drain [322].
- 12 Results of the pollen analysis of samples from ditch [2008] and cess pit/garderobe [469].
- 13 Charcoal analysis: medieval pit [835] deposit [577], sample <12>.

Summary of the samian, by J M Mills

Graffiti [on pottery], by Roger Tomlin

Roman glass catalogue, by John Shepherd

Roman small finds catalogue, by John Shepherd

Roman coins catalogue, by Murray Andrews

Clay tobacco pipes, by Chris Jarrett

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BIBLIOGRAPHY

- Allason-Jones, L, 1989 *Ear-rings in Roman Britain*, BAR Brit Ser, **201**
- Alonso, J, & Maldonado, S, 2018 Joyas de vidrio de época Romana procedentes de Augusta Emerita y su territorio, in *VIII Encontro de Arqueologia do Sudoeste Peninsular: Encontro de Arqueología del Suroeste Peninsular* (Serpa), 407–32
- Apples, A, & Laycock, S, 2007 *Roman buckles and military fittings*, Witham, Essex: Greenlight Publishing
- Askew, P, with Badham, S, & Humphrey, S, 1999 Excavations at 8 and 10–18 London Bridge Street, *London Archaeol*, **9.2**, 39–46
- Atkinson, D, & Oswald, A, 1969 London clay tobacco pipes, *J Brit Archaeol Assoc*, 3 ser, **32**, 171–227
- Atkinson, D R, & Oswald, A, 1980 The dating and typology of clay pipes bearing the Royal Arms, in P J Davey (ed), *The archaeology of the clay tobacco pipe, III, Britain: the North and West*, BAR Brit Ser, **78**, 363–91
- Batchelor, C R, Allott, L, & Hill, T, 2019 Proposed Science Gallery, Boland House, Guy's Campus, London Borough of Southwark: Environmental Archaeological Analysis Report, Quaternary Scientific (Quest), unpubl rep
- Bates, J, & Minkin, J, 1999 Lafone Street Southwark: prehistoric farming and a medieval bridge, *London Archaeol*, **8.12**, 325–30
- Bekvalac, J, 2007 *St. Thomas' Hospital cemetery summary*, Museum of London (<https://www.museumoflondon.org.uk/collections/other-collection-databases-and-libraries/centre-human-bioarchaeology/osteological-database/post-medieval-cemeteries/st-thomas-hospital-post-medieval> ; accessed February 2017)
- Binford, L, 1981 *Bones ancient man and modern myths*, New York: Academy Press

- Bird, D (ed), 2017 *Agriculture and industry in south-eastern Roman Britain*, Oxford: Oxbow Books
- Bird, J, & Graham, A H, 1978 Gazetteer of Roman sites in Southwark, in J Bird, A Graham, H Sheldon & P Townend (eds), *Southwark Excavations 1972–74*, London Middlesex Archaeol Soc & SyAS Soc Joint Publ, **1**, 517–26
- Blackmore, D, 1990 *Arms & Armour of the English Civil Wars*, Royal Armouries HM Tower of London: Belmont Press
- Bland, R, 1997 Amersham, Buckinghamshire, *Numismatic Chronicle*, **157**, 227
- , 2018 *Coin hoards and hoarding in Roman Britain, AD 43–c. 498*, London: Spink
- Boessneck, J, 1969 Osteological differences between sheep (*Ovis Aries* Linné) and goat (*Capra hircus* Linné), in D R Brothwell & E Higgs (eds), *Science in archaeology*, London: Thames & Hudson, 331–58
- Bowsher, J, 2015 The coins, in L Dunwoodie, C Harward & K Pitt (eds), *An early Roman fort and urban development on Londinium's eastern hill. Excavations at Plantation Place, City of London, 1997–2003*, MOLA Monogr, **65**, 214–39
- Bowsher, J M, 1991 A burnt mound at Phoenix Wharf, south-east London: a preliminary report, in M A Hodder and L H Barfield (eds), *Burnt mounds and hot stones technology: papers from the second International Burnt Mound Conference Sandwell, 12–14 October 1990*, West Bromwich: Sandwell Metropolitan Borough Council, 11–19
- Brigham, T, 1990 The Late Roman waterfront in London, *Britannia*, **21**, 99–183
- Bryan, J, 2013 London Bridge Utilities Diversion Stainer Street and Weston Street, London, SE1: a report on the archaeological watching brief, MOLA, unpubl rep
- Burger, A S, 1966 The Late Roman cemetery at Ságvár, *Acta Archaeologica Academiae Scientiarum Hungaricae*, **18**, 99–235
- Carlin, M, 1996 *Medieval Southwark*, London: Hambledon Press
- Challis, C E, 1992 Lord Hastings to the Great Silver Recoinage, 1464–1699, in C E Challis (ed), *A new history of the Royal Mint*, Cambridge: University Press, 179–397
- Chameroy, J, 1999 Le trésor de bronzes Valentinieniens de Kings Langley (Hertfordshire), *Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz*, **46.2**, 357–411
- Charleston, R J, 1964 Medieval and later glass, in B Cunliffe, *Winchester excavations, 1949–60*, vol 1, Winchester: Museums & Libraries Committee, 145–51
- , 1971 Glass, in S Moorhouse, *Finds from Basing House, Post-Medieval Archaeol*, **5**, 63–70
- Choyke, A, 2006 Bone tools for a lifetime: experience and belonging, in L Astruc, F Bon, V Léa, P-Y Milcent & S Philibert, *Normes techniques et pratiques sociales: de la simplicité des outillages pré-et protohistoriques*, Actes des XXIVe Rencontres Internationales d'archéologie et d'histoire d'Antibes, Antibes: Editions APDCA, 49–60
- Clairmont, C W, 1963 *The excavations at Dura-Europos, Final report 4: Part 5, Glass vessels*, New Haven: Yale University Press
- Clay, R M, 1909 *The medieval hospitals of England*, London: Methuen
- Coombe, P, & Grew, F, with Watson, B, 2017 London fieldwork and publication round-up 2016, *London Archaeol*, **15**, supplement 1
- Cosyns, P, Janssens, K, Vanderlinden, V, & Schalm, O, 2006 Black glass vessels and jewellery in Belgium: production, context analysis, chronology and use, in G Creemers, B Demarsin & P Cosyns (eds), *Roman glass in Germania Inferior: interregional comparisons and recent results. Proceedings of the International conference, held in the Gallo-Romain Museum in Tongeren (13 May 2005)*, Tongeren: Gallo-Romeins Museum, 21–6
- Cowan, C, Seeley, F, Wardle, A, Westman, A, & Wheeler, L, 2009 *Roman Southwark settlement and economy: excavations in Southwark 1973–91*, MoLAS Monogr, **42**
- Cowie, R, & Blackmore, L, with Davis, A, Keily, J, & Rielly, K, 2012 *Lundenwic: excavations in Middle Saxon London, 1987–2000*, MOLA Monogr, **63**
- Culpeper, N, 1653 *The complete herbal*, <http://www.gutenberg.org/files/49513/49513-h/49513-h.htm> (accessed 22 January 2015)
- Davies, B J, Richardson, B, & Tomber, R, 1994 *A dated corpus of early Roman pottery from the City of London*, *Archaeology of Roman London 5*, CBA Res Rep, **98**
- Dawson, G J, 1979 Excavations at Guy's Hospital 1967, *SyAS Res Vol*, **7**, 27–65
- Dennis, G, 1978 1–7 St Thomas Street, in J Bird, A Graham, H Sheldon & P Townend (eds), *Southwark excavations 1972–74*, London Middlesex Archaeol Soc & SyAS Joint Publ, **1**, 291–422
- Doneus, N, 2014 *Das Kaiserzeitliche Gräberfeld von Halbtorn, Burgenland. Teil 1: Archäologie, Geschichte und Grabbrauch*, Monographien des Römisch-Germanischen Zentralmuseums, Mainz, **122.1**
- Douglas, A, 2018 Science Gallery Boland House, Guy's Campus, London SE1. An archaeological assessment, Pre-Construct Archaeology, unpubl rep no R13415
- Drummond-Murray, J, & Thompson, P, with Cowan, C, 2002 *Settlement in Roman Southwark: archaeological excavations (1991–8) for the London Underground Limited Jubilee Line Extension Project*, MoLAS Monogr, **12**
- Edwards, J, & Stephenson, R, 2002 Production and use of tin-glazed wares in late 16th and early 17th century London, in J Veckman, *Majolica and glass; from Italy to Antwerp and beyond*, City of Antwerp: Archaeology Department, 173–85
- Edwards, R, 1974 *London potters circa 1570–1710*, *J Ceram Hist*, **6**
- Egan, G, 1992 Marks on butterpots, in D Gaimster & M Redknap (eds), *Everyday and exotic pottery from Europe c. 650–1900: studies in honour of John G Hurst*, Oxford: Oxbow Books
- , 1997 *Dice*, Finds Research Group 700–1700, Datasheet **23**

- , 2005 *Material culture in London in an age of transition. Tudor and Stuart period finds c 1450–c 1700 from excavations at riverside sites in Southwark*, MoLAS Monogr, **19**
- , 2011 The accessioned finds, in T Dyson, M Samuel, A Steele & S M Wright, *The Chuniac priory and abbey of St Saviour Bermondsey, Surrey: excavations 1984–95*, MoLAS Monogr, **50**, 242–6
- Egan, G, & Forsyth, H, 1997 Wound wire and silver gilt: changing fashions in dress accessories c.1400–c.1600, in D Gaimster & P Stamper (eds), *The age of transition. The archaeology of English culture 1400–1600*, Society Medieval Archaeol Monogr, **15**, Oxbow Monogr, **98**, Exeter, 215–38
- Egan, G, & Pritchard, F, 1991 *Dress accessories c.1150–c.1450*, Medieval finds from excavations in London **3**, London: HMSO
- Egberts, E, 2018 Lithic assessment, in A Douglas, An assessment of an excavation at the proposed Science Gallery, Boland House, Guy's Campus, London Borough of Southwark, Pre-Construct Archaeology, unpubl rep no R13415
- Ellis, S E, & Moore, D T, 1990 The hones, in M Biddle (ed), *Object and economy in medieval Winchester*, Winchester Studies, **7i-ii**, Artefacts from Medieval Winchester, Oxford: Clarendon Press, 868–81
- Fairman, A, 2016 An archaeological evaluation at the proposed Science Gallery London, Boland house, Guy's Campus, London Borough of Southwark. Pre-Construct Archaeology, unpubl rep no R12573
- Fairman, A, Teague, S, & Butler, J, 2020 *Bridging the past: life in medieval and post-medieval Southwark: excavations along the route of Thameslink Borough Viaduct and at London Bridge Station*, Thameslink Monogr, **2**, Oxford Archaeology/Pre-Construct Archaeology
- Fremersdorf, F, 1951 *Figürlich geschliffene Gläser, eine Kölner Werkstatt des 3. Jahrhunderts*, Römische-Germanische Forschungen, **19** (Berlin)
- , 1967 *Die römischen Gläser mit Schliff, Bemalung und Goldauflagen aus Köln*, Die Denkmäler des römischen Köln **8**, Cologne
- Frere, S S, & Tomlin, R S O, 1991 *The Roman inscriptions of Britain: vol 2, Instrumentum Domesticum, Fasc 2*, Stroud: Alan Sutton
- Gaimster, M, 2018 Post-Roman metal and small finds assessment, in A Douglas, An assessment of an excavation at the proposed Science Gallery, Boland House, Guy's Campus, London Borough of Southwark, Pre-Construct Archaeology, unpubl rep no R13415
- , 2020 Metal and small finds, in A Fairman, S Teague & J Butler, *Bridging the past: life in medieval and post-medieval Southwark: excavations along the route of Thameslink Borough Viaduct and at London Bridge Station*, Thameslink Monogr, **2**, Oxford Archaeology/Pre-Construct Archaeology, 477–88
- , in prep The metal and small finds, in D Killock, *Monastic garden to mother's ruin: medieval and later reclamation of the Thames foreshore at Whitefriars, London*, Pre-Construct Archaeology Monogr
- Galloway, J A, Keene, D, & Murphy, M, 1996 Fuelling the City: production and distribution of firewood and fuel in London's region, 1290–1400, *Econ Hist Rev*, **49.3**, 447–72
- Garrard, I P, 1995 The other objects of copper alloy and silver, in K Blockley, M Blockley, P Blockley, S S Frere & S Stow, *Excavations in the Marlowe car park and surrounding areas*, Archaeology of Canterbury, **5**, 1005–63
- Gerrard, J, 2011a New light on the end of Roman London, *Archaeol J*, **168**, 181–94
- , 2011b Romano-British small finds, in A Douglas, J Gerrard & B Sudds, *A Roman settlement and bath house at Shadwell: excavations at Tobacco Dock and Babe Ruth restaurant*, *The Highway, London*, Pre-Construct Archaeology Monogr, **12**, 91–103
- , 2015 Coins, in D Killock with J Shepherd, J Gerrard, K M J Hayward, K Rielly & V Ridgeway, *Temples and suburbs. Excavations at Tabard Square, Southwark*, PCA Monogr, **18**, 140–4
- Goethert-Polaschek, K, 1977 *Katalog der römischen Gläser des Rheinischen Landesmuseums*, Trier: Rheinisches Landesmuseum
- Goffin, R, 1991 A group of pottery from a medieval pit at 223–227 Borough High Street, Southwark, *London Archaeol*, **6:12**, 315–8
- Golding, B, 1819 *An historical account of St Thomas's hospital, Southwark*, London
- Graham, A H, 1988 District heating scheme, in P Hinton (ed), *Excavations in Southwark 1973–76, Lambeth 1973–79*, London Middlesex Archaeol Soc/SyAS, Joint Publ, **3**, 327–54
- Grant, A, 1982 The use of tooth wear as a guide to the age of domestic ungulates, in R Wilson, C Grigson & C Payne (eds), *Ageing and sexing animal bones from archaeological sites*, BAR Brit Ser, **109**, 91–108
- Green, E, 2017 Summary of the watching brief at the Science Gallery, Boland House, Guy's Campus, London SE1, Pre-Construct Archaeology, unpubl rep
- Greenwood, P, & Thompson, A, 1992 Excavation round-up 1991: part 2, Greater London, *London Archaeol*, **6.15**, 415–23
- Hammond, P J & Jarrett, C, 2020 Southwark clay tobacco pipe makers, appendix 2a (<https://library.thehumanjourney.net/5684>; accessed 22 February 2021)
- Harden, D B, 1936 *Roman glass from Karanis found by the University of Michigan archaeological expedition in Egypt 1924–9*, Univ Michigan Stud Humanistic Ser, **4**, Chicago
- , 1970 Ancient glass, II: Roman, *Archaeol J*, **126**, 44–77
- , 1987 *Glass of the Caesars*, Milan: Olivetti
- Harris, S, & Moore, P, 2016 An archaeological watching brief at the proposed Science Gallery London, Boland House, Guy's Campus, London Borough of Southwark, Pre-Construct Archaeology, unpubl rep no R12408

- Heard, K., 2006 The clay pipes, in R Bluer, T Brigham & R Nielsen, *Roman and later development east of the Forum and Cornhill: excavations at Lloyd's Register, 71 Fenchurch Street, City of London*, MoLAS Monogr, **30**, 99–100
- , 2007 Clay tobacco pipes, in D Bowsher, T Dyson, N Holder & I Howell, *The London GuildHall. An archaeological history of a neighbourhood from early medieval to modern times, Part II*, MoLAS Monogr, **36**, 437
- Higgins, D., 2016 Pipes and stoppers from the 1665 wreck of *The London*, Society for Clay Pipe Research Annual Conference Paper
- , 2017 Guidelines for the recovery and processing of clay tobacco pipes from archaeological projects, unpubl document (https://www.academia.edu/34892835/Higgins_-2017_Guidelines_for_Clay_Tobacco_Pipes_from_Archaeological_Projects ; accessed 22 February 2021)
- , in prep Goods for the Colonies: British tobacco pipes made for the Atlantic trade, c. 1600–1850, *Post-Medieval Archaeol*
- Hill, J. & Rowsome, P., 2011 *Roman London and the Walbrook stream crossing: excavations at 1 Poultry and vicinity, City of London*, 2 vols, MOLA Monogr, **37**
- Hinton, P (ed), 1988 *Excavations in Southwark 1973–76, Lambeth 1973–79*, London Middlesex Archaeol Soc/SyAS Joint Publ, **3**
- Hudak, E., 2019 The Roman pottery, in S Maher, An assessment of an archaeological excavation at 56–62 Moorgate and 41–42 London Wall, London EC2, City of London, Pre-Construct Archaeology, unpubl rep no R13700
- Hudak, E. & Jarrett, C., 2018 Clay tobacco pipe assessment, in N Hawkins, Assessment of an archaeological excavation at 116–120 Fenchurch Street, City of London, London EC3M 5DY, Pre-Construct Archaeology, unpubl rep no R13230
- Hutchinson, M., 1996 Edward IV's bulwark: excavations at Tower Hill, London, 1985, *Trans London Middlesex Archaeol Soc*, **47**, 103–44
- Isings, C., 1957 *Roman glass from dated finds*, Groningen: J B Wolters
- Jarrett, C., 2002 The medieval and post-medieval pottery, in C Pickard, An assessment of archaeological excavations at the new Wolfson Wing, King's College London, London Borough of Southwark, SE1, Pre-Construct Archaeology, unpubl rep
- , 2002 Clay tobacco pipe assessment, in D Killock, An archaeological excavation at Whitefriars, Pre-Construct Archaeology, unpubl rep
- , 2005 The clay tobacco pipes, in D Killock & F Meddens, Pottery as plunder, a 17th century maritime site in Limehouse, London, *Post-Medieval Archaeol*, **39.1**, [1–91], 58–60
- , 2006 Assessment of the clay tobacco pipes, in B Suds & R Mattinson, An assessment of archaeological investigations at 56 Southwark Bridge Road, London Borough of Southwark, SE1, Pre-Construct Archaeology, unpubl rep
- , 2007 Assessment of the clay tobacco pipes, in A Haslam, An assessment of an archaeological excavation and watching brief at Ludgate West, 14 Farringdon Street, City of London, London EC4, Pre-Construct Archaeology, unpubl rep
- , 2008 Clay tobacco pipes, in T Bradley & J Butler, *From temples to Thames Street – 2000 years of riverside development. Archaeological excavations at the Salvation Army International Headquarters*, Pre-Construct Archaeology Monogr, **7**, 97–102
- , 2014 Post-Roman Pottery, in A Fairman, C Champness & J Taylor, Thameslink archaeological assessment 10: archaeological excavations at London Bridge Station Improvement Works, London Borough of Southwark, Oxford Archaeology–Pre-Construct Archaeology, unpubl rep
- , 2016a Pottery spot dating index, in S A Harris & P Moore, An archaeological watching brief at the proposed Science Gallery, Boland House, Guy's Campus, London Borough of Southwark, Pre-Construct Archaeology, unpubl rep no R12408
- , 2016b Post-Roman pottery assessment, in A Fairman, An archaeological evaluation at the proposed Science Gallery, Boland House, Guy's Campus, London Borough of Southwark, Pre-Construct Archaeology, unpubl rep no R12573
- , 2016c Post-Roman pottery report, in D Killock, A summary assessment of an archaeological excavation at 127–143 Borough High Street, London Borough of Southwark, London SE1 1NP, Pre-Construct Archaeology, unpubl rep no R12582
- , 2017 Pottery, in N Billson, 71 Newcomen Street, Southwark, SE1 1Y2: an archaeological excavation and monitoring (watching brief), Pre-Construct Archaeology, unpubl rep no R12896
- , 2020 Clay tobacco pipes and production waste, and hair curlers, in A Fairman, S Teague & J Butler, *Bridging the past: life in medieval and post-medieval Southwark: excavations along the route of the Thameslink Borough Viaduct and at London Bridge Station*, Thameslink Monogr, **2**, Oxford Archaeology–Pre-Construct Archaeology, 489–517
- , 2020 Pottery, in A Fairman, S Teague & J Butler, *Bridging the past: life in medieval and post-medieval Southwark. Excavations along the route of the Thameslink Borough Viaduct and at London Bridge Station*, Thameslink Monogr, **2**, Oxford Archaeology–Pre-Construct Archaeology, 359–451
- Jeffries, N, Featherby, R, & Wroe-Brown, R., 2014 'Would I were in an alehouse in London!': a finds assemblage sealed by the Great Fire from Rood Lane, City of London, *Post-Medieval Archaeol*, **48.2**, 261–84
- Kelleher, R. & Leins, I., 2008 Roman, medieval and later coins from the Vintry, City of London, *Numismatic Chronicle*, **168**, 167–233

- Keller, E, 1971 *Die Spätromischen Grabfunde in Südbayern*, Münchner Beiträge zur Vor- und Frühgeschichte, **14**, Munich
- Kenyon, K M, 1959 *Excavations in Southwark, 1945–47*, SyAS Res Pap, **5**
- Killock, D, with Shepherd, J, Gerrard, J, Hayward, K M J, Rielly, K, & Ridgeway, V, 2015 *Temples and suburbs: excavations at Tabard Square, Southwark*, Pre-Construct Archaeology Monogr, **18**
- Knight, H, 2002 *Aspects of medieval and later Southwark: archaeological excavations (1991–8) for the London Underground Limited Jubilee Extension Project*, MoLAS Monogr, **13**
- Lawrence, M J, & Brown, R W, 1973 *Mammals of Britain their tracks, trails and signs*, London: Blandford Press
- Le Cheminant, R, 1981 *Armorial from Paul's Wharf*, in P Davey (ed), *The archaeology of the clay tobacco pipe, VI. Pipes and kilns in the London region*, BAR Brit Ser, **97**, 102–26
- Lloyd-Morgan, G, 1994 *Copper-alloy objects excluding brooches*, in S Cracknell & C Mahany (eds), *Roman Alcester: southern extramural area 1964–1966 excavations: Part 2: finds and discussion*, CBA Res Rep, **97**, 177–94
- Locker, A, 1988 *The animal bone*, in P Hinton (ed), *Excavations in Southwark 1973–76, Lambeth 1973–79*, London Middlesex Archaeol Soc/SyAS Joint Publ, **3**, 427–42
- Lyne, M, 2002 *Roman pottery*, in R Taylor-Wilson, *Excavations at Hunt's House, Guy's Hospital, London Borough of Southwark*, Pre-Construct Archaeology Monogr, **1**, 49–50
- Lyne, M, & Jefferies, R S, 1979 *The Alice Holt/Farnham Roman pottery industry*, CBA Res Rep, **30**
- MacGregor, A, 1985 *Bone, antler, ivory and horn. The technology of skeletal materials since the Roman period*, London & Sydney: Croom Helm
- MacGregor, A, 2001 *Antler, bone and horn*, in J Blair & N Ramsay (eds), *English medieval industries*, London: Hambledon Press, 355–78
- Maloney, C, 2009 *Fieldwork round-up 2008*, *London Archaeol*, **12**, supplement 2, 45–81
- Maltby, M, 1979 *The animal bones from Exeter 1971–1975*, Exeter Archaeol Rep, **2**, Sheffield
- , 2017 *The exploitation of animals and their contribution to urban food supply in Roman southern England*, in D Bird (ed), *Agriculture and industry in south-eastern Roman Britain*, Oxford: Oxbow Books, 180–210
- Marsden, P, 1965 *A boat of the Roman period discovered on the site of New Guy's House, Bermondsey, 1958*, *Trans London Middlesex Archaeol Soc*, **21**, 118–31
- Mees, A, 1995 *Modellsignierte Dekorationen auf südgallischer Terra Sigillata*, Stuttgart: Theiss
- Milne, G, 1986 *The Great Fire of London*, New Barnet: Historical Publications
- Mitchiner, M, 1988 *Jetons, medalets & tokens: the medieval period and Nuremberg, volume one*, London: Seaby
- Moore, S, 1999 *Cutlery for the table: a history of British table and pocket cutlery*, Sheffield: The Hallamshire Press
- Moorhead, S, 2001 *Roman coin finds from Wiltshire*, in P Ellis (ed), *Roman Wiltshire and after. Papers in honour of Ken Annable*, Devizes: Wiltshire Archaeological Society, 85–105
- , 2008 *Newton Abbot, Devon*, *Numismatic Chronicle*, **168**, 394
- MPRG, 2016 *A standard for pottery studies in archaeology*, Medieval Pottery Research Group on behalf of the Prehistoric Ceramics Research Group, the Study Group for Roman Pottery and the Medieval Pottery Research Group, Historic England
- Museum of London, [nd] *Clay tobacco pipe makers' marks from London*, (<http://archive.museumoflondon.org.uk/claypipes/index.asp> ; accessed 28 January 2020)
- Noël-Hume, I, 1957 *Medieval bottles from London*, *The Connoisseur* (March 1957), 104–8
- Oswald, A, 1975 *Clay pipes for the archaeologist*, BAR Brit Ser, **14**
- Oswald, F, 1936–1937 *Index of figure-types on terra sigillata ('samian ware')*, Liverpool: University Press
- PAS: Portable Antiquities Scheme database (<https://finds.org.uk/database/search>)
- Payne, S, 1973 *Kill-off patterns in sheep and goats: the mandibles from Asvan Kale*, *Anatolian Studies*, **23**, 281–303
- Pearce, J, 2002 *The 13th- to 15th-century pottery*, in E Howe, *Roman defences and medieval industry: excavations at Baltic House, City of London*, MoLAS Monogr, **7**, 70–4
- , 1992 *Border wares, post-medieval pottery in London, 1500–1700, Vol 1*, London: HMSO
- , 2011 *Note on clay tobacco pipes from LBZ10*, MOLA, unpubl rep
- , 2015 *Medieval and post-medieval pottery*, in L Casson, J Drummond-Murray & A Francis, *Romano-British round houses to medieval parish: excavations at 10 Gresham Street, City of London, 1999–2002*, MOLA Monogr, **67**, 174–8
- Pearce, J, & Vince, A, 1988 *A dated type-series of London medieval pottery, Part 4: Surrey Whitewares*, London Middlesex Archaeol Soc Spec Pap, **10**
- Peaucelle, J L, & Manin, S, 2006 *Billettes and the economic viability of pin-making in 1700*, in *Eleventh World Congress of Accounting Historians, July 2006, Nantes* (<https://hal.univ-reunion.fr/hal-01404345/document> ; accessed 5 August 2021)
- Penades, L, 2018 *Summary report of a watching brief at The Science Gallery London and Guy's Bar/The Spit, Boland House, Guy's Campus*, Pre-Construct Archaeology, unpubl rep
- Perez-Sala, M, & Shepherd J, 2009 *The glass culet assemblage*, in N Bateman, C Cowan & R Wroe-Brown, *London's Roman amphitheatre: excavations at the Guildhall*, MoLAS Monogr, **25**, 202–7
- Philp, B, 1981 *The excavation of the Roman forts of the Classis Britannica at Dover 1970–1977*, Kent Monogr, **3**
- Porter, R, 1994 *London, a social history*, London: Hamish Hamilton
- Price, J, 1978 *Trade in glass*, in J du Plat Taylor & H Cleere (eds), *Roman shipping and trade: Britain and the Rhine provinces*, CBA Res Rep, **24**, 70–8

- Pritchard, F, 1991 Small finds, in A Vince (ed), *Aspects of Saxo-Norman London: II. Finds and environmental evidence*, London Middlesex Archaeol Soc Spec Pap, **12**, 120–278
- Proctor, J, & Bishop, B, 2002 Prehistoric and environmental development on Horsleydown: excavations at 1–2 Three Oak Lane, *SyAC*, **89**, 1–26
- Prummel, W, 1987 Atlas for the identification of foetal elements of cattle, horse, sheep and pig, Part 2, *Archaeozoologia*, **1.2**, 11–41
- Rayner, L, & Seeley, F, 2009 The pottery, in C Cowan, F Seeley, A Wardle, A Westman & L Wheeler, *Roman Southwark settlement and economy: excavations in Southwark 1973–91*, MoLAS Monogr, **42**, 206–29
- Reilly, L, 1998 *Southwark: an illustrated history*, London: London Borough of Southwark
- Rhodes, M, 1991 The Roman coinage from London Bridge and the development of the City and Southwark, *Britannia*, **22**, 179–90
- Ricken, H, & Fischer, C, 1963 *Die Bilderschüsseln der römischen Töpfer von Rheinzabern. Textband mit Typenbildern zu Katalog VI der Ausgrabungen von Wilhelm Ludowici in Rheinzabern 1901–1914*, Materialien zur römisch-germanischen Keramik, **7**, Bonn
- Riddler, I D, 2009 Ivory working, in E Shepherd Popescu, *Norwich Castle: excavations and historical survey, 1987–98. Part II: c 1345 to modern*, *E Anglian Archaeol*, **132**, Gressenhall: NAU Archaeology and Norfolk Historic Environment, 882
- Ridgeway, V, with Butler, J, 1999 Prehistoric finds at Hopton Street in Southwark, *London Archaeol*, **9.3**, 72–6
- Ridgeway, V, Taylor, J, & Biddulph, E, 2019 *A bath house, settlement and industry on Roman Southwark's North Island: excavations along the route of Thameslink Borough Viaduct and at London Bridge Station*, Thameslink Monogr, **1**, Oxford Archaeology–Pre-Construct Archaeology
- Rielly, K, 2009 Animal bone assessment, in D Killock, Tabard Square, 34–70 Long Lane & 31–47 Tabard Street, London Borough of Southwark: assessment of an archaeological excavation. Pre-Construct Archaeology, unpubl rep
- , 2014 Animal bone assessment, in A Fairman, C Champness & J Taylor, Thameslink Archaeological Assessment 10: archaeological excavations at London Bridge Station Improvement Works, London Borough of Southwark, Oxford Archaeology–Pre-Construct Archaeology, unpubl rep
- , 2019 Animal bones, in V Ridgeway, J Taylor & E Biddulph, *A bath house, settlement and industry on Roman Southwark's North Island: excavations along the route of Thameslink Borough Viaduct and at London Bridge Station*, Thameslink Monogr, **1**, Oxford Archaeology–Pre-Construct Archaeology, 403–28
- , 2020 Animal bone, in A Fairman, S Teague & J Butler, *Bridging the past: life in medieval and post-medieval Southwark: excavations along the route of the Thameslink Borough Viaduct and at London Bridge Station*, Thameslink Monogr, **2**, Oxford Archaeology–Pre-Construct Archaeology, 579–617
- Roberts, H, & Godfrey, W H (eds), 1950 *Survey of London, Volume 22, Bankside (The parishes of St Saviour and Christchurch Southwark)*, London: London County Council
- Rogers, G B, 1974 *Poteries Sigillées de la Gaule Centrale I. – Les motifs non figurés*, Supplément à Gallia XXVIII, Paris: CNRS Editions
- Rowson, P, 2008 Mapping Roman London: identifying its urban patterns and interpreting their meaning, in J Clark, J Cotton, J Hall, R Sherris & H Swain (eds), *Londinium and beyond: essays on Roman London and its hinterland for Harvey Sheldon*, CBA Res Rep, **156**, 25–32
- Schmid, E, 1972 *Atlas of animal bones*, London: Elsevier Press
- Schofield, J, 1995 *Medieval London houses*, Newhaven: Yale University Press
- Schofield, J, Blackmore, L, & Pearce, J, with Dyson, T, 2018 *London's waterfront 1100–1666: excavations in Thames Street, London, 1974–84*, Oxford: Archaeopress
- Seddon B, 2017 Post-Roman pottery assessment, in A Haslam, Brandon House, 170–194 Borough High Street, London SE1: an archaeological assessment, Pre-Construct Archaeology, unpubl rep no R12804
- Serjeantson, D, & Cohen, A, 1996 *A manual for the identification of the bird bones from archaeological sites*, London: Archetype Publications Ltd
- Sheldon, H, 1972 Excavations at Parnell Road and Appian Road, Old Ford E3, *Trans London Middlesex Archaeol Soc*, **23.2**, 101–47
- Shepherd J, 1990 The glass, in J C Driver, J Rady & M Sparks, *Excavations in the Cathedral Precincts, 2 Linacre Garden, 'Meister Ormers' and St Gabriel's Chapel*, Archaeol Canterbury, **4**, 206–17
- , 1995 The glass vessels, in K Blockley, M Blockley, P Blockley, S S Frere & S Stow, *Excavations in the Marlowe car park and surrounding areas*, Archaeol Canterbury, **5**, 1227–59
- , 2018 Glass assessment, in A Douglas, Science Gallery, Boland House, Guy's Campus, London SE1: an archaeological assessment, Pre-Construct Archaeology, unpubl rep no R13415
- , in prep The Guildhall Yard cullet dump: a closer look
- Sidell, E J, 2003 Holocene sea level change and archaeology in the inner Thames estuary, London, UK, Durham theses, Durham University (available at Durham E-Theses [http://etheses.dur.ac.uk/1415/2/1415_v2.pdf?ETHOS%20\(BL\)](http://etheses.dur.ac.uk/1415/2/1415_v2.pdf?ETHOS%20(BL))); accessed November 2020)
- Silver, I, 1969 The ageing of domestic animals, in D R Brothwell & E Higgs (eds), *Science in archaeology*, London: Thames & Hudson, 283–302
- Smith, R W, 1957 *Glass from the ancient world. The Ray Winfield Smith Collection*, New York: Corning Museum of Glass

- Spitzers, T A, 1997 Late medieval bone-bead production: socio-economic aspects on the basis of material from Constance, Germany, in G De Boe & F Verhaeghe (eds), *Papers of the Medieval Europe Brugge 1997 Conference, Volume 7, Material Culture in Medieval Europe*, Asse-Zellik, 147–54
- Stanfield, J A, & Simpson, G, 1990 *Les potiers de la Gaule Centrale*, Revue Archéologiques Sites, Hors-série no **37**, Gonfaron
- Stephenson, R, 1997 The pottery, in G Malcolm, Excavations at Island Site, Finsbury Pavement, London EC2, *Trans London Middlesex Archaeol Soc*, **48**, 44–9
- Sudds, B, 2018 Post-Roman pottery assessment, in A Douglas, Science Gallery, Boland House, Guy's Campus, London SE1: an archaeological assessment. Pre-Construct Archaeology, unpubl rep no R13415
- Sudds, B, & Jarrett, C, 2009 Post-Roman pottery assessment, in D Killock, Tabard Square, 34–70 Long Lane & 31–47 Tabard Street, London Borough of Southwark: assessment of an archaeological excavation, Pre-Construct Archaeology, unpubl rep
- Swain, H, 1988 Gazetteer of sites, in P Hinton (ed), *Excavations in Southwark 1973–76, Lambeth 1973–79*, London Middlesex Archaeol Soc/SyAS Joint Publ, **3**, 479–88
- Sykes, N, 2007 Animal bones and animal parks, in R Liddiard (ed), *The medieval deer park: new perspectives*, Macclesfield: Windgather Press, 49–62
- 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), MoLAS, unpubl document
- , 2005 Pottery, in B Yule, *A prestigious Roman building complex on the Southwark waterfront, Excavations at Winchester Palace, London, 1983–90*, MoLAS Monogr, **23**, 101–3
- Symonds, R, & Tomber, R, 1991 Late Roman London: an assessment of the ceramic evidence from the City of London, *Trans London Middlesex Archaeol Soc*, **42**, 59–99
- Taylor, J, 2014 Archaeological desk-based assessment of the proposed Science Gallery, Boland House, Guy's Campus, London Borough of Southwark, Pre-Construct Archaeology, unpubl rep no R11907
- Taylor, M, 1981 *Wood in archaeology*, Shire Archaeology, **17**, Aylesbury: Shire Publications Ltd
- Taylor-Wilson, R, 2002 *Excavations at Hunt's House, Guy's Hospital, London Borough of Southwark*, Pre-Construct Archaeology Monogr, **1**
- Taylor-Wilson, R H, 1990 Preliminary report on the excavations carried out in advance of the Guy's Hospital phase 3 development, Museum of London, Department of Greater London Archaeology (Southwark and Lambeth), unpubl rep
- Thomas, C, Sloane, B, & Phillpotts, C, 1997 *Excavations at the Priory and Hospital of St Mary Spital, London*, MoLAS Monogr, **1**
- Thompson, A, Grew, F, & Schofield, J, 1984 Excavations at Aldgate, City of London, 1974, *Post-Medieval Archaeol*, **18**, 1–148
- Thompson, A, Westman, A, & Dyson, T, 1998 *Archaeology in Greater London 1965–90: a guide to records of excavations by the Museum of London*, London: Museum of London
- Tucker, F, 2007 Kill or cure? The osteological evidence of the mercury treatment of syphilis in 17th- to 19th-century London, *London Archaeol*, **11.8**, 220–4
- Tyers, I, 1988 The prehistoric peat layers (Tilbury IV), in P Hinton (ed), *Excavations in Southwark 1973–76, Lambeth 1973–79*, London Middlesex Archaeol Soc/SyAS Joint Publ, **3**, 5–12
- von den Driesch, A, 1976 *A guide to the measurement of animal bones from archaeological sites*, Harvard: University Press
- Walker, S, 1981 The clay pipe industry of the parish of St Olave's Southwark, in P Davey (ed), *The archaeology of the clay tobacco pipe. VI. Pipes and kilns in the London region*, BAR Brit Ser, **97**, 173–82
- Watson, B, 2009 Saxo-Norman Southwark: a review of the archaeological and historical evidence, *London Archaeol* **12.6**, 147–52
- Watson, B, Brigham, T, & Dyson, T, 2001 *London Bridge: 2000 years of a river crossing*, MoLAS Monogr, **8**
- Whipp, D, 2006 *The medieval postern gate by the Tower of London*, MoLAS Monogr, **29**
- Willemsen, A, 2012 'Man is a sack of muck girded with silver': metal decoration on late-medieval leather belts and purses from the Netherlands, *Medieval Archaeol*, **56**, 171–202
- Wilson, B, & Edwards, P, 1993 Butchery of horse and dog at Witney Palace, Oxfordshire, and the knacker and feeding of meat to hounds during the post-medieval period, *Post-Medieval Archaeol*, **27**, 43–56
- Young, C, 1977 *The Roman pottery industry of the Oxford region*, BAR Brit Ser, **43**
- Yule, B, 2005 *A prestigious Roman building complex in the Southwark waterfront: excavations at Winchester Palace, London 1983–90*, MoLAS Monogr, **23**