The prehistoric, Roman and later landscape between Watling Street and Bermondsey Eyot: investigations at Rephidim Street and Hartley’s Jam Factory, Bermondsey

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Archaeological investigations at two adjacent redevelopment sites in Bermondsey provided evidence for the evolving Holocene landscape and drainage in a former valley between Bermondsey Eyot and the mainland. The sites at Rephidim Street and the former Hartley’s Jam Factory, respectively investigated in 1976–7 and 2000–3, covered an area extending from Tabard Street to Rothsay Street.

The origin of the valley was a broad (c. 150m wide) shallow channel in the Pleistocene gravel. Initially much of the channel bed was covered by shallow flowing water, although gravel bars within the channel probably supported vegetation. Gradually the channel silted up, and by the Bronze Age the margins of the valley were dry enough for water meadows to form, with a backwater fringed by marshy sedge fen in its central part. During the Late Iron Age or early Roman period a freshwater stream exploited the southern margins of the valley. Its re-activation may have been caused by increased run-off from adjacent land, possibly caused by land clearance and drainage. This would accord with the presence of Roman ditches next to Watling Street on the south-west side of the valley. Significantly, the tidal Thames appears to have had little effect on the stream, suggesting that the north-west end of the valley was blocked off by a neck of land connecting the eyot to the mainland. In other words Bermondsey Eyot was a peninsula rather than an island.

There was no clear evidence for medieval activity in the area, and it seems likely that during the Middle Ages much of the valley would have been water meadow. Measures to improve the land began in the 16th century with the extensive dumping of earth to raise ground level. Early maps show that the two sites were farmland in the 18th century, but were gradually developed for housing and industrial use in the 19th century. Archaeological evidence for industrial activity mainly comprised the remains of Victorian tanning pits in areas adjacent to Rothsay Street and the basement of an early 20th century building associated with the jam factory.

Introduction

This report describes the results of archaeological work carried out during the redevelopment of two contiguous sites, Rephidim Street (site code RS76) and the former Hartley’s Jam Factory (GEN00), located about 150m to the north of the Bricklayer’s Arms roundabout (fig 1). Together the sites comprise a study area of about 27,000m².

The report incorporates material from unpublished reports by the recorders of the respective sites (Cowie 2003; Cowie & Corcoran 2003; Hammerson nd). Those parts dealing with the analyses and interpretation of environmental evidence are principally by Jane Corcoran but include contributions by Nigel Cameron, Anne Davis and Alan Pipe on diatoms, plant remains and animal remains respectively. Other sections are mainly by Robert Cowie, but include contributions by Lyn Blackmore, Jackie Keily and Terence Paul Smith on pottery, accessioned finds and ceramic building material respectively. The site archives are held by the Museum of London under their respective site codes.

The first archaeological work in the locality was a watching brief and excavation undertaken on the site of Rephidim Street from October 1976 to March 1977 by the Southwark and Lambeth Archaeological Excavation Committee (hereafter SLAEC) under the direction of Michael Hammerson. The site encompassed a large irregular plot extending...
east from Tabard Street to the east side of Rothsay Street (TQ 32990 79240). It took its name from Rephidim Street, which was replaced during the redevelopment by a housing estate built around the reconfigured roads of Potier Street, Prioress Street and Rothsay Street. The site lay immediately to the east of the projected line of Watling Street. The main purpose of the archaeological fieldwork was to monitor the machine excavation of foundation trenches for new housing blocks (fig 2; Blocks 2–7, 9). During this project evidence for a broad shallow natural channel was recorded to the north-east of the projected route of Watling Street. In addition, a number of Roman ditches were found between the channel and the Roman road.

Further evidence for the channel was found at the Hartley’s Jam Factory during fieldwork undertaken intermittently from November 2000 to June 2003 by the Museum of London Archaeology Service (hereafter MoLAS). This site formed a trapezoidal block bounded by Alice Street, Prioress Street and Rothsay Street, with its entrance at the north end of Green Walk (TQ 33070 79240). Its redevelopment included the conversion of the three former factory buildings (fig 2; Blocks A, B and C) to luxury flats and the construction of a new building (fig 2; Block D).

Initially, a watching brief was undertaken in and around Blocks A and B to monitor excavations for crane bases and new foundations, drains and plant rooms. Monitoring continued sporadically until March 2003, by which time information about the underlying palaeochannel had been recorded in twelve areas across the site (fig 2; Areas 1–12). These observations were followed in June 2003 by the archaeological excavation of a trench (fig 2; Area 13) on the proposed site of Block D, which obtained detailed environmental and
topographical information from a cross-section roughly at a right angle to the projected course of the palaeochannel.

Geology and topography

The sites lay on Pleistocene gravel, mapped by the British Geological Survey (1998) as belonging to the Kempton Park River Terrace (the first terrace above the flood plain) of the Thames (fig 3). They straddled the valley of a relict channel that at one time ran between the mainland to the south-west and Bermondsey Eyot to the north-east. The eyot (from the Old English ēg, meaning island or land partly surrounded by water or marsh) was either a gravel island or more probably a peninsula, of about 2km², with the gravel surface rising to +2.20m OD. Early maps of the area suggest the valley formed part of the drainage system feeding the watercourse known as Earl’s Sluice, which joined the Thames at Deptford (Barton 1992, 54).

For much of the Holocene the sites lay on the southern fringes of the wetland environment of the river Thames, where a network of watercourses flowed through a diverse and evolving landscape comprising low gravel islands, fen, mudflats and channels. The complex history of the natural topography of this area, which today comprises north Southwark and Bermondsey, has been the subject of a number of studies based on data from borehole surveys and archaeological fieldwork (Allen et al 2005; Graham 1978; Heard et al 1990; Milne et al 1983; Sidell et al 2000; 2002; Yule 1988).
Archaeological and historical background

PREHISTORIC

Much evidence for prehistoric activity has been recovered from excavation sites on the eyots of Southwark, including Bermondsey Eyot and Horsleydown Eyot to the north (see Drummond-Murray et al 1994; Heard 1996; Sidell et al 2002). The nearest of these investigations to the site include Alscott Road (ARD93), where two parallel ditches produced Neolithic and Bronze Age struck flints (Heard 1996, 78) and Bermondsey Abbey, Long Walk/Abbey Street, where a sizeable assemblage of Mesolithic–Bronze Age struck flints and Bronze Age–Iron Age pottery was found (Sidell et al 2002, 40–2).

Wooden structures on the southern edge of the Bermondsey Eyot at the Bricklayer’s Arms (Sidell et al 2002) and a Bronze Age trackway at Bramcote Grove (Thomas & Rackham 1996) show that the prehistoric settlers were utilising the wetland areas, as well as the drier islands, where ardmarks found on various sites in the vicinity attest to cultivation (fig 4).
The sites lay about 0.75km south-east of the Roman settlement in north Southwark (Sheldon 2000) and on the east side of Watling Street, which runs roughly parallel to and between Great Dover Street and Tabard Street (Mackinder 2000, 5–7). This major road between London and Canterbury continued to be an important route during the Saxon and medieval periods.

Roman burials have been found nearby, mainly alongside Watling Street at sites such as Deverel Street, Long Lane, Tabard Gardens and 165 Great Dover Street (Hall 1996, 75–9, 83; Mackinder 2000). Two inhumations were also found on Bermondsey Eyot during excavations at the former Trocette Cinema, Tower Bridge Road (Steele 1998). At three sites to the west of Bricklayer’s Arms roundabout, Aberdour Street, 6–12 Leroy Street (LER91) and behind 63–71 Old Kent Road (ROY91) there was evidence for Roman ditches and a masonry structure that could have been a temple or funerary monument alongside the Roman road. In 2005–6, excavations at Bermondsey Square revealed Roman pottery and structural features (BYQ98; Alistair Douglas, pers comm).

Evidence for agricultural activity has been found close to the sites in areas that were slightly higher (and drier). For example, a number of ditches, which may have served as field boundaries and drainage channels, have been recorded during excavations at sites such as Cardinal Bourne Street (CBS77) and the Trocette site. To the north and east of the site, evidence for Roman activity has also been recorded at Long Lane and Grange Road (GGA92).

Fig 4 Rephidim Street and Hartley’s Jam Factory, Bermondsey: current model of local topography, based on archaeological data.
SAXON AND MEDIEVAL

There is little evidence for Saxon activity in the locality. The few finds of this date include residual Middle Saxon artefacts from Long Walk (BA84) and Early to Late Saxon pottery from Bermondsey Square (BYQ98; Alistair Douglas, pers comm), about 300m to the north-east of the site, which indicate the presence of a settlement on Bermondsey Eyot. This accords with documentary evidence suggesting the existence of an abbey at Bermondsey in the early 8th century (Blair 1991, 95, 102). In the Late Saxon period a *burh* was established in Southwark, probably on the site of the Roman settlement.

During the medieval period the sites lay a short distance to the south of settlements in north Southwark and Bermondsey. The development of Bermondsey in the Middle Ages was largely due to the presence of a monastery on Bermondsey Eyot (Carlin 1996, 30–1). This religious house, which began as a Cluniac priory in 1082, became the Benedictine abbey of St Saviour in 1399 (Knowles & Hadcock 1971, 98; *VCH*, 2, 64–77). Its precinct wall lay less than 100m to the east of the sites. The abbey was dissolved in 1538, and the remains of its church, infirmary, precinct wall and other buildings have been recorded during surveys and excavations (Beard 1986; Grimes 1968, 210–17; Martin 1926; Steele 1998; in prep). The most recent excavations on the site of the abbey revealed parts of the south-west tower and south wall of the church, and ranges to the south (BYQ98; Gaimster et al 2006, 315–17).

Documentary evidence suggests that at this time much of the locality was poorly drained and prone to inundation despite the construction of dykes and banks as flood defences. Indeed, the frequent flooding of abbey land in Bermondsey during the 13th and 14th centuries impoverished the monastery (*VCH*, 2, 68, 70, 72). The existence of streams in Bermondsey at this time is indicated by local place-names (*VCH*, 4, 17–18). Their presence encouraged the growth of various local industries during the medieval and post-medieval periods, notably milling, brewing, tanning and cloth manufacture (Carlin 1996, 55–7, 184–9; *VCH*, 4, 18).

POST-MEDIEVAL

At the beginning of this period much of the valley on the south-west side of Bermondsey Eyot was probably water meadow, but during the 16th and 17th centuries measures were taken to improve the land by drainage and raising the ground level. By the 1740s the area of the sites had been divided into fields, around which flowed a rectilinear network of ditches and sluices into which local streams had been channelled. As Bermondsey grew during the 19th century the sites were gradually developed for housing and industrial use.

**Methodology**

**REPHIDIM STREET**

Fieldwork at Rephidim Street mainly entailed rapidly recording strata briefly exposed in machine-excavated foundation trenches. However, a limited excavation was undertaken over a weekend in Block 9 on the east side of Tabard Street.

The work was carried out under extremely difficult conditions and was hampered by limited time for recording, by the depth and narrowness of the trenches and adverse weather. This may have affected the accuracy of records, which mainly comprise notes, lists of spot-heights and hastily sketched plans and sections. For example, the recorded locations of some foundation trenches, especially in Blocks 2, 6 and 7, do not coincide with the completed buildings shown on OS maps. As it is known that the trenches were not repositioned during building work (M Hammerson, pers comm) the discrepancy must be due to survey error. Therefore the trench locations on the published plans have been amended so that they more closely correspond to the completed buildings.
FORMER HARTLEY'S JAM FACTORY

All archaeological work at the Hartley's Jam Factory was undertaken in accordance with methods described in the Museum of London's *Archaeological Site Manual*. Deposits in Areas 6 and 13 were examined geoarchaeologically (by Jane Corcoran) and were sampled with monolith tins for microfossil examination, radiocarbon dating and sediment analysis and with bulk samples taken adjacent to the tins to recover remains of plants, insects, snails, ostracods, fish and other vertebrates (fig 6).

**Bulk samples**

The bulk samples were processed by flotation, using a Siraf flotation tank with meshes of 0.25mm and 1.00mm to catch the flot and residue respectively. Residues were dried and flots were kept wet. Both were scanned under a low-powered binocular microscope. The residues were sorted for artefacts, mollusc shells, fish bone and ostracod valves. A record was made of the most abundant and significant plant macrofossils and any invertebrate remains and artefacts in the flots. Mollusc shells and ostracod valves were identified with reference to Cameron & Redfern (1978), Henderson (1990) and Macan (1977). Fish bones were identified by comparison with the MoLSS Environmental Archaeology Section reference collection, and interpreted with reference to Wheeler (1978) and Wheeler & Jones (1989).

**Diatoms**

A diatom assessment was carried out on eight sediment samples, which were prepared by standard techniques and scanned at magnifications of x400 and x1000 under phase contrast illumination (Cameron 2005). Diatoms were present in five samples (table 1), and were identified with reference to Hartley et al (1996), Hendey (1964) and Krammer & Lange-Bertalot (1986–91). Salinity preferences of diatoms were assessed using the classification data in Denys (1992) and the halobian groups of Hustedt (1953; 1957, 199).

**Radiocarbon dating**

Radiocarbon dates were obtained from samples of organic sediment and peat by Beta Analytic Radiocarbon Dating Laboratory, Miami, Florida (table 2). The calibrated date ranges were calculated using *INTCAL 98* with reference to Stuiver & van der Plicht (1998), Stuiver et al (1998) and Talma & Vogel (1993).

Table 1 Diatom assessment results. Samples from contexts 114, 115 and 120 are from the central part of Area 13; samples from contexts 107, 116 and 119 are from the south-west end of Area 13

<table>
<thead>
<tr>
<th>Context</th>
<th>m OD</th>
<th>Diatom concentration</th>
<th>Quality of preservation</th>
<th>Habitat/type</th>
</tr>
</thead>
<tbody>
<tr>
<td>114</td>
<td>-0.15</td>
<td>Not present</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>115</td>
<td>-0.05</td>
<td>Very low</td>
<td>Poor</td>
<td>Single sp. freshwater non-planktonic</td>
</tr>
<tr>
<td>115</td>
<td>0.05</td>
<td>Not present</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>120</td>
<td>0.15</td>
<td>Very low</td>
<td>Very poor</td>
<td>Single sp. freshwater aerophile</td>
</tr>
<tr>
<td>107</td>
<td>-0.40</td>
<td>Not present</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>107</td>
<td>-0.25</td>
<td>Very low</td>
<td>Very poor</td>
<td>Single sp. freshwater non-planktonic</td>
</tr>
<tr>
<td>116</td>
<td>0.05</td>
<td>Low</td>
<td>Poor</td>
<td>Mainly non-planktonic species of shallow freshwater, with some fragments of the estuarine species</td>
</tr>
<tr>
<td>119</td>
<td>0.10</td>
<td>Low</td>
<td>Poor</td>
<td>Mainly shallow freshwater non-planktonic with two taxa associated with the Thames Estuary also present – one a (brackish) planktonic diatom the other a non-planktonic marine genus</td>
</tr>
</tbody>
</table>
The evidence

PLEISTOCENE GRAVEL AND THE CHANNEL

The earliest deposits revealed on both sites comprised Pleistocene sand and gravel, either belonging to the Kempton Park River Terrace or reworked at the end of the last glacial stage and thus belonging to the Shepperton Gravels, which underlie the modern flood plain of the Thames. The height of the gravel across the site was plotted from levels obtained from the archaeological investigations and from borehole surveys (fig 5). The levels indicated the presence of a shallow south-west to north-east channel about 150m wide. The channel bed is uneven, and its deepest part lies at –0.82m OD, beneath the north end of Prioress Street. The surface of the gravel gradually slopes upwards to the south-west (towards what would have been the Surrey shore), rising above Ordnance Datum in the middle of Block 7, to about +1.05m at the Tabard Street frontage (Hammerson nd, 8). The gravel also rises to the north-east (towards Bermondsey Eyot), reaching heights between +0.16m and +0.35m OD in Areas 4 and 3 respectively and up to +0.97m OD on the north-east side of Rothsay Street.

Part of the channel bed in Block 7 was noticeably deeper than the adjacent bed. This anomaly possibly represented the confluence of a small stream with the main channel (Hammerson nd, 6). Several other tributary streams also appear to drain into the main channel area from the higher ground either side (fig 5). The channel probably formed at the end of the last glacial stage, c 10,000–15,000 years ago, at roughly the same time as the scouring-out of the present valley floor of the Thames. However, the watercourse that subsequently flowed through it during the Holocene would have been a ‘mis-fit’ stream exploiting a valley it had not itself formed.

Until the 16th century the deposits that accumulated in the valley appear mainly to have comprised alluvium and possibly colluvium, and mostly consisted of silt and clay. These sediments, and the environmental remains preserved within them, reflect changes in the local landscape over the period of deposition. Unlike most archaeological deposits, which represent discrete events, natural deposits such as these are likely to have built up gradually across an area, and would have been accumulating in some parts of the channel at the same time as different deposits were replacing them elsewhere. This reflects the natural process of landscape evolution when environments migrate across a landscape as controlling conditions change. Significantly, this means that dating a deposit in one location will not necessarily provide a date for its accumulation elsewhere.

During the Rephidim Street project undated channel fills were recorded in Blocks 1–8, where they were simply described as clay, owing to constraints on time available for excavation (see methodology), the surface of which lay between +0.50m and +0.60m OD. ‘Earth’ containing Roman pottery covered the clay. Geoarchaeological examination of the channel fills at the Hartley’s Jam Factory provided more detail about the environments represented by the deposits and an indication of their date. In particular, interpretation of the channel fills focused on a long section made available for examination by the excavation of Area 13, which ran roughly at right angles to the axis of the channel (fig 6). Although the best exposure of the channel fills was obtained from this section, the topographic plot of the

<table>
<thead>
<tr>
<th>Context</th>
<th>Elevation</th>
<th>Laboratory no</th>
<th>Material</th>
<th>Radiocarbon age (BP)</th>
<th>Calibrated date range (95% confidence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>0m OD</td>
<td>Beta-175418</td>
<td>organic sediment</td>
<td>2290 ± 60</td>
<td>420–200 cal BC</td>
</tr>
<tr>
<td>109</td>
<td>0m OD</td>
<td>Beta-181100</td>
<td>organic detritus</td>
<td>1970 ± 60</td>
<td>100 cal BC–140 cal AD</td>
</tr>
<tr>
<td>120</td>
<td>0.25m OD</td>
<td>Beta-181101</td>
<td>peat</td>
<td>2540 ± 70</td>
<td>820–410 cal BC</td>
</tr>
<tr>
<td>upper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>0.15m OD</td>
<td>Beta-181102</td>
<td>peat</td>
<td>2980 ± 60</td>
<td>1390–1010 cal BC</td>
</tr>
</tbody>
</table>

Table 2 Results of radiocarbon dating of organic material and peat from Areas 6 and 13
Fig 5 Rephidim Street and Hartley’s Jam Factory, Bermondsey: computer generated contour plan of the flood plain gravel, showing the topography of the ancient channel.
shallow valley shows that its deepest part lies to the south-west of Area 13 (fig 5). The Area 13 section may, therefore, have occupied a marginal position to any stream that exploited the deeper (Rephidim Street) side of the valley floor in the Holocene.

As might be expected, active channel deposits and organic sediments thickened towards the deepest part of the channel and pinched out towards its edge, in the section exposed in Area 13. In contrast, weathered deposits representing episodic drying out, together with more disturbed deposits representing inputs of material from the valley side, were characteristic of the channel edge. Thus, for the most part, the area closest to the north-east side of the valley was characterised by weathered clays. In the central part of the Area 13 section the fills were more organic, and further into the channel (the south-west part of Area 13) the fills were of soft waterlogged clays and bedded sands and organic material, representing deeper standing and flowing water. These characteristics, observed in Area 13, were representative of the deposits seen in more restricted exposures but in similar landscape positions in the other areas of the watching brief.

HOLOCENE DEPOSITION UNTIL THE MIDDLE/LATE BRONZE AGE

The earliest Holocene deposits found above Pleistocene gravel in Area 13 record the evolution of the valley from an area of stream channels to a backwater. The lowest deposits were bedded sand, silt and clay (112 and 113) that, if contemporary, were probably deposited by a multi-threaded stream, which exploited the hollows between the gravel bars that had formed the bed of the Pleistocene channel. Organic matter associated with the gravel bars suggests they may have been vegetated, at least during periods of low stream discharge. A similar range of plant macrofossils was found in the samples taken from 113 to those in 114 (described below), with the addition of alder (*Alnus glutinosa*) and gipsywort (*Lycopus europaeus*). Although this suggests that throughout this early period the vegetation growing in the shallow valley was marshy and fen-like, changes in the distribution of the various plant species and hence in the appearance of the valley probably took place in line with changes in the characteristics of the stream itself. This earliest episode in the evolution of the valley is undated, but three tiny waste flakes were found in context 113, which suggest the network of streams, pools of water and vegetated bars existing within the shallow valley in this early stage were exploited by prehistoric people.

Subsequently, stream flow appears to have lessened, or to have become focused into a single stream channel, which may have lain beyond the south-west end of Area 13. As a result, the north-east side of the valley floor (Area 13) became a backwater where clayey deposits, which preserved the imprints and remains of sedges, accumulated in shallow standing or sluggishly flowing water. In fact the plant assemblages from deposit 114 are dominated by roots and rootlets, possibly from plants of the Cyperaceae family (sedge). Seeds of water crowfoot (*Ranunculus subgen. Batrachium*) water dropwort (*Oenanthe* sp.) and water-plantain (*Alismataceae*) together with yellow iris (*Iris pseudacorus*), stonewort (*Chara* sp.) and occasional larval cases of caddis flies (*Trichoptera; aquatic insects*) suggest a fen-type environment with shallow, slow-moving water. Pebbles and sand within the clay indicate occasional episodes of swifter flowing water, perhaps following rainstorms when the stream flowing down the south-west side of the valley would have been swollen. Wood, including twigs, is also common in the plant remains from deposit 114 and may represent detritus washed among the sedges during episodic flooding. Seeds of dry or damp-ground species may have been incorporated into the assemblages through similar processes, and include black nightshade (*Solanum nigrum*), stinging nettle (*Urtica dioica*), elder (*Sambucus nigra*), hemlock (*Conium maculatum*) and blackberry (*Rubus cf. fruticosus*). Although these plants imply the presence of woodland or scrub on the river bank, several of these species grow in highly nitrogenous soils, suggesting that the channel may have been a watering place for animals.

The characteristics of the backwater clays differed laterally across Area 13. In the central part of Area 13, they were recorded as context 114, but the clay became softer towards the
Fig 6  Hartley's Jam Factory, Bermondsey: two interpretative drawings of the same section across strata in Area 13.
deepest part of the shallow valley (107) and thicker, more oxidised and firmer towards its edge (contexts 127–129). The latter probably reflect periods of drying out, thicker plant growth and inputs of material from the drier ground of the eyot. In this location the clay is also likely to have accumulated for considerably longer than elsewhere, as it may have begun to form when 112 and 113 were still being deposited further into the channel and it may have continued to accumulate when peaty organic sediments were developing in the central part of Area 13 during the Middle to Late Bronze Age (see fig 6).

**MIDDLE/LATE BRONZE AGE TO MIDDLE IRON AGE**

During this period the stream appears to have contracted still further with dry land encroaching across much of the north-east side of the valley floor. Initially the backwater clay became more humic (organic) as the area was increasingly marginalised from the active stream and gradually the north-east side of the valley was dry enough for a peaty land surface to form. A sample taken from humic clay 115 in the central part of Area 13 at -0.05m OD contains a very low concentration of diatoms of a non-planktonic freshwater species, but no evidence for contact with the tidal Thames. The assemblage of plant remains from the same context is larger and more diverse than the earlier assemblages, but the major taxa are broadly similar. Seeds of yellow iris are more abundant, and those of branched bur-reed (*Sparganium erectum*), not seen in earlier deposits, are moderately frequent. Both are common in drainage ditches crossing damp meadowland today. However, a slightly wider range of dry-land plants than recovered from the earlier assemblages was represented including thistles (*Carduus/Cirsium spp.*), docks (*Rumex spp.*) and knotgrass (*Polygonum aviculare agg*), all of which are characteristic of disturbed ground.

As the north-east side of the valley dried out, a thin peat bed, context 120, developed above the humic clay in the middle of Area 13. It comprised dark brown peat, which was generally about 0.10m thick, with its surface at about +0.30m OD. Samples from the base and top of the peat respectively gave calibrated radiocarbon dates of 1390–1010BC and 820–410BC. This suggests that the peat was forming between the Middle or Late Bronze Age and the Early to Middle Iron Age. Although the peat suggests a general drying out of the valley in the later prehistoric period and a contraction of the wetland within it, the plant remains and diatoms suggest that a body of water continued to exist in some form during this period. This may have lain to the south-west of Area 13, in the deepest part of the valley. Plant remains from the peat include occasional seeds of bogbean (*Menyanthes trifoliata*) and marsh pennywort (*Hydrocotyle vulgaris*) indicating marsh and/or shallow water nearby. Diatoms are represented in very low concentrations by *Pinnularia* sp., which would also be consistent with a marginal freshwater environment. Thus it is likely that the stream had become an area of standing or slow-flowing water fringed with sedges, which continued to exist in the deeper part of the valley throughout the later Bronze and Early Iron Age. The south-west part of Area 13 may have lain within this area and is represented by the upper parts of 107, which probably continued to accumulate in this period.

As the former backwater area contracted, drier ground encroached across the former wetland and this is apparent in the plant assemblages from the peat: wood and stem tissue, thorns, a number of seeds of white bryony (*Bryonia dioica*) and many small dicotyledonous leaf fragments, all of which may have come from scrub or hedgerows on drier land nearby. Other dry-land plants include hemlock, black nightshade and elder, all characteristic of nitrogenous waste-ground. Towards the eyot the peat merged with the lower part of clay layer 122 (fig 6), a flood plain soil, suggesting that a drier land surface had begun to extend into the valley from the eyot. The clay contained many rootlets, but was otherwise not rich in plant remains, as a result of slow accumulation, weathering and oxidation. A single grape pip (*Vitis vinifera*), clinker, charcoal, and occasional small pieces of coal, indicate that, although the clay soil may have begun to develop in the later Bronze Age, it continued to exist until the early post-medieval period in this location (see Roman or later section below for discussion of this soil).
Other deposits recorded in the watching brief are also likely to relate to the general period of drying out and the evolution of the eastern side of the valley from a wet fen to damp grassland, which appears to have taken place between the Middle to Late Bronze Age and Middle Iron Age. These include undated organic clay and peat with surface levels between +0.35m and +0.60m OD recorded in an adjacent pile hole and Areas 7, 8 and 11 and in Block 5, a 0.20m-thick peat bed, which was recorded above alluvial clay at +0.28m OD. Further dated evidence for this period of drying out comes from Area 6. Examination of the Area 6 sequence suggests it lay on a bar of slightly higher Pleistocene gravel that may have formed a stepping-stone of drier ground within the Bronze Age and earlier fen. A humic clay deposit accumulated above the vegetated gravel bar, which was buried with the build-up of a flood plain soil. A radiocarbon sample taken from the humic clay produced a calibrated date of 420–200 BC, which suggests that here, as seen in Area 13, the transition from wetland to dry land had taken place by the Middle Iron Age.

LATE IRON AGE OR EARLY ROMAN

During the Late Iron Age or early Roman period, deposits at the south-west end of Area 13 accumulated along the shoreline (‘strandline’) of an active stream. This suggests that the watercourse, which had existed close to the south-west side of the shallow valley since some time in the Bronze Age, was either migrating towards the north-east bank or expanding.

A series of thin waterlaid deposits (108–111, 116–119) accumulated at the edge of the stream. The earliest consisted of dipping lenses of shelly sand with patches of gravel (108). It produced an incomplete tapering wooden shaft, which was probably a spindle. The shaft is circular in section at its thin end, but becomes square in section as it broadens towards its missing end. The overlying stream deposit comprised organic detritus (109), typical of a strandline at the water’s edge, and produced two tiny flint waste flakes, plant remains, snail shells, a few resting eggs (ephippia) of water fleas (Cladocera), caddis fly larval cases and fish and reptile bones. A radiocarbon date obtained from the organic material was calibrated to 100BC–AD140.

The large plant assemblage of 109 includes wood and leaf fragments, stems and moss. A cherrystone (Prunus avium/cerasus) may be human waste, and charcoal, perhaps also from human activities, is moderately common. All other remains are of wild plants that probably grew nearby. Many of the seeds are from water crowfoot, water dropwort, water-plantain, sedges and alder, suggesting slow-moving water fringed with marshland, and from dry-land species associated with disturbed ground. The presence of hemp agrimony (Eupatorium cannabinum), which lives in rather shady habitats, suggests that land bordering the watercourse comprised a mixture of scrub, with trees and open grassy areas. However, two other plants, meadowsweet (Filipendula ulmeria) and marsh marigold (Caltha palustris), suggest that there were also more open, grassy areas beside the channel or marsh.

Apart from single shells of the rounded/radiated snail Discus rotundatus, and shiny glass snail Zonitoides nitidus the 109 mollusc assemblage is dominated by freshwater species, especially common bithyna (Bithynia tentaculata) and pea shell (Pisidium sp.), with smaller numbers of margined ram’s-horn (Planorbis planorbis), common/wandering pond snail (Lymnaea peregra), common valve snail (Valvata piscinalis) and a single lake limpet (Acroloxus lacustris). Freshwater ostracods are represented by a few valves of Candona neglecta and Herpetocypris reptans. The preferred habitats of most of these freshwater species are large, slow-moving or still bodies of water, often with muddy beds.

The remains of fish and reptiles comprised an eel vertebra (Anguilla anguilla), the tibia and fibula of a juvenile frog or toad and a dermal scute of a three-spined stickleback (Gasterosteus aculeatus), which generally suggest a shallow freshwater environment. However, the presence of the dermal plate suggests that the fish had lived in water that was at least slightly saline, as three-spined sticklebacks show variations in dermal morphology, with greater incidence of bony dermal plates with increasing salinity (Wheeler 1978, 198).
A similar picture of a freshwater stream, influenced by hillwash from the surrounding landsurface and at a very low level by estuarine water was obtained from the snail, ostracod and diatom samples, taken from the stream deposits above the organic strandline. The lowest of these deposits comprised layers of humic clay 110, sand 111 and silt 116. The latter produced eight tiny struck flints (flakes and three bladelet fragments) and a few freshwater snail shells, ostracod valves and caddis fly larval cases. The snail shells are mainly of *B. tentaculata* with occasional *Pisidium* sp., and the ostracod valves are chiefly of *Candona* sp. with a single example of *H. reptans* (which were all also found in the underlying organic strandline deposit).

A sample of the silt (116) yielded low concentrations of poorly preserved diatoms. These include predominantly freshwater, non-planktonic species associated with shallow water environments including benthic (mud surface) and epiphytic (on macrophytes) habitats. However, a low number of diatoms present were of species indicating elevated salinity.

Layer 116 was overlain successively by clayey gravel (117), clayey sand (118) and gravely silty clay (119), which contained dipping lenses of sand and a prominent lens of sandy silt (121). These deposits suggest episodic water flow and may be, at least in part, colluvial material washed in from the surrounding land. Granules and flecks of brick/tile and charcoal were present throughout, suggesting human activity may have contributed to their accumulation at some stage in the process of erosion, transport and deposition.

As was found in the lower sample, the diatom assemblage from context 119 was dominated by non-planktonic diatoms that represent shallow, freshwater habitats, although estuarine species were also present.

Evidence from the stream deposits implies that, in the Late Iron Age/early Roman period, a reversal in the gradual drying out of the shallow valley took place. The stream that may have dwindled to insignificance in earlier periods was now reactivated and was directly influencing the south-west end of Area 13, which lay at its margin. While the environmental evidence suggests the stream may generally have been a slow-moving body of calcareous ‘hard’ water with a muddy bed, and dense aquatic flora, the sediments themselves are characteristic of actively flowing water, at least episodically. Although essentially a freshwater stream, the composition of the diatom assemblages suggests that the water was (at least occasionally) slightly saline, indicating that the tidal Thames had a slight influence on the stream – far less, however, than typically recorded in river deposits of this date from elsewhere in Southwark and Bermondsey.

**ROMAN**

**Ditches**

In Block 9, next to Tabard Street, several Roman features cut a layer of ‘green earth’ that overlay terrace sand and gravel and survived to a height of +1.50m OD (Hammerson nd, 9–11). Most of the features were ditches or gullies that had been severely truncated by modern activity so that it was not possible to determine their original width. For the purposes of this report the features have been renumbered (fig 7, 500–502).

Linear features in four contractors’ trenches on the north-west side of Block 9 probably represented a single ditch (500) stretching over a length of about 20m, and surviving to a maximum width of 1.50m. The half nearest to Tabard Street and the projected line of Watling Street was aligned east-north-east to west-south-west. This stretch of ditch produced a substantial part of a Highgate Wood ware beaker with a short everted rim dated to c AD105–60, which was in good condition. The pot was found in association with a small quantity of burnt grain. It also yielded a sherd of a cup-mouthed ring-necked flagon of unidentified fabric dated to c AD140–200. The half nearest to Potier Street was aligned roughly north-east to south-west, and produced three sherds of Black-burnished ware 2 dated to AD120–250. The ditch may have formed a boundary for a field or enclosure aligned
roughly at a right angle to nearby Watling Street. It may also have been intended for drainage, as its base sloped down away from the road into the valley.

Ditch 501 was recorded on a north-west to south-east alignment in four separate locations over a distance of about 12.5m. Although severely truncated, it survived to a maximum width of 1.10m and a depth of 0.20m. Its base had a rounded profile and was level (only varying between +0.78m at its south-east end and +0.76m OD at its north-west end). Roman pottery, including a sherd from a Nene Valley Colour-coated beaker dated to c AD200–400, was recovered from the general area of the ditch. However, the pottery could not be definitely attributed to the ditch, which may have formed a boundary parallel to Watling Street.

Ditch 502 was aligned north-east to south-west, roughly at a right angle to Watling Street. A 9.5m length was revealed, which survived to a depth of between 0.30m and 0.50m. Its base was almost level, lying at +0.61m OD at the south-west end and +0.59m OD at the north-east end. The primary fill, a 0.10m-thick deposit of sandy silt, produced a sherd of pottery, dated to c AD250–400.

The south-east butt-end of a possible ditch (not illustrated) lay a few metres to the north-west of ditch 502. It was at least 3.50m long and survived to a depth of 0.30m. Although its full width was not observed it was at least 1m wide, and may have been more than 2m wide. It produced a sherd of pottery of uncertain date.

Pit?

Only one feature of possible Roman date was identified during fieldwork at the Hartley’s Jam Factory. This was a small pit or posthole (35) cut into undated alluvial clay in Area 10. It was 0.56m in diameter and survived to a depth of 0.24m. The upper part of the feature and the alluvium had been truncated at +0.74m by the factory basement. The feature

Fig 7 Rephidim Street, Bermondsey: Roman ditches in Block 9.
produced an amphora handle in Verulamium region white ware dated to AD50–160, although the sherd is abraded and may have been deposited at a much later date.

**ROMAN OR LATER**

In Blocks 2–8 ‘brown sandy earth’ overlay the clay channel fill, and in Blocks 6 and 7 it produced abraded sherds of Roman pottery. The surface of the earth generally lay between +0.80m and +0.90m OD. The ‘earth’ may correspond to deposits containing Roman pottery in Areas 6 and 13, which are interpreted as accretionary soils subject to seasonal flooding. The deposit in Area 6 comprised buff sandy/silty clay (15) with iron-stained root channels, and probably represented oxidised seasonal flood deposits incorporated into the soil by plant and animal disturbance. Its truncated surface lay at +0.66m OD. It contained flecks of mortar and ceramic building material and produced an abraded handle from a Gaulish amphora dated to AD50–250. A similar accretionary soil in Area 13 (122 and 123) mainly comprised clay and produced a small amount of Roman pottery. The top of this soil lay at +0.82m OD. Similar deposits of this approximate date and level are ubiquitous in north Southwark and Bermondsey, and are generally considered to be overbank flood deposits of the Thames, building up as an alluvial soil.

The limited dating evidence from the alluvial soil suggests that it accumulated during the Roman period or later. However, as discussed above, the deposit probably developed gradually, encroaching from the channel margins into the former channel as the latter dried out. It was probably already starting to form during the Bronze Age close to the Bermondsey Eyot itself, but had not begun to form until the Roman period or later above the deepest parts of the former channel.

Mean High Water Spring Tides might have reached about +1.5m OD in the 1st century AD (Brigham 2001, 25), although the evidence from this part of Southwark suggests the Roman river levels were probably lower, given that at 165 Great Dover Street the highest surviving road gravel of Watling Street was only at +1.7m OD and that the base of the road gravel 0.5m lower still (Mackinder 2000, 7). The alluvial soil on the site lay below +1m OD and therefore may have been low enough for occasional flooding from the Thames. However, by the late 3rd century, when river levels had dropped to just below Ordnance Datum, the risk of flooding was probably negligible.

**16TH AND 17TH CENTURY LAND IMPROVEMENT**

At the end of the medieval period the valley would still have been poorly drained and prone to flooding. This was remedied in the 16th and 17th centuries by the dumping of earth, domestic waste and possibly nightsoil to raise the ground level and by drainage schemes. In Areas 12 and 13 dumps of dark grey/brown silt and clay were over 1m thick with their respective surfaces at +1.67m OD and +1.92m OD. These would probably correspond to the ‘black post-medieval soils’ that extended across the entire Rephidim Street site ‘to about +1.60m OD’ (Hammerson nd, 3).

The contents of these dumps included fragments of brick, roof tile, pottery and other domestic waste, which allowed the period of this activity to be closely dated. Deposition had probably begun by the 16th century, since two sherds from Rhenish stoneware jugs were found near the base of a dump (52) in Area 12. Dumping appears to have continued at least until the late 17th century for pottery from the earliest dump in Area 13 (124), which comprises 38 sherds (441g), including a range of redwares, biscuit tin-glazed ware and tin-glazed wares that suggest a date of c. 1630–1700 for the deposit. However, the presence of a clay pipe bowl of a type manufactured between 1660 and 1680 narrows the date range to the last three or four decades of the 17th century (type AO15; Atkinson & Oswald 1969). A corresponding dump in Area 14 produced two sherds dated to 1660–1700.

The dumps in Area 13 formed three horizontal layers, including a middle ‘humic’ horizon
Its fine tilth suggests it may have been used for cultivation or market gardening. A ‘worm sorted’ layer existed within this deposit, suggesting the ground had been left abandoned for some time following its use for cultivation.

The improved land may have been used for cultivation/market gardening to supply the growing local population, which would accord with late 17th and mid-18th century maps that show the area neatly divided into fields bounded by drainage ditches and channels.

In Area 4 a ditch or pit, 7, cut the alluvium. It was 0.46m deep with a steep side and flat base. Its primary fill comprised dark grey sandy clay, which yielded single sherds of Surrey/Hampshire border white ware, dated to 1550–1700, and post-medieval red ware, dated to 1580–1900.

**19TH CENTURY**

**Tanning pits**

Features probably associated with tanning were observed during the Rephidim Street watching brief, when several wooden compartments were revealed by the contractor’s excavations about 0.5m below modern ground level in Block 3, on the north-east side of Rothsay Street. Although circumstances did not allow a thorough investigation of these structures it was evident that they covered an area of at least 14 x 14m. The complex apparently consisted of a grid of rectangular wooden compartments, each measuring at least 1 x 2m and about 2m deep (the base of a compartment in the north-west corner of the complex lay about 2.5m below ground level). A wooden ‘water’ pipe emerged from the wall of a compartment in this part of the complex. Contractors had previously found three other ‘elm water pipes’ in the area. Similar elm pipes have been found at nearby sites (Elsden 2001, 279–81; McKinley 2006, 91; Thompson et al 1998, 215).

It was not clear whether the compartments were originally four-sided or had been open on one side for access. This led to speculation that the complex may have formed ‘a storehouse of bins constructed back to back’ (Hammerson nd, 4). However, as the compartments were below ground level, and may have been fed and/or drained by pipes, it seems most likely that they were four-sided tanks for containing liquid, probably tanning liquor. Indeed, they probably correspond to rectangular and square structures, almost certainly tanning pits, shown in this location on the OS 1:2500 map of 1894. A rag and bone store, shown on the OS 1:2500 map of 1872, had previously occupied the site.

Evidence for tanning was also recorded at the Hartley’s Jam Factory, notably in Area 9, where the plank bases of tanning tanks were exposed at about +0.30m OD within an area measuring about 12 x 4m. These were probably the remnants of large tanks shown in this area on the OS map of 1894, which replaced a complex of smaller tanks shown on the OS map of 1872. They may have continued in use until the site became a jam factory in 1911.

In addition, two well-preserved 19th century tanning tanks were found at the north-east end of Area 13. They had been built in a clay-lined pit, which was over 2m across (extending beyond the excavation area) and survived to a depth of 1.90m. Both tanks were rectangular in plan: one measured 1.70 x 1.34m, the other 1.70 x 1.40m. Their bases and sides were made of wooden planks. The tanks were filled with crumbly dark brown silt, which produced a sherd from an English stoneware bottle and three waste off-cuts of leather hide. The largest piece of leather has cut edges and also part of the hide edge, along which are three holes. The holes are slightly pulled and would have been used for pegging out the hide. Other tanks were seen immediately to the north-east, but were not recorded.

**Other features**

In Area 7 two late post-medieval features cut the alluvial clay 14. One was a barrel-lined feature, which yielded a fragment of brick probably made after c 1800. The barrel, which
was very badly decayed, may have been used as a well or, more probably, as a tank for some industrial process such as hide liming.

The other feature, probably a pit, was 0.44m deep. It produced two fragments of peg tile of a type manufactured after c 1480, possibly quite recently.

A brick shaft in Area 10, probably a well or soakaway, cut through the alluvium into the terrace gravel. Brick typology and cartographic evidence suggests that the feature was of 19th century date and associated with the tannery (see above). Badly decayed wood behind the brickwork may have been the original lining, but was more probably the remnants of shoring used during the construction of the shaft.

EARLY 20TH CENTURY

In Area 9 a back-filled basement of a substantial industrial building lay above the Victorian tanning pits. The basement had a concrete floor about 0.20m thick, with its surface at +0.90m OD, and brick walls that were 0.45m thick. The latter were aligned parallel to the now converted blocks of the jam factory. The basement probably corresponds to a building shown on the OS 1:2500 map of 1914. This building would have been part of the jam factory, and it was probably demolished in about 1950, when planning permission was granted for the construction of Block C.

Discussion and conclusions

The evidence from the sites provides considerable information about the changing landscape during the Holocene of the channel on the south-west side of Bermondsey Eyot. The history of the channel is very different to that of the better known Southwark channels, which are generally deeper and tidal from the later prehistoric period. The channel was a broad, shallow valley in the surface of the Kempton Park Gravel, which was exploited (possibly episodically) by a freshwater stream during the Holocene. Such evidence for a freshwater stream so close to the estuarine Thames is very unusual in this area. Little contact with the tidal Thames appears to have taken place, at least until sometime in the Roman period, but quite probably much later, when contact would have taken the form of prolonged seasonal flooding.

The earliest Holocene deposits in the shallow valley (channel) were not dated but probably accumulated from the Mesolithic to Early Bronze Age. A network of streams initially flowed across the valley floor, with vegetated gravel bars within it. Subsequently, water flow slackened and a backwater, fringed by marshy fen developed within the channel, with sedges growing in shallow standing water. The margins of the channel next to the eyot may have episodically dried out, and seeds from aquatic plants and those growing on dry land next to the channel suggest that animals may have used the location as a watering hole.

By the Middle to Late Bronze Age a boggy land surface had developed across much of the valley floor, with wet grassland at the edge of the eyot. In the deepest part of the channel, however, it is likely that standing water fringed by sedge fen persisted. In Area 13 deposits dated to this and earlier periods only yielded diatoms of non-planktonic freshwater species, and did not provide any evidence for contact with the estuarine river Thames.

During the Late Iron Age to early Roman period a more active stream channel appears to have exploited the valley and deposits accumulated along its margins were recorded at the south-west end of Area 13. Diatoms and the remains of snails, ostracods and fish from bedded stream sediments indicate a predominantly freshwater environment. This suggests that the origin of the stream was from water flowing from the surrounding higher land, as opposed to incursion by the tidal Thames. Although diatoms included estuarine and marine species, indicating some contact with the Thames estuary, the frequency and degree of contact appears to be low: their presence may be as a result of infrequent flooding. Had the environment been of similar mean salinity to the Thames in London during the post-Roman period (see Sidell et al 2000, 17–18) there would have been a greater component and diversity
of marine and brackish water diatoms. In addition, the dominant component of these assemblages seems to be oligohalobous indifferent (freshwater) diatoms with halophobous *Eunotia* spp. These halophobous diatoms would not grow in brackish water and, along with aerophilous diatoms (*Pinnularia borealis, Pinnularia major*), may be derived from peat or hillwash.

The re-activation of a stream within the valley was possibly the result of the clearance and drainage of adjacent land. This accords with evidence from Rephidim Street for presence of Roman drainage and/or field boundary ditches. However, diatoms from the stream deposits (and from earlier channel deposits) do not show any evidence for human exploitation of the habitat, such as elevated nutrient levels or unusual changes in water quality.

The existence of the freshwater stream is intriguing as it suggests that the north-west end of the previously plotted ‘channel’ was blocked off from the Thames by a neck of land. The latter was probably formed of Kempton Park Gravel, as mapped by the British Geological Survey (fig 3). The presence of such a topographical feature might explain the development of the Roman religious complex recently found at the junction of Long Lane and Tabard Street (site code LLS02; Maloney 2003, 53). Evidence from the Hartley’s Jam Factory site suggests that the postulated land bridge was probably high enough to form a barrier between the head of the channel and the tidal channels to the north until sometime after the early Roman period. Indeed, from what is known of past Thames river levels, it seems likely that the stream would have been largely unaffected by the tidal Thames until at least the second half of the 9th century (Cowie & Blackmore 2008).

A land bridge connecting Bermondsey Eyot to the mainland would have played an important role in the human exploitation of the area from the Mesolithic period through to medieval times. It would, for example, have made an attractive route. The sites appear to have been located almost at the head of the valley, which, in its lower part contained the Bermondsey Lake, a significant prehistoric landscape feature known to have been exploited by Mesolithic to Bronze Age people (Thomas & Rackham 1996). It is likely that these people followed the valley upstream and exploited the varied environments it contained. The presence of a freshwater stream may have made the valley and BermondseyEyot a focus for activity as estuarine environments developed in Southwark during the prehistoric period and in the historic period and may even account for the siting of the early 8th century minster at Bermondsey.

During the Middle Ages the valley would probably have been water meadows, and of little use other than possibly for grazing animals. Indeed, no clear archaeological evidence for medieval activity was found on the sites, despite their proximity to the former precinct of Bermondsey Abbey. Measures to improve the land appear to have begun in the 16th century, possibly after the suppression of the abbey.

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BIBLIOGRAPHY

Anon 1976 Mosaic: Roman Southwark’s hinterland, London Archaeol, 3.2, 56
Beard, D, 1986 The infirmary of Bermondsey Priory, London Archaeol, 5.7, 187–91
Blair, J, 1991 Early medieval survey landholding, church and settlement before 1300, Stroud: Alan Sutton Publishing/SyAS
Bigham, T, 2001 The Thames and the Southwark waterfront in the Roman period, in Watson, B, Brigham, T, & Dyson, T, London Bridge: 2000 years of a river crossing, MoLAS Monogr Ser, 8, 12–27
Cameron, N G, 2005 Diatom assessment of deposits from an evaluation trench at the former Hartley’s Jam Factory (GEN00) Green Walk, London SE1, unpubl University College London rep
Cameron, R A D, & Redfern, M, 1978 British land snails, Linnean Society of London synopses of the British fauna, 6
——, & Blackmore, I, 2008 Early and Middle Saxon rural settlement in the London region, MoLAS Monogr, 41
——, & Corcoran, J, 2003 Former Hartley’s Jam Factory, Rothsay Street, London, SE1, London Borough of Southwark, a report on the archaeological evaluation, unpubl MoL rep
Denys, L, 1992 A check list of the diatoms in the Holocene deposits of the Western Belgian Coastal Plain with a survey of their apparent ecological requirements: I. Introduction, ecological code and complete list, Berchem: Service Geologique de Belgique, Professional Pap, 246
Drummond-Murray, J, Saxby, D, & Watson, B, 1994 Recent archaeological work in the Bermondsey district of Southwark, London Archaeol, 9.10, 251–7
Elsden, N, 2001 Excavations at 36–40 Tanner Street and 159–161 Tower Bridge Road, Bermondsey, London Archaeol, 9.10, 275–82
Hammerson, M, [nd] Observation work at Rephidim Street (TQ 329 792) and Cardinal Bourne Street (TQ 328 791), London, SE1, 1976–7, unpubl MoL rep
Heard, K, 1996 The hinterland of Roman Southwark: part 1, London Archaeol, 8.3, 76–82
——, Sheldon, H, & Thompson, P, 1990 Mapping Roman Southwark, Antiquity, 64, 608–19
Henderson, P, 1990 Freshwater ostracods, Linnean Society of London synopses of the British fauna, 42
Hendey, N I, 1964 An introductory account of the smaller algae of British coastal waters, part V, Bacillariophyceae (diatoms), Ministry of Agriculture Fisheries and Food, 4 ser, London: HMSO
Hustedt, F, 1953 Die Systematik der Diatomeen in ihren Beziehungen zur Geologie und Okologie nebst einer Revision des Halobien-systems, Abh Bot Tidskr, 47, 509–19
——, 1957 Die Diatomeenflora des Fluss-systems der Weser im Gebiet der Hansestadt Bremen, Ab naturae Ver Bremen, 34, 181–440
Knowles, D, & Hadcock, N, 1971 Medieval religious houses: England and Wales, Harlow: Longman
Macan, T T, 1977 A key to the British fresh and brackish-water gastropods, Freshwater Biological Association scientific publication, 13
Mackinder, A, 2000 *A Romano-British cemetery on Watling Street, excavations at 165 Great Dover Street, Southwark, London*, MoLAS Archaeol Stud Ser, 4

McKinley, J I, 2006 *Excavations at 211 Long Lane, Southwark part II; Romano-British pasture to post-medieval tanneries*, *London Archaeol*, 11.4, 87–94


——, Cotton, J, Rayner, L, & Wheeler, L, 2002 *The prehistory and topography of Southwark and Lambeth*, *MoLAS Monogr Ser*, 14


——, in prep *Excavations at the monastery of St Saviour, Bermondsey, Surrey*, *MoLAS Monogr Ser*


Thomas, C, & Rackham, J, 1996 *Bramcote Green, Bermondsey: a Bronze Age trackway and palaeoenvironmental sequence*, *Proc Prehist Soc*, 62, 221–53


