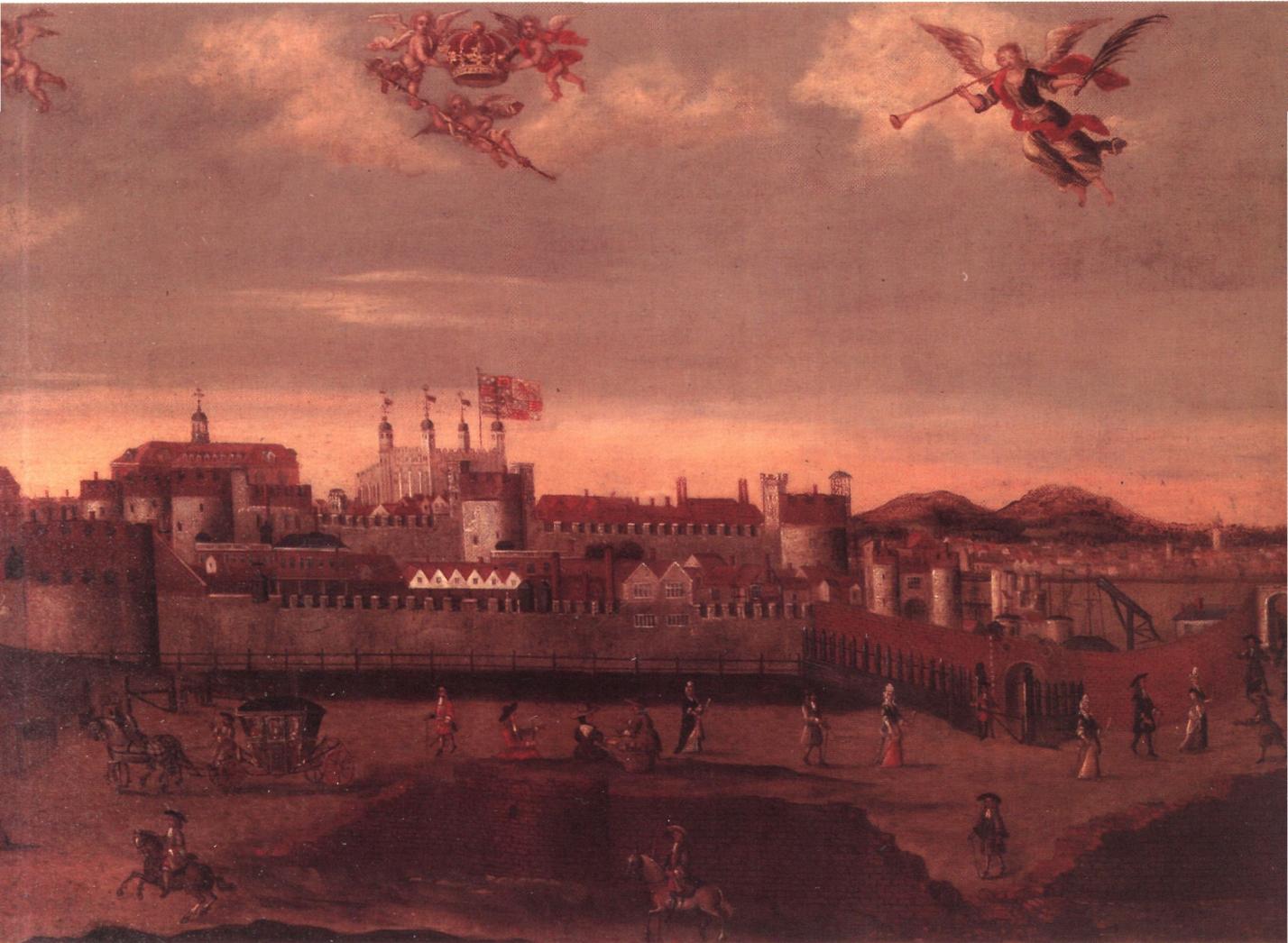
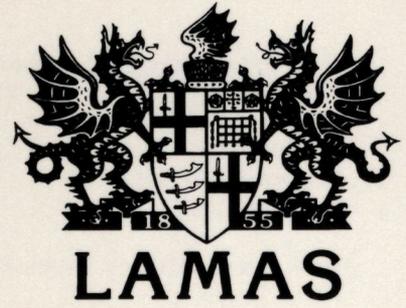


Transactions
Volume 47 1996



London and Middlesex Archaeological Society

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Editors' note: the editors are happy to consider articles for publication in *Transactions*. New contributors are advised to ask the Production Editor for a copy of *LAMAS Notes for Contributors* before submitting papers.

Front cover: The Tower of London viewed from the west, looking east and showing the remains of the northern end of Edward IV's Bulwark. Painting by Johannes Spilburg c. 1690. ©Crown Copyright: UK Government Art Collection. An illustration from *Edward IV's Bulwark: excavations at Tower Hill, London 1985* in this volume.

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LAMAS

Transactions of the
**London and Middlesex
Archaeological Society**

Volume 47
1996

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London & Middlesex Archaeological Society

Registered as a charity

ESTABLISHED IN 1855

Patrons: the Most Rev The Archbishop of Canterbury; the Right Rev The Bishop of London; The Right Hon The Lord Mayor of London; HM Lieutenant for Greater London and Custos Rotulorum; HM Assistant Lieutenant for the Middlesex area of Greater London; The Very Rev The Dean of St Paul's.

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Council (*as from AGM February 1996*)

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Historic Buildings and Conservation Committee: Chairman, D.G. Corble, FCIB.

Greater London Local History Committee: Secretary, Roy Vinjevold.

Youth Section: Vacant.

Honorary Auditors: Mrs C.H. Allen, FCA; Mr A.C. Sergeant, FCA.

Trustees: Barclays Nominees (Branches) Ltd.

Bankers: Barclays Bank Ltd (Cocks Biddulph Branch)

London and Middlesex Archaeological Society

140th ANNUAL REPORT OF COUNCIL FOR THE SUBSCRIPTION YEAR
ENDING 30th SEPTEMBER 1995

Council heard with real sadness of the death of our Past President, Dr. Ralph Merrifield, who had had a long association with LAMAS and was President from 1974-76. He held a unique position in the archaeology of Roman London, a widely renowned scholar who made an enormous contribution in the field of its history and topography. His book 'The Roman City of London' was a landmark, surveying work up to that time and forming a background for subsequent work. He was primarily a museum man, and became Deputy Director of the Museum of London. After his term as President of LAMAS Ralph continued to maintain close contact with the Society and was at the time of his death still a member of the Archaeological Research Committee. He will be sadly missed by all members of the Society and by those involved with London archaeology.

There were changes in Council membership. Eileen Bowlt, having served four years as Chairman of Council (in addition to editing the Newsletter for part of that time) was replaced by Patricia Clarke. Michael Cooper resigned as Hon. Treasurer because of pressure of work but, in the absence of a replacement continued in an acting capacity. Peter Rutland was obliged to resign just before the year's end for reasons of health, thus creating two vacancies, as Newsletter Editor and Membership Secretary. Rosalind Woodhouse took over as Newsletter Editor.

In June LAMAS was launched on the World Wide Web of the Internet, the first British archaeological society to offer information on it. It has been made possible by courtesy of the University of North London.

Meetings and visits

At the AGM in February 1995 Harvey Sheldon gave his second Presidential Address entitled *Roman London and Southwark*. The other meetings, arranged by Joanna Clark and the Council included *The Temple of Mithras* by John Shepherd; *The Divine right of Kings* by John Kent; *The Guildhall Yard Excavations*, by Nick Bateman; *Fulham Palace* by Miranda Poliakoff; *Glass in London* by Wendy Evans; the Hugh Chapman Memorial Lecture was given by Mark Hassall, on Roman London.

The Stow Commemoration Service was held at St. Andrew Undershaft on 26th April, when the Rev. Richard Coombes gave a combined lecture and sermon on the theme of the earthly city of London and the Heavenly City of God.

Publications

Volume 43 (1992) of Transactions was published during the year. Gustav Milne resigned as Hon. Archaeological Editor in September 1995.

Consideration was given to a proposal that the cost of producing MOLAS Monographs might be shared by local societies through buying in bulk and distributing to members. The Monographs would not replace Transactions, but an increase in subscriptions would be needed to cope with the costs.

Membership and finance

Like many organisations in the voluntary sector LAMAS finds it increasingly difficult to attract new members. Total paid up membership at 30.9.1995 was as follows;

Honorary	3	
Life	33	
Ordinary	453	
Student	3	
Institutional	55	
Affiliated Societies	44	= total <u>591</u>

Archaeological Research Committee

There were four meetings in the year. Matters addressed included reports on archaeology from MoLAS and English Heritage, as well as the encouragement of amateur involvement in London archaeology and updating the Committee's aims and objectives. The 32nd Annual Conference of London Archaeologists in March publicised recent work by a number of different organisations.

The committee decided to commemorate the life and work of the late Ralph Merrifield by an annual award for 'the most significant and original contribution to London archaeology during the year'—the decision to be announced at each Annual Archaeological Conference.

Greater London Local History Committee

The 29th Local History Conference held on 19th November, entitled 'Wretched London—the London Poor 1700–1900', was again sold out in advance. The committee considered the shortage of local history items for Transactions and appealed to affiliated societies and their members for more articles. Work on the population study continued, but at a reduced rate through lack of volunteers.

Historic Buildings and Conservation Committee

The committee met eight times and considered 237 listed building applications, of which 55 needed a second consideration. The Committee deals with these cases as agents of the Council for British Archaeology, one of the national societies required by the Regulations to be notified of listed building applications. The Committee covers all the London Boroughs except Croydon, Sutton and Kingston, which are dealt with by the Surrey Archaeological Society. Nothing was notified from Barking, Havering, Hillingdon, Lambeth, Lewisham, Richmond, Southwark or Wandsworth. Four authorities notified less than 6 cases each. Westminster notified 111, Merton 27, City 20, Docklands 11, Hounslow 9, Bexley 9, Hammersmith & Fulham 8, Kensington & Chelsea 7, Redbridge 7.

Among the cases considered have been; the Charterhouse, Crosby Hall in Chelsea, Flamsteed House in Greenwich, King's Head public house in Harrow, The Manse at Chaseside in Enfield, Morden Hall, Warehouse 2 at Shad Thames, 46–52 Stanhope Gardens, SW7.

Young LAMAS

Unfortunately no replacement for Gabriel Pepper came forward, despite repeated appeals in the Newsletter and many informal approaches by Council. As a result the Youth Section has not functioned at all—a matter of serious concern. The outlook is depressing. A review of the demand and viability of the section is under way.

BY DIRECTION OF COUNCIL

Patricia A. Clarke
Chairman of Council

Malcolm Harden
Hon Secretary

LONDON & MIDDLESEX ARCHAEOLOGICAL SOCIETY
 INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30th SEPTEMBER 1995
 AND BALANCE SHEET AS AT 30th SEPTEMBER 1995

	1993/94	1994/95		1994	1995
	£	£		£	£
Income					
Subscriptions	4,848	4,749		1,127	1,127
Income Tax reclaimed on Deeds				2,884	1,715
C.B.A. Grant to Historic Buildings Committee	247	49		6,930	8,715
Dividends and Interest	980	1,469		18,590	19,467
Sales of Publication	3,741	2,383		<u>£29,531</u>	<u>£31,024</u>
Grants for Publication					
English Heritage	18,957	5,828			
Museum of London	1,670	0			
Miscellaneous	20	23			
TOTAL INCOME	<u>£30,463</u>	<u>£14,501</u>			
Expenditure					
Publications:					
Publications Assistant	0		1,050	118	118
Transactions: Volume 39	7,249			270	0
Volume 41	6,583			10,000	10,000
Volume 42	1,541			2,462	4,607
Volume 43	0				
Volume 44	5,000			4,137	2,199
Newsletter	1,012		1,024		
Production Editor	2,325		0		
	<u>23,710</u>	12,637		<u>£29,531</u>	<u>£31,024</u>
Lectures and Visits	190	70			
Local History Committee	(307)	(832)		6,905	12,544
Archaeological Committee	(481)	(217)			(2,145)
Youth Section	17	0		0	1,938
Historic Buildings Committee	173	117			
Postage, Printing & Stationery	415	110			
Secretarial and Administration	250	0			
Subscriptions and Donations	62	62			
Sundry Expenses	545	254		5,639	14,100
SCOLA	250	350			
Lamas Project	0	187			
TOTAL EXPENSES	<u>24,824</u>	<u>12,738</u>		<u>£29,531</u>	<u>£31,024</u>
Surplus \ (Deficit) for the Year	5,639	1,763			
	<u>£30,463</u>	<u>£14,501</u>			

Note: No value has been attributed to the Society's library, stock of publications or sundry equipment.

RECENT PREHISTORIC FINDS FROM THE THAMES FORESHORE AND BEYOND IN GREATER LONDON

Jonathan Cotton and Barbara Wood

With contributions from Caroline Cartwright and Stuart Needham

SUMMARY

This paper rounds up a selection of recent prehistoric finds reported to the Museum of London. All but five of the 43 finds were recovered from the modern foreshore of the River Thames (16 from the Middlesex bank and 22 from the Surrey bank), and the majority remain in private possession. In addition to the expected run of single flint, stone, antler, pottery and metal objects, several small hoards are described. These include caches of Middle and Late Bronze Age metalwork (Nos 22, 24, 26 from the modern foreshore and No. 27 from the London Clay overlooking the River Brent) and at least one, and possibly as many as three, hoards of Late Iron Age potin coins (Nos 35 and 36) from the modern foreshore. In terms of their rarity and significance, a substantial fragment of a handled pottery beaker from a point off Isleworth Eyot (No. 19) and part of a Middle Bronze Age gold composite ring from the modern foreshore at Wandsworth (No. 23) are worth particular note. Each of the pieces is described and their local/regional significance indicated.

INTRODUCTION

This is the second occasional paper rounding up prehistoric objects from Greater London reported to the Museum of London. Like that published previously (Cotton & Merriman 1991), a majority of the pieces noted here were found on the Thames foreshore. Unless otherwise stated they remain in private possession and are dealt with in chronological order. A concluding section attempts to pull together a number of points

regarding the recovery of objects from the Thames catchment and its intertidal zone in the London area.

PALAEOLITHIC (Fig 2)

1. Pointed flint biface found on the Surrey foreshore of the Thames at Barn Elms (TQ 233 774) by John Gibson during 1976 or 1977 (MoL 95.533/1).

The implement measures 130mm in length, 80mm in width at the butt and weighs 464.41g. It has a heavy butt which retains patches of worn cortex, and a reverse-S twist along one edge; the tip is missing. It is heavily rolled and ochreously stained; there are also traces of thermal cracking on the illustrated face.

2. Palaeolithic side scraper worked on a flake found close to low water on a 0.4m tide on the Surrey foreshore of the Thames at Vauxhall (c.TQ 2980 7782) by Jonathan Cotton in August 1993 (MoL 95.290/1).

The implement measures 96mm in length and 53mm in width, and is worked on a robust stone-struck flake with a plain butt. The piece is of mottled yellow-brown cortical flint; it is rolled and has a faint milky patina on the dorsal face.

3. Distal end of a Palaeolithic flake/blade found on the Middlesex foreshore of the Thames in front of Custom House Quay (c.TQ 333 806) by Mark Paros, and reported in 1996. The piece lay on a sandy deposit towards the rear of the foreshore close to the quay.

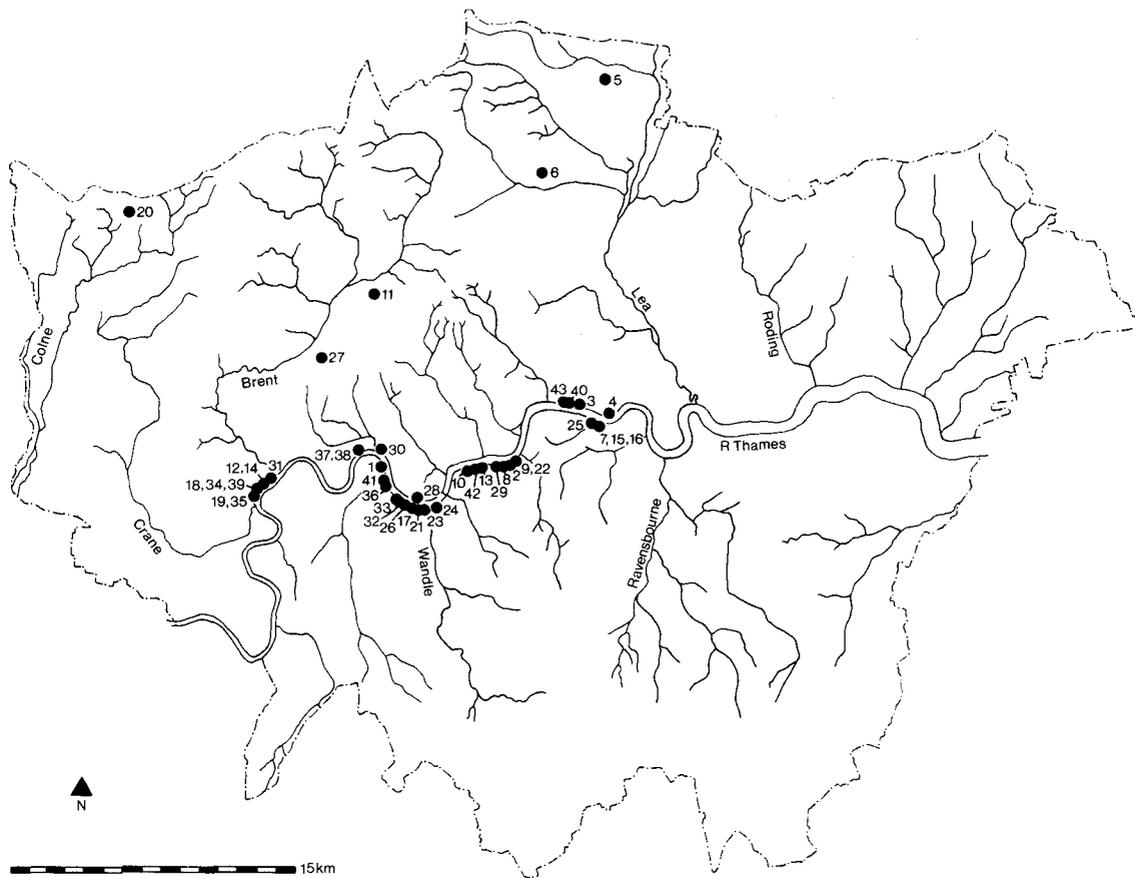


Fig 1. Location of finds mentioned in the text

The robust, double-ridged, parallel-sided flake/blade terminates in a hinge fracture, is 45mm in width, 8mm thick and has a surviving length of 54mm. It is heavily rolled and stained a dark chocolate brown; all high points and edges are worn and abraded. Although lacking its butt, the piece has Levalloisian traits.

4. Small, rectangular Palaeolithic flake found on the Middlesex foreshore of the Thames at Execution Dock, Wapping (c.TQ 3490 8005) by Anita Freeman ‘two or three months’ prior to May 1997. The dock lies immediately downstream of the Thames Police Station. The piece lay on the surface of the gravel shingle about half way down the foreshore on a normal low tide, and close to a metal pipe recently inserted in the foreshore. The finder suggests that it could have come from the upcast of the excavation to install the pipe.

The flake measures 64mm in length, 41mm in

width at its widest point, is some 13mm thick and weighs 42.18g. It is stained a lustrous dark olive-brown-black. It has been struck from a small, carefully-prepared core Levallois-fashion which has resulted in the production of a characteristically faceted butt.

Discussion

The biface and scraper (Nos 1 and 2) are both of lower Palaeolithic type and likely to have been eroded from one of the higher implementiferous gravel terraces by the Thames or one of its tributaries. They can be added to a number of other such pieces recovered from the foreshore of the modern Thames (eg Wymer 1991, Fig 3).

Although well-known from localities such as Yiewsley/West Drayton, Creffield Road, Acton and Baker’s Hole, Crayford, Levallois material is

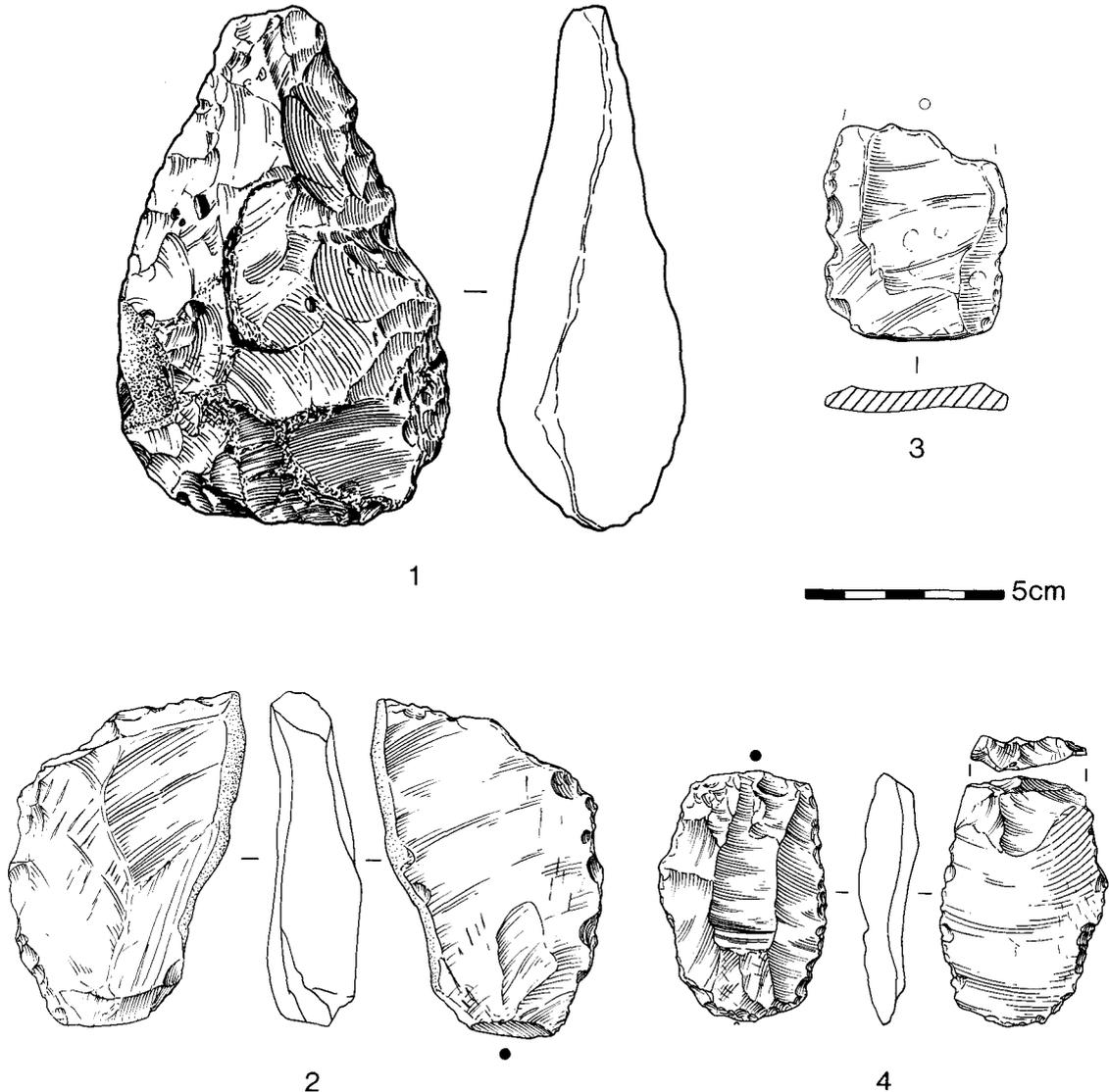


Fig 2. Palaeolithic flint artefacts Nos 1-4, scale 1:2

not often recorded from the modern Thames foreshore. The findspots of Nos 3 and 4 suggest that they could have become incorporated in Lower Floodplain (Shepperton Gravel) deposits which, downstream of Westminster, fill the late Pleistocene 'Buried Channel' of the Thames (eg Wymer 1991, 11-4; Bridgland 1994, 177, Fig 4.3; Gibbard 1994, 100-6). Other finds recovered from the 'Buried Channel' further downstream at Erith and Tilbury include four or five 'flat-butted cordate' or 'bout coupé' bifaces in somewhat similar states of preservation and staining to 3 and 4 above, and probably

attributable to the earlier part of the Devensian (Wymer 1985, 302).

MESOLITHIC (Fig 3)

5. Blade of a Mesolithic flint adze recovered 'with other flints' from an allotment in Goat Lane off Forty Hill, Enfield (TQ 3395 9814), and reported by Geoffrey Gillam of the Enfield Archaeological Society in June 1996. The findspot lies on an expanse of Third Terrace gravels on the west side of the Lea Valley.

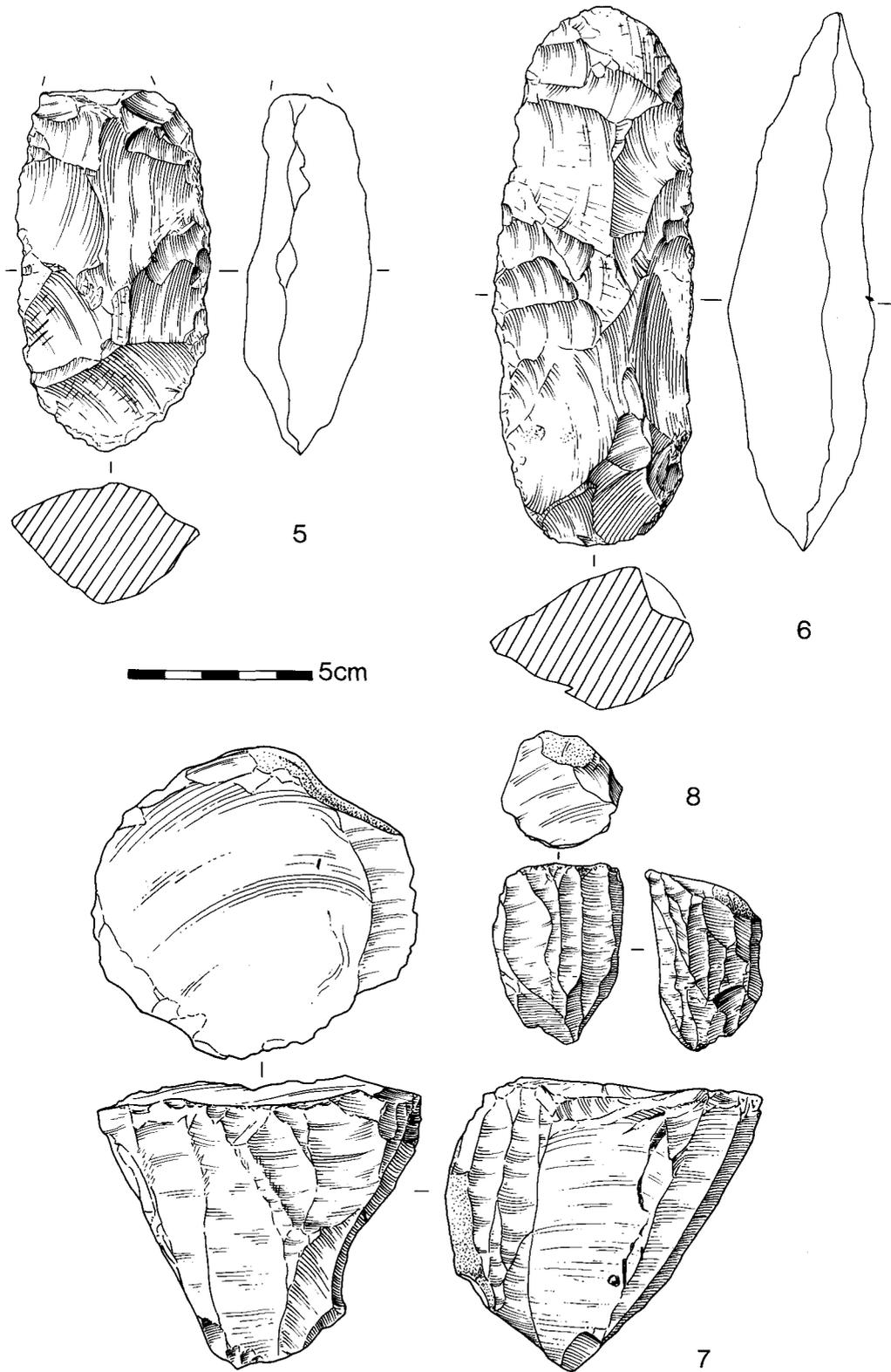


Fig 3. Mesolithic flint artefacts Nos 5-8, scale 1 : 2

The implement measures 97mm in length, 48mm in width, is 32mm thick and weighs 196.17g. It is of cherty, mottled grey-brown flint with iron staining on the high points of both faces. The piece also shows signs of wear and abrasion, particularly around the break, presumably the result of its having lain on or close to the surface. The cutting edge has been re-sharpened on one face with a tranchet blow.

6. Complete Mesolithic flint adze found in 1967 in a garden in Ulleswater Road, Southgate (TQ 3050 9313), and reported by Geoffrey Gillam in May 1997. The houses in Ulleswater and surrounding roads date from *c.*1909; prior to that time the area formed part of the parkland belonging to a private estate (Geoffrey Gillam, pers comm). The findspot overlooks Pymme's Brook, a tributary of the Lea.

The implement measures 147mm in length, 52mm in width, is 36mm thick and weighs 320.63g. It is of attractively banded grey-brown/pinkish-buff flint, and shows no sign of surface wear or abrasion. Both faces of the cutting edge have been resharpened with tranchet blows.

Discussion

Nos 5 and 6 can be added to a handful of other Mesolithic artefacts recorded from the Enfield, Edmonton and Southgate localities (*eg* Wymer 1977, 187; Gibson 1992). Excavations in the floor of the Lea valley at Enfield Lock to the east (Bedwin 1991) have located early Flandrian peats with high concentrations of charcoal, thought to indicate widespread clearance of the local pine-dominated tree cover by gatherer-hunter groups (Lewis *et al* 1992, 243–4). Adzes of the type published here could well have been used by these or later Mesolithic communities for tree-felling and related carpentry activities.

7. Large, single-platform pyramidal core found close to low water on the Surrey foreshore of the Thames in front of Chambers Wharf, Bermondsey (TQ 3438 7980) by Susanne Clokey and Julian Przybyla, and reported by Richard Hill in March 1995. The core was recovered from the surface of the foreshore at the downstream end of Chambers Wharf, in an area where seemingly *in situ* bedded horizons producing struck and burnt flint, pottery, animal, human and molluscan remains have been recorded by

Richard Hill and others (see also Nos 15, 16 and 25 below).

The core measures 80mm in overall length, is 81mm across its striking platform and weighs 554.9g. A patch of smooth cortex survives at one point and makes it clear that the core has utilised a thermally-fractured (and lightly peat-stained) cobble of river gravel, of cherty, originally mottled grey-black flint stained yellow-brown. There are at least eight flake beds remaining on the core, the largest of which measures 90mm in length. The striking platform appears to have been renewed with the removal of a large broad core tablet, suggesting that the core was originally capable of producing somewhat longer flakes/blades.

8. Single-platform pyramidal bladelet core found on the Surrey foreshore of the Thames at Vauxhall (*c.*TQ 2970 7780) by Jonathan Cotton in August 1993 (MoL 95.290/2). The core was picked up close to low water on a 0.4m tide, having apparently been eroded out of an extensive horizontal peaty horizon or 'platform'. (The findspot lay a few tens of metres upstream from that of No. 2 above.)

The core measures 53mm in length, 37mm in width and is 33mm thick. It is of good quality dark grey-black flint, with a small patch of rough white cortex adjacent to the striking platform.

MESOLITHIC/NEOLITHIC (Fig 4)

9. Worked red deer antler-base found on the Surrey foreshore of the Thames at Nine Elms, Vauxhall (TQ 3009 7796) by Jonathan Cotton in August 1993 (MoL 95.290/5). The piece was picked up close to low water between a series of pairs of substantial round-wood piles which run out into the deep water channel immediately upstream of the jetty belonging to the Nine Elms Cold Store. An antler tine and a flint blade were recovered a few metres downstream of the findspot; a pair of Middle Bronze Age spearheads from further up the same stretch of foreshore are discussed below (No. 22).

The antler-base measures 216mm in length along the beam, 64mm in diameter across the base, 43mm in diameter across the beam and weighs 695.2g. There are considerable signs of its having been worked with flint/stone tools: the beam has been severed between the bez and trez tines, the brow tine has been removed by careful

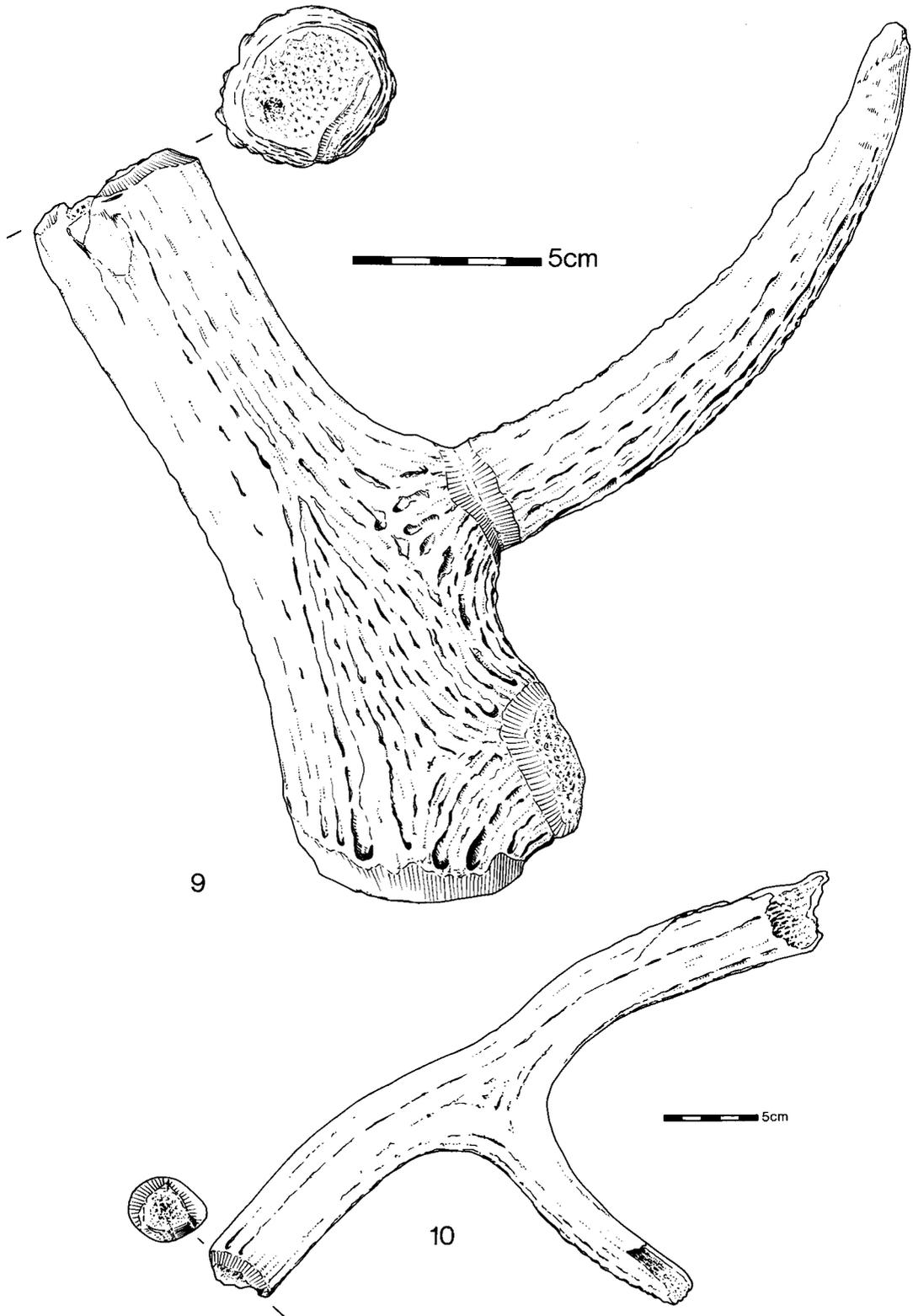


Fig 4. Antler waste, No. 9 scale 1:2, No. 10 scale 1:4

grooving and then snapping through the cancellous tissue, and the bez tine (175mm in length from base to tip) is in process of being removed by grooving, the latter presumably accomplished either by nibbling with a flint burin or sawing with a flint blade. The base of the antler (*ie* the part which joined the antler to the animal's skull) has also been modified using the same grooving technique, and this operation has effectively removed any evidence for determining whether the antler was shed naturally or cut from a dead animal (the use of shed antler is more common).

The piece is quite clearly in process of modification, and the original antler worker may have had any of several possibilities in mind: the creation of a heavy hammer suitable say for flint knapping, with the antler base as the working end; or perhaps the manufacture of a perforated 'base-mattock' (as Smith 1989, Types A & B) for use in wood-working, flenching or digging (*ibid*, 282). The problem with the first suggestion is that although modern flint-knappers use such tools, few actual examples with which to compare our piece survive in the archaeological record (Phil Harding, pers comm). However, the careful removal of the burr at the base of the antler suggests that this was the focus of attention. The manufacture of a base mattock would require the removal of the bez tine, the provision of an angled working edge (probably achieved by chopping away surplus antler with a stone axe), and the perforation of the implement for hafting (Smith 1989, 281), though in this instance the surviving length of the antler-beam is perhaps too short to produce an effective tool of this type (Clive Bonsall, pers comm). The reason for its discard part-worked remains equally unclear, although it is conceivable that it was deliberately immersed in the river to soften the tough outer surface of the antler for ease of working (*eg* Serjeantson *et al* 1991-2, 83), carried away in a flash flood and never recovered.

10. Worked red deer antler beam found on the Surrey foreshore of the Thames at Battersea (c.TQ 2765 7748) by Richard Hill in August 1996. The piece lay some 14m out from the river wall and 225m downstream of the Albert Bridge.

The antler beam is 400mm in length, 40mm in diameter and weighs 617.6g. The bez tine survives to a length of around 140mm although its tip is missing. The beam itself is badly shattered at its distal end, while there is a distinctive bevel at the proximal end providing

clear evidence of grooving with a flint burin or knife, as on No. 9 above.

It is possible that the intention here was the manufacture of a 'beam mattock', of which a number are known from the Thames (as Smith 1989, Types C and D). If so, a generally late Mesolithic date would be appropriate (Bonsall & Smith 1989).

Discussion

A number of finished antler tools including barbed points, antler-base and antler-beam mattocks, sleeves, picks, combs, pins, maceheads and cheek-pieces have been recovered from the Thames (*eg* Lawrence 1929; Lacaille 1961 & 1966; Smith 1989; Simpson 1996). However, few pieces of prehistoric antler waste have been identified locally hitherto. A group of grooved and chopped antlers of probable Neolithic date lay within a silted up river channel located at Eden Walk, Kingston during excavations carried out in the 1960s and late 1970s (Penn *et al* 1984, 216 & Fig 5; Serjeantson *et al* 1991-2, 83 & Fig 9, nos SF17 & SF18); a cut antler burr was recovered from a segment of the outer ditch of the earlier Neolithic causewayed enclosure at Yeoveney Lodge, Staines (Robertson-Mackay 1987, 122 & Fig 75); while an unfinished 'later Neolithic' antler macehead from the 'Thames foreshore' (MoL 84.405) has been noted by Simpson (1996, 303, No. 51). Antler working was also clearly taking place during the Late Bronze Age at Runnymede Bridge, primarily for the production of cheek-pieces (Longley 1980, 27-31; Foxon 1991, 148-9). Neither piece considered here can be closely dated, and both could belong equally well within either the Mesolithic or Neolithic periods.

NEOLITHIC (Figs 5, 6, 7)

11. Neolithic ground stone axe found during landscaping in the back garden of no 6 North Square, Hampstead Garden Suburb (c.TQ 254 885), and reported by the householder, Mrs C. Eilon, in January 1996. The axe had been discovered at a depth of approximately two feet during the removal of a Yew tree. North Square is situated on an eminence of London Clay which falls away northwards towards a minor

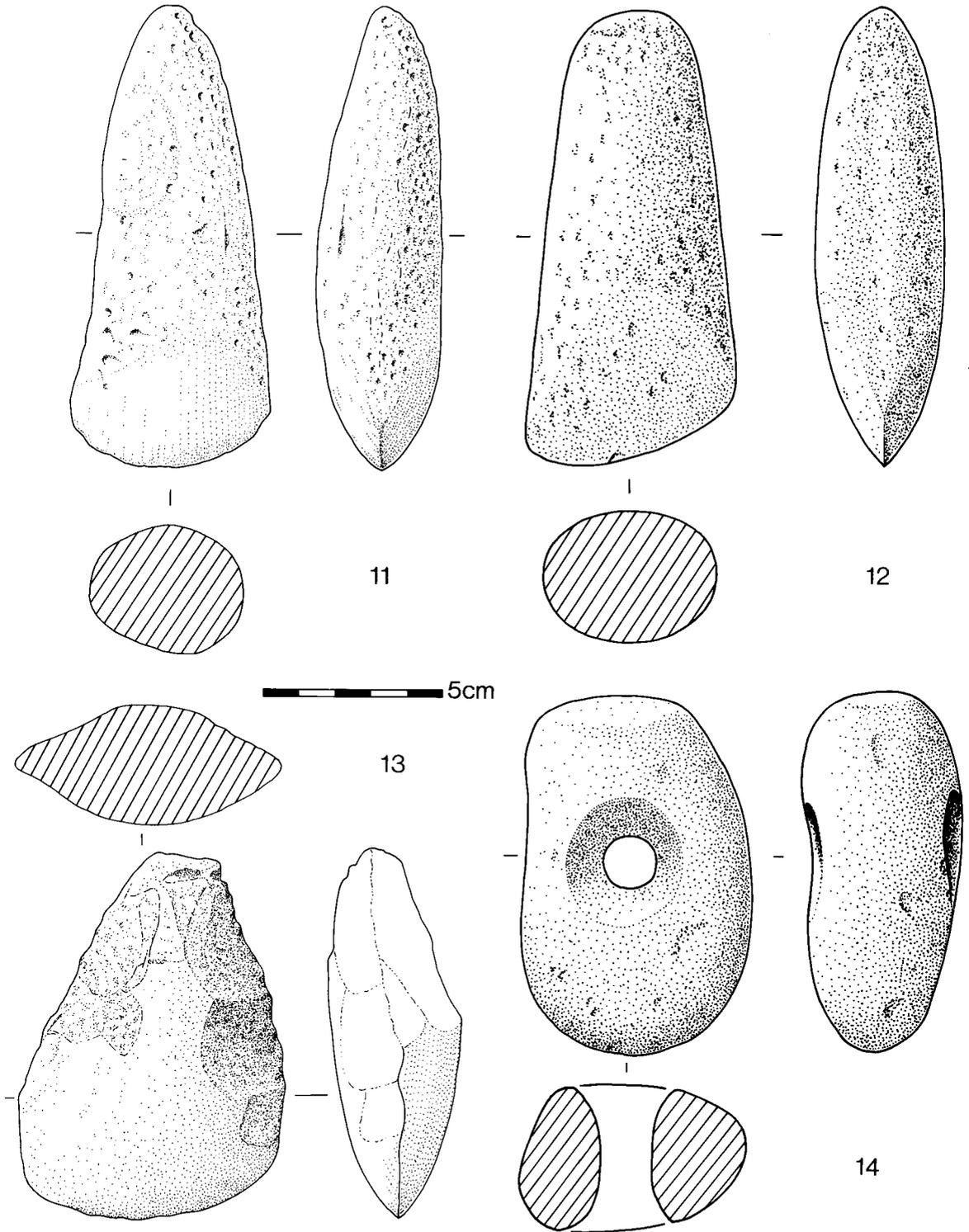


Fig 5. Neolithic stone artefacts Nos 11-14, scale 1:2

tributary of the Brent, the Mutton Brook, a kilometre or so distant.

The implement measures 130mm in length, 56mm in width at the cutting edge, is 35mm thick and weighs 330.65g. It is of nearly circular cross-section at the mid point and is made of a close-grained rock of grey-green hue, burnt pink across much of the illustrated face. It has not been sliced and the intensity of the heat to which the axe has been subjected renders macroscopic identification of the parent rock difficult (Sylvia Humphries, pers comm). The surface is pitted and cracked away from the cutting edge, although how much of this is due to fire action is unclear. The less damaged portions close to the cutting edge are heavily scratched and striated.

12. Neolithic ground stone axe found on the Middlesex foreshore of the Thames at Syon (TQ 175 764) by John Gibson sometime around 1976 or 1977 (MoL 95.533/2). The piece was discovered three quarters of the way down the foreshore and in (presumably) fortuitously close association with a Late Bronze Age scrap hoard (Needham & Burgess 1980, 445 & Fig 2; Needham 1987, 121, Fig 5.15, nos 2–18). It was considered to form part of the hoard by its finder. A quartzite pebble hammer (No. 14 below) was also picked up close by.

The axe measures 127mm in length, 58mm in width at the cutting edge, is 34mm thick and weighs 405.56g. It has a flattened circular cross section and a markedly asymmetric cutting edge, and is made of a coarse grained and much pitted green-black rock visually similar to products of Group I or Ia (Mount's Bay area of Penzance, Cornwall). However, the sourcing of rocks of 'Cornish' type has recently been critically reviewed by Berridge (1994), who has raised doubts about the whole concept of 'factory' sites in the Cornish peninsula.

13. Blade of a Neolithic ground stone axe found on the Surrey foreshore of the Thames at Battersea Park (c.TQ 2816 7760) by Richard Hill in early 1997. The findspot lies 16.3m out from the river wall and 70m downstream of the Festival Pier.

The axe fragment now measures 102mm in length, 71mm in width close to the cutting edge, is 34mm thick and weighs 279.23g. It retains a pointed lentoid cross-section and is made of greenish-grey, medium coarse-grained rock. Although it has not been sliced, it is visually similar to another axe from the Thames at

Hampton Court in the collections of the Museum of London (MoL 49.107/165), sourced as 'Mynydd Rhiw, North Wales' (Group VII). The axe has clearly been crudely re-worked at some stage subsequent to breakage to create a small but serviceable triangular tool, and would probably originally have been somewhere in the region of 180–220mm in length.

14. Neolithic perforated pebble hammer found on the Middlesex foreshore of the Thames at Syon (TQ 175 764) by John Gibson sometime around 1976 or 1977 (MoL 95.533/5). The piece was found three quarters of the way down the foreshore and close to a Neolithic axe (No. 12 above) and a Late Bronze Age scrap hoard (Needham & Burgess 1980, 445 & Fig 2).

The implement measures 100mm in length, 60mm in width, is 43mm thick and weighs 397.98g. It comprises a small oval quartzite pebble with an hour-glass perforation drilled slightly off-centre and towards the narrower end. Although there are one or two pock marks on the surface and at the edges, there is no trace of wear or abrasion at either end consonant with its use as a hammer (see Roe 1979, 36 & Fig 15).

Other 'pebble hammers' have been recovered from Syon Reach/Old England, and fall within a west London Thames cluster (Roe 1968; Field & Penn 1981, 15). The dating of these pieces is problematical, although the Mesolithic associations of many of their number are perhaps best known. However, others – as Roe has noted (1979, 36) – could belong within the Neolithic/Bronze Age or even later. The shape and size of our pebble, together with the off-centred positioning of its hour-glass perforation, is reminiscent of maceheads of Roe's 'ovoid' type, the latter often associated with late Neolithic Grooved Ware (eg Roe 1979, 30).

15. Naturally perforated flint nodule worked into a 'macehead' found on the Surrey foreshore of the Thames in front of the downstream end of Chambers Wharf, Bermondsey (c.TQ 3439 7980) by Richard Hill in 1989. Like the large pyramidal core (No. 7 above), the piece was recovered from the surface of the foreshore in an area where apparently *in situ* bedded deposits had been observed by the finder and others (see also No. 16 below).

The object measures 138mm × 132mm, is 49mm thick and weighs 780.1g. The flint is a mottled grey/black in colour with expanses of smooth grey-white cortex surviving around the

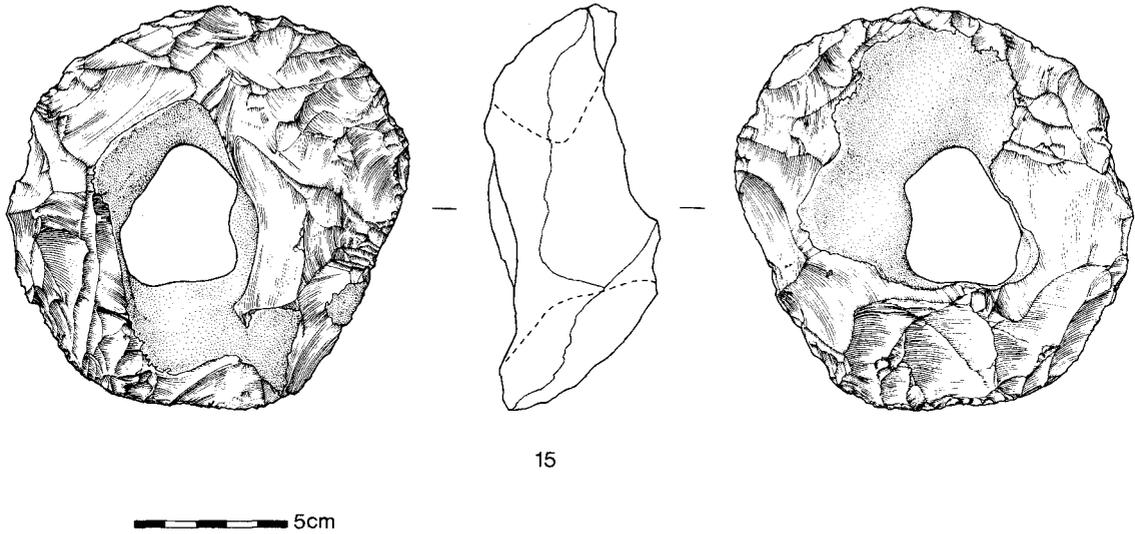


Fig 6. Neolithic/Bronze Age flint 'macehead' No. 15, scale 1:2

natural hole and at one point on the circumference. The flaking is bold and combines both hard and soft hammer technique. At several points the edge has been used as a striking platform for the removal of flakes/blades. The edge itself shows some signs of localised crushing and wear, although this may be a result of the time spent on the foreshore. (Traces of green algae on one face may be similarly explained.) No attempt appears to have been made to modify the central perforation, and no signs of wear are visible (*eg* from hafting).

Naturally holed stones worked into 'maceheads' are not particularly common. Examples from Foxholes Farm, Hertfordshire (Partridge 1989, 151 & Fig 89, No. 37) and West Kennet Avenue (Smith 1965, 242 & Fig 80, No. f205) are anyway both markedly smaller in size than that from Bermondsey, although in this respect a third piece from Mucking, Essex – now in the British Museum (P1990 12-4 1; Gill Varndell, pers comm) – is closely comparable (as is another somewhat larger stray piece from Paris currently in the Musée Carnavalet (Philippe Velay, pers comm)). The Mucking and West Kennet examples exhibit edge bruising while, unlike our piece, all three of the parallels cited above appear to have a worn or 'lustrous' appearance at the perforation. The two smaller examples have been interpreted as possible amulets, and the signs of wear argued as the result of friction from a thong threaded through the hole; alternatively these could result from hafting friction.

Dating is inevitably something of an imperfect exercise given the universal appeal – and folklore (*eg* Dent 1965; Merrifield 1987, 161–2) – attached to naturally-holed stones; the Foxholes Farm piece for example was recovered from a deep 'shaft pit' (F50) dating to the Late Bronze Age (Partridge 1989, 110 & Fig 62), while that from West Kennet formed part of a scatter of struck flint and Peterborough Neolithic pottery recovered from an old land surface towards the southern end of the Avenue (Smith 1965, 210). The Paris piece is described as 'Neolithic', while that from Mucking has been tentatively assigned a Neolithic/Bronze Age date, which would on balance perhaps suit the Bermondsey piece too. Simpson (1996, 299) has drawn attention to a further group of 13 smaller flint 'maceheads' with natural perforations, some of which may be linked to the Maesmore group by virtue of the presence on several of decorative faceting, and for which a later Neolithic date might also be appropriate.

16. Rimsherd of decorated, heavily flint-tempered pottery found on the Surrey foreshore of the Thames in front of the downstream end of Chambers Wharf, Bermondsey (TQ 3436 7980) by Richard Hill in July 1995. It lay close to low water in an area which had previously yielded flintwork and a small series of dressed timber uprights 20–30cms in diameter (Richard Hill, pers comm). The naturally-holed 'macehead' (No. 15 above) and the large pyramidal core

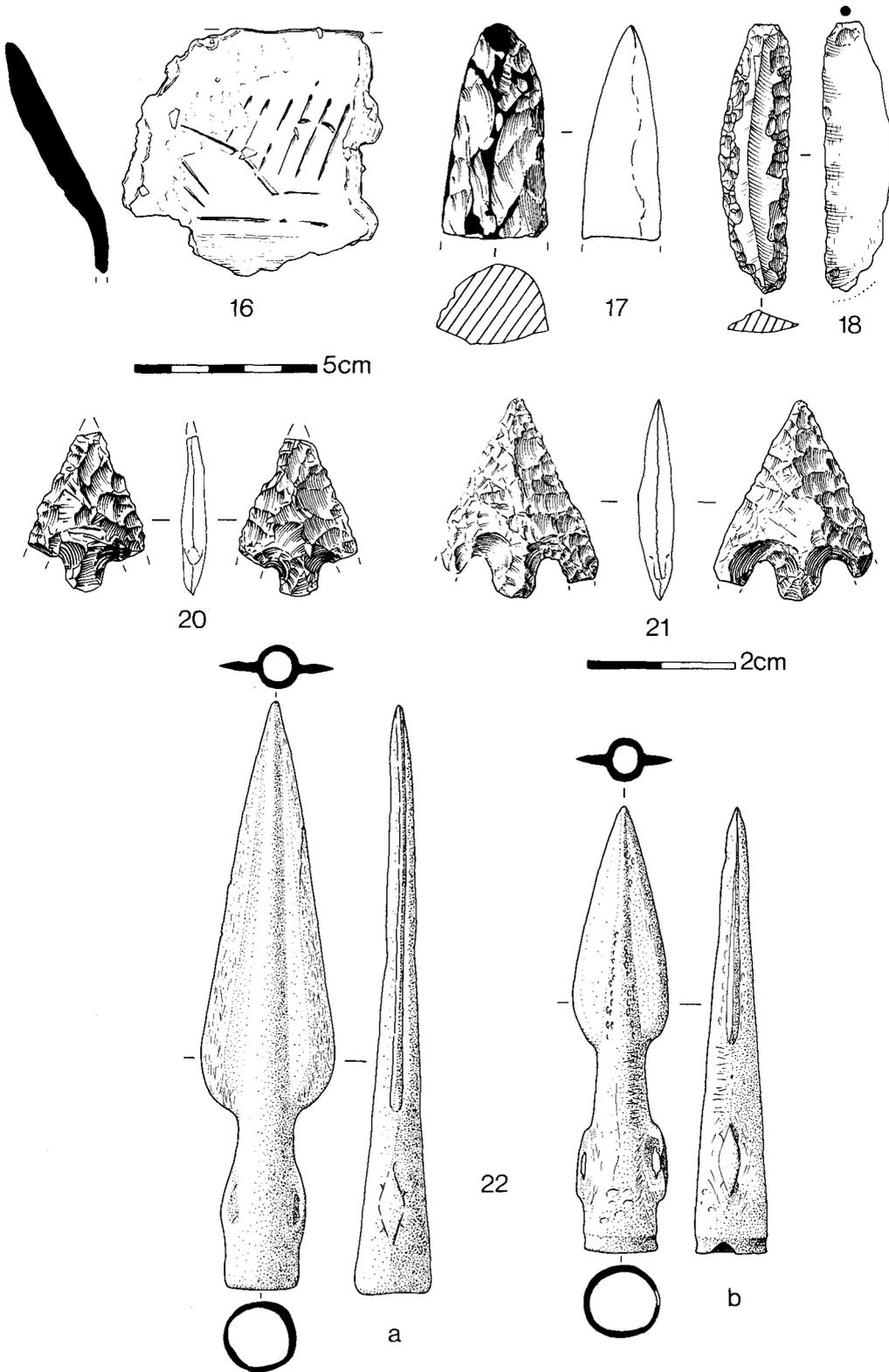


Fig 7. Neolithic, Nos 16-18, and Bronze Age, Nos 20-22 artefacts including MBA hoard No. 22 a and b. Nos 20-21, scale 1:1, the remainder, scale 1:2

(No. 7 above) were recovered from the same general area, as apparently was a sherd of Peterborough Neolithic pottery published previously (Cotton & Merriman 1991, 43).

The sherd measures 67mm by 65mm and weighs 51.68g. It comprises part of a large, flaring-mouthed but thin-walled open bowl with a simple, unexpanded rim, of fine sandy fabric with frequent angular crushed burnt flint inclusions, the latter up to 5mm in size. The sherd is fired light brown throughout. Little attention seems to have been paid to the finish of the exterior surface which, though somewhat abraded, appears to have been undecorated. (A thick layer of sandy 'tufa'-like deposit originally adhered to this surface, but has since been removed under laboratory conditions, and retained for future analysis.) The interior, by contrast, is better preserved and finished, and is decorated with a series of short oblique parallel strokes probably applied with a rounded point of wood or bone.

Its thin-walled open form is suggestive of Earlier Neolithic rather than Peterborough Neolithic affinities, though local parallels are hard to find. It is perhaps best accommodated within the 'southern decorated bowl tradition' (Whittle 1977, 85-97), though with closer affinities to the Sussex Whitehawk material rather than the heavy rims prevalent in the East Anglian Mildenhall style.

The thick 'tufa'-like layer adhering to the outer surface of the Chambers Wharf sherd has been noted on a number of objects from the Thames, and is often referred to as 'Thames race'. It comprises a calcareous deposit usually thought to have formed under slow moving water conditions such as would occur naturally in a mature braided river system. Here, the sherd presumably lay with its inner surface face-down, which effectively preserved the incised decoration.

17. Butt of a Neolithic part-ground flint chisel found on the Surrey foreshore of the Thames at Wandsworth (TQ 2480 7537) by Bob Wells, in February 1995. The object lay amongst 'gravel shingle' about three quarters of the way down the foreshore in front of Wandsworth Park.

The implement measures 59mm in length, 28mm in width, is 22mm thick and weighs 38.14g. It is of stained, cherty mottled grey flint and has a robust D-shaped cross-section. Its worn condition suggests that it had lain exposed on the foreshore for some while before discovery.

Such part-ground tools are usually regarded as Late Neolithic, though chisels of this type are not especially common locally. Lawrence for example notes only six specimens known to him (1929, 96). A complete example, 195mm in length, from the Thames at Wandsworth, is in the collections of the Museum of London (MoL A1478); a second, slightly smaller, comes from Barn Elms (MoL A23644).

18. Neolithic blade knife found on the Middlesex foreshore of the Thames at Syon (TQ 1730 7630) by John Gibson sometime around 1976 or 1977 (MoL 95.533/3). The piece was found while 'sieving for coins' below low water. A potin coin from the same findspot is dealt with below (No. 39); a second, halved, potin was recovered from this same locality by Richard Hill around 1980 (Richard Hill, pers comm).

The implement measures 75mm in length, 19mm in width, is 5mm thick and weighs 10.97g. It comprises a narrow robust blade of olive-green flint stained grey-black, subsequently reworked with shallow, invasive retouch along both lateral edges of the dorsal face to reveal the original flint colour. The distal tip is heavily worn through use. The original blade has a plain butt and has been detached from its parent core with a soft hammer.

A knife of this form was found with a beaker burial at Winterbourne Stoke G54 (Annable & Simpson 1964, No. 58), and with a food vessel at Weaverthorpe, Yorkshire (Kinnes & Longworth 1985, 46); similar knives were also associated with Grooved Ware at Mount Pleasant, Dorset (there termed 'blades with flat edge retouch' (Wainwright 1979, F10, F41-3, F57-60, F91, F104 & F141)). Such associations indicate a generally late Neolithic or Early Bronze Age date for the type.

BRONZE AGE (Figs 8, 9, 10, 11)

19. Substantial portion of an Early Bronze Age handled pottery beaker found off the downstream tip of Isleworth Eyot on the Middlesex foreshore of the Thames (TQ 1682 7596) in the Summer of 1976. Said to have had the consistency of 'wet blotting paper' on its discovery in shallow water at low tide, it was subsequently seen and photographed by John Gibson. The present whereabouts of the fragment are unknown, and the following description is based solely on the evidence provided by the photograph. Other



Fig 8. Early Bronze Age handled pottery beaker No. 19, scale 1 : 1

objects recovered from this same locality include a 'multiple find' of potin coins (No. 35 below) and a copper alloy lipped terret (Cotton 1978).

The beaker fragment itself is 175mm in overall length, and has separated into at least six,

possibly seven, conjoining sherds. The vessel form appears to be tripartite; the upper part of the (missing) handle seems to have been luted to the pot wall, while the lower end was attached by means of a rectangular hole cut when the pot

was green hard. The fabric appears to be sandy and somewhat vesicular. The decoration, probably incised with a flint blade or bone point rather than impressed with a comb, comprises four horizontal lines of floating lozenges infilled with lattice hatching. The two lines of lozenges on the upper part of the vessel wall are divided from the two on the lower by a distinct 'waist' emphasised by a band of cross hatching. Two horizontal bands of cross-hatching lend emphasis to the rim.

The vessel belongs to Clarke's Handled Southern Beaker Group (SH₄(B); Clarke 1970, 245–53), and to Lanting and Van der Waals' Step 7 (1972). In any current scheme the handled beaker appears to be a late phenomenon, perhaps as late as c.2000–1700 BC, though complicated panelled and floating decoration occurs from a much earlier date. Human bone associated with three Final Southern Beakers (Clarke's class S₄; Lanting & Van der Waals Step 7) has yielded calibrated calendar dates at 95% confidence which span the period 2195 to 1520 BC (Kinnes *et al* 1991). A number of handled vessels occur in East Anglian graves, with others recorded from South Wales and the Essex coast. Geographically, the closest examples are the single vessel from Lion Point, Clacton (Clarke 1970, fig 1072) and two others from Sible Hedingham (Clarke 1970, figs 1053–4). The Isleworth vessel is of particular interest because of the relative, and continuing, scarcity of beaker pottery in this part of the lower Thames valley. It is also one of the more elaborately decorated examples from the region. Boast (1995, 76) is careful not to equate decorative complexity with 'value', but he does note the recurrence of closed motifs such as lozenges on vessels chosen to accompany burials.

20. Barbed-and-tanged flint arrowhead found while digging in the back garden of 15 Blythwood Road, Pinner (TQ 117 906) by Barry Lanning early in 1997. The findspot lies on London Clay adjacent to an outcrop of the Reading Beds, and overlooks the Woodridings Brook, a minor tributary of the River Pinn.

The arrowhead, which is missing its tip and both barbs, measures 22mm in length, 16mm across the base of the barbs, is 3mm thick and weighs 0.98g. It is made of opaque light brown flint and has been dexterously shallow-flaked across both faces.

It can be added to a number of stray Bronze Age finds from the upper reaches of the Pinn; in

addition to a plano-convex knife mentioned in passing by Braun (1933, 102), two transitional palstaves and a barbed spearhead are also known from the locality (*eg* Cotton & Merriman 1991, 46).

21. Barbed-and-tanged flint arrowhead found on the Surrey foreshore of the Thames at Wandsworth (TQ 2501 7540) by Bob Wells, and reported in October 1992. The object was found on the surface of the foreshore during a heavy rainstorm, at a point close to the edge of a peat deposit visible at low water near Point Pleasant.

The arrowhead measures 28mm in length, 22mm in width across the barbs, is 4mm thick and weighs 2g. It is made of opaque, peat-stained grey-brown flint, and is somewhat plano-convex in long-section; part of the ventral face of the parent flake survives on one face. Both faces are otherwise neatly ripple-flaked although both barbs are now broken.

It belongs to Green's 'Sutton b' type (1980, 50–1), and can be added to a number of such arrowheads recovered locally from the Thames and beyond (*eg* No. 20 above). Barbed-and-tanged arrowheads appear to have had a wide currency, and were not the exclusive prerogative of beaker-using groups (*eg* Needham 1987, 101), most of the limited local evidence for which has been recovered from the river and its margins (*eg* No. 19 above). The stained condition of the piece, and its proximity to the edge of a peat platform, suggests that it may have been eroded out of the peat deposit itself, although this particular stretch of peat has provided several very early late glacial/early Flandrian dates (James Rackham, *pers comm*).

22. A pair of Middle Bronze Age copper alloy side-looped spearheads found on the Surrey foreshore of the Thames at Nine Elms, Vauxhall (TQ 3008 7795) by Jake Rylance, reported first to the British Museum in the Summer of 1994 and subsequently acquired by the Museum of London in November of the same year (MoL 94.215/1–2). The spearheads were found with the aid of a metal-detector at the same findspot on separate occasions a day or two apart; both lay at a depth of several inches below the surface of the modern foreshore amongst a number of substantial, paired round-wood piles, the latter under active erosion by the tides. It is fair to assume that the spearheads were deposited together, although the relationship between the metalwork and the wooden piles remains

uncertain. A site visit by Stuart Needham of the British Museum confirmed the finder's observation that peat-stained animal bones lay in the vicinity; at least one was noted to be 'firmly embedded' in an organic deposit. Other finds from the immediate locality of the piles included several pieces of struck flint and a partially-worked antler base (see No. 9 above).

a) The larger of the two spearheads measures 164mm in length, 36mm in width across the base of the leaf-shaped blade, which is 115mm in length, with a socket diameter of 20mm. It weighs 97.8g. The mid-rib is rounded and the blade-wings have bevelled edges with traces of extensive grinding; on one face of the blade there is a channelled groove or internal facet either side of the mid-rib. The side-loops are neatly modelled and protected by lozenge-shaped plates, although both loops are encrusted with iron concretions, amongst which were identified traces of mineral-replaced bast fibres of lime/linden (see below). The spearhead has a patchy oily green-brown surface patina and is in robust condition.

b) The smaller example measures 123mm in length, 26mm in width across the base of the leaf-shaped blade, which is 66mm in length, with a socket diameter of 20mm. It weighs 87.8g. The mid-rib is rounded and the blade-wings have slightly bevelled edges. The side-loops are neatly modelled and protected by lozenge-shaped plates, while the socket mouth is defined by a carefully-modelled hollow collar or inset bevel. There are traces of hammer facets close to the socket mouth and at the junction of the blade-wings with the mid-rib, and of grinding along the socket and adjacent to the side loops. The piece has a dark brown-purple surface patina and is in robust condition.

Discussion

Side-looped spearheads are usually attributed to the Taunton phase of the Middle Bronze Age (MBA 2: 14th-13th centuries BC), and their currency overlaps with that of other MBA spearhead types such as the larger basal-looped form. Both Vauxhall pieces fall within Rowlands's Group 1 (1976, 52), in having slender, leaf-shaped blades, rounded mid-ribs and angular loops with lozenge-shaped protective plates. Such spearheads concentrate in the lower Thames

valley. The two Vauxhall pieces clearly constitute a small hoard, and can be added to the few other Middle Bronze Age hoards known from the London area, most of which are composed of palstaves (*eg* Rowlands 1976, 236-7, but see also No. 24 below). Their relationship with the paired timber piles, though uncertain, is intriguing in view of the recurrent associations between metalwork finds and other late prehistoric timber structures noted elsewhere (*eg* Testwood Lakes, Southampton (Fitzpatrick *et al* 1996, 10; Andrew Fitzpatrick, pers comm), Flag Fen (Coombs 1992) and Fiskerton (Field 1986); for the local associations of metalwork with timber piles see Needham & Burgess 1980, 457). Fuller discussion of this potentially exciting possibility must await definitive dating of the Vauxhall timbers.

If the mineral-replaced bast fibres of willow/poplar caught in the loop of the larger piece do represent the remains of original organic bindings, this raises questions as to whether the spearheads were hafted when deposited and if so how such presumably buoyant objects came to rest at precisely the same spot (see Ehrenburg 1977, 17; Hooper & O'Connor 1976). It could be argued that they became entangled in flotsam around the pile structure, though, as noted above, the contemporaneity of spearheads and timbers cannot be demonstrated. Against this idea, however, no remains of any wooden hafts were found in the sockets of either spearhead despite the apparently favourable conditions for their survival (but see Caroline Cartwright's report below). This being so, it is perhaps more likely that the bast fibres represent the remains of string used to tie the two unhafted spearheads together for ease of transportation/deposition. Whether they represent a deliberately placed foundation deposit or a casual loss, however, remains unclear, as does their precise relationship with the timber piles.

Both spearheads were submitted to Caroline Cartwright of the Department of Scientific Research at the British Museum; she reports as follows:

Two bronze spearheads from Nine Elms foreshore, London were submitted for scientific examination of organic remains in the basal loop area of one of the specimens. Examination under a Wild M8 stereo microscope revealed a small area of mineral-replaced organics where the end of the basal loop joins the haft and another small area of organic remains on the loop itself. The second spearhead was also examined under

the stereo microscope but there were no identifiable organic remains.

The area of mineral-replaced organics in the end of the basal loop/haft region comprises fragments of wood which can be ascribed to *Salix/Populus* (willow/poplar) on the basis of a diffuse porous arrangement of vessels, simple perforation plates and uniseriate rays but chiefly on account of the highly diagnostic large ray-vessel pits present in the radial cross-field area which is visible on the spearhead surface – (BMRL 47023S).

The organic remains from the loop comprise fragments of bast fibres (phloem) from *Tilia* sp. (lime, linden) bark (BMRL 47024Q). Lime bast fibres have been used for cordage, coarse sewing and binding; many Neolithic and Bronze Age waterlogged sites from Switzerland and Germany contain a high proportion of lime bark debris from which the lime bast fibres have been extracted (Schweingruber 1990).

Unfortunately there is no conclusive way to demonstrate that the fragments of mineral-replaced *Salix/Populus* wood represent traces of the original hafting material. None of the organic remains from the Nine Elms foreshore spearheads has been submitted as part of the radiocarbon dating by accelerator mass spectrometry of Bronze Age metalwork but the use of wood and other organic remains associated with the hafting of Bronze Age metalwork will be synthesised and interpreted towards the conclusion of the programme; the Nine Elms organic remains will be discussed as part of this synthesis.

23. Fragment of a Middle Bronze Age gold composite ring found on the Surrey foreshore of the Thames at Wandsworth (TQ 253 753) by Bob Wells in February 1992. The object was located using a metal detector and lay at a depth of about three inches in gravel and mud over peat at a point about one metre above the dead low tide line near Point Pleasant. The find has been the subject of a Coroner's inquest.

The following report was prepared for the Coroner by Stuart Needham of the British Museum, to whom the find was referred:

Description

Length of fragment 15mm; width at cut end 8.7mm; width at terminals 7.1mm; maximum thickness of band 3.8mm; weight 6.13g.

The Wandsworth piece is about half of a penannular ring made up of two round- to oval-sectioned rods. The two rods appear to have been fashioned separately, then joined together with solder. They are coming adrift towards the broken end. The surviving terminals are roughly flattened, leaving small hammer facets and a slight depression in the centre of each.

The ring appears to have been cut through in antiquity, probably using a sharp bronze tool such as a chisel or knife against an anvil stone. This has resulted in an asymmetrically-tapered fracture. The surfaces of the rods are generally smooth and even, but are disfigured by a few scratches and indentations.

Analysis

The ring fragment has been analysed in the Department of Scientific Research, British Museum using X-ray fluorescence on an unabraded surface. This gives a semi-

quantitative result which nevertheless shows that it is substantially precious metal: mainly gold, some silver and a small percentage of copper.

Discussion

Despite its fragmentary nature, the Wandsworth ring can be confidently classified as a composite ring, a type well known in Middle Bronze Age contexts in Britain and parts of Europe (Taylor 1980, 53–9; Eogan 1994, 59). The proportions of the major elements in the metal compare well with other analysed goldwork of the Middle Bronze Age. Associations suggest a date range between about 1300 and 1000 BC.

In detail composite rings can be constructed in different ways; the fused variety, to which the Wandsworth example belongs, can comprise up to six parallel rings. Such rings seem to form part of a set of gold jewellery including plain penannular bracelets and more elaborate twisted torcs. In some associations composite rings have been found attached to one another (interlinked) or to the loop of a torc (notably in the Isle of Axholme find, Humberside). They may therefore have functioned as appendages to other ornaments, rather than being used individually.

Previous finds of composite rings in Britain and Ireland are not particularly numerous (about 13 findspots) and have a widely scattered distribution. The new Wandsworth find fills something of a gap between findspots in Sussex and East Anglia (Taylor 1980, 150 map 4). As an isolated find it is difficult to hazard a guess as to its original context of deposition. The evidence for being cut in antiquity could, however, suggest that this piece was destined for recycling by a goldsmith prior to its loss or disposal.

24. Middle Bronze Age notched hilted copper alloy rapier found in three pieces on the Surrey foreshore of the Thames 'about 300 yards up river from Wandsworth Bridge' (*ie c.* TQ 257 754) by Mr E. Penn in the summer of 1993. All three pieces were recovered with the aid of a metal detector at the same time and at low water; all were about 'three–four inches down in the mud'. The hilt and upper portion of the blade were found together, while the lower part of the blade was 'about 20 feet away'. The butt fragment refits with the middle section; although clearly from the same blade, the tip does not. The reported findspot lies off the Delta Business Park, downstream of the Wandle-Thames confluence.

Together, the butt and mid-section measure 120mm in length, and the tip a further 172mm in length, giving a minimum overall length of 292mm. The combined weight of the butt and mid-section is 38.38g; that of the tip 40.39g, giving an overall weight of 78.77g. All three fragments are worn and abraded; the butt is clearly incomplete but was probably originally provided with two rivet holes and two notches above the shoulder which may indicate the positions of other rivet emplacements.

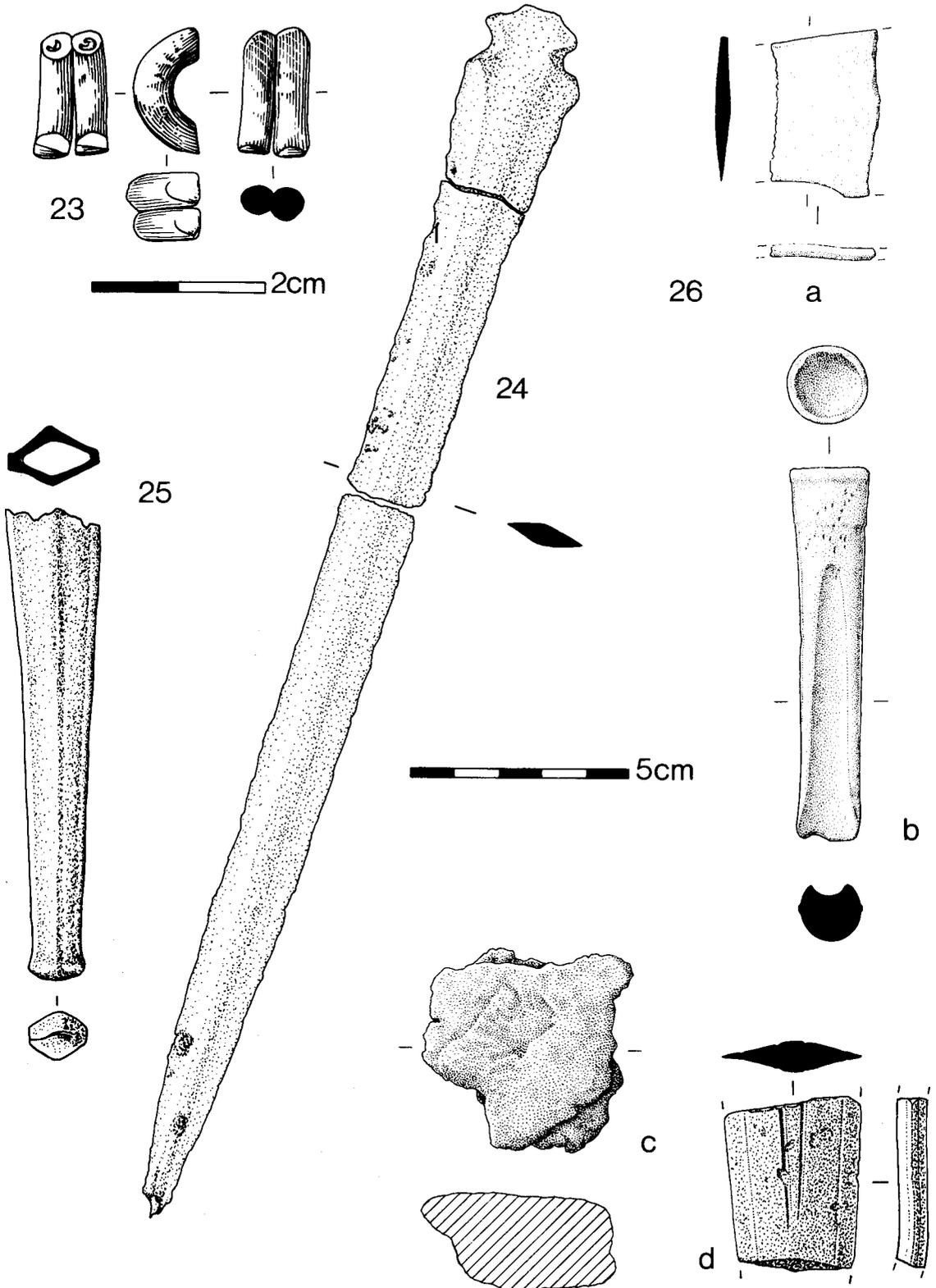


Fig 9. Bronze Age metal artefacts Nos 23-26 including LBA hoard 26a-d. No. 23 scale 1:1, the remainder 1:2

The narrow blade has a flattened mid-rib, and this, together with the short blade and butt form, suggests that the piece belongs to Burgess and Gerloff's Group IV: Type Appleby (1981, 74ff). Most Group IV rapiers can be attributed to the Penard phase (MBA 3: 12th-11th centuries BC; Burgess & Gerloff 1981, 106-9); upwards of thirty Type Appleby's have been recovered from the west London Thames downstream of Staines (eg Cotton & Merriman 1991, 46-8). The proximity of the three pieces of rapier (two conjoining) is noteworthy, and the find can, to all intents and purposes, be regarded as an atypical scrap hoard. The broken but otherwise reconstructable state of the rapier can be paralleled by later swords recovered both from the river and from hoards on dry land, as for example at Watford (Coombs 1979, 202-5).

25. Late Bronze Age tongue-shaped copper alloy chape fragment found on the Surrey foreshore of the Thames at Chambers Wharf, Bermondsey (TQ 3425 7984) by Richard Hill in 1993. The piece lay about half way down the foreshore in front of the western (upstream) end of the wharf and on an exposure of laminated clay eroding out of the foreshore.

The piece comprises the lower end of the chape and measures 108mm in length, 21mm in width at the mouth, 12mm in width at the slightly expanded tip and weighs 43.70g. The chape is clearly incomplete and somewhat abraded, and had probably lain exposed on the foreshore for some time prior to its discovery.

Long forms of tongue-shaped chapes belong within the Wilburton phase (LBA 1: 10th century BC) of the Late Bronze Age. This piece can be added to other Wilburton pieces already known from the City and adjacent reaches of the Thames (Needham & Burgess 1980, fig 7B). Its relationship with the laminated clay, the latter perhaps indicative of a transgression phase in the Thames alluviation sequence (Richard Hill, pers comm), is unclear, though likely to be fortuitous. Higher ground to the south, in the form of Horselydown and Jacob's Island, provides a plausible topographic setting for contemporary settlement activity; ardmarks of probable Bronze Age date have been discovered on several sites in the area of higher ground adjacent to St Saviour's Dock (eg Drummond-Murray *et al* 1994, 254; Heard 1996, 77-8).

26. Small Late Bronze Age hoard comprising three copper alloy objects (a fragment of knobbed

sickle, a socketed gouge and a lump of ingot) found on the Surrey foreshore of the Thames at Wandsworth (TQ 247 756) by Bob Wells and reported in September 1990. A fragment of copper alloy sword blade was subsequently found about three metres away from the original find by Ron Caddy and reported in August 1991. The first three pieces were found together with the aid of a metal detector at a depth of 'five or six inches'. They lay beneath a layer of shingle and about an inch into the top of a 'sandy peat' deposit; the fourth piece was also found with a metal detector and lay in a similar stratigraphic position. (A scrapped socketed axe of 'south-eastern' type was recovered from the surface in the same general area by Pat Loobey of the Wandsworth Historical Society (Pamela Greenwood, pers comm); it is unclear whether or not this forms part of the same hoard.)

a) The sickle fragment comprises a segment of the blade at the point where the angular butt meets the cutting edge. It measures 23mm in length, 37mm in width, is 3.5mm thick and weighs 14.95g. The blade is plano-convex in section with a central thickening and a straight, flattened but slightly bevelled back.

Although fragmentary the straightness of the back of the blade indicates that the Wandsworth piece belongs to a characteristic form of knobbed sickle termed the Minnis Bay type by O'Connor (1980, 178 & 533-4), after the discovery of two complete examples in the Minnis Bay, Kent hoard (Worsfold 1943). Such sickles concentrate in the lower Thames valley and appear to be an insular type; examples in north-eastern France and the middle Rhine are indicative of close cross-channel contacts (O'Connor 1980, 178). The type falls within the Ewart Park/Carp's Tongue phase of the Late Bronze Age (LBA2/3; 9th-8th centuries BC). Fragmentary examples occur locally in hoards from Petters Sports Field, Egham (Needham 1990, 17, 46 & fig 10, nos 84 & 86) and the churchyard of Great St Thomas Apostle, City (Anon 1933, 297 & e on accompanying figure).

b) The socketed gouge measures 87mm in length, and is 15mm wide across the blade. The external diameter of the circular socket mouth is 19mm, and the interior diameter is 15mm; it weighs 69.82g. The mouth of the slightly expanded socket has a low collar but the piece is otherwise plain. Casting flashes are visible down both sides. There are traces of ?hammer blows between the

mouth and the start of the gouge furrow; the semi-circular cutting edge has been damaged at one point.

Socketed gouges are a regular component of Late Bronze Age hoards, and most belong to the Ewart Park phase (LBA 2; 9th-8th centuries BC), although a slightly earlier Wilburton genesis (LBA 1: 10th century BC) is possible for examples with multiple mouth-mouldings (Needham 1990, 49). A number of single finds have been recovered from local stretches of the Thames; hoarded examples include those from Petters, Egham (Needham 1990, 48-9); Wandsworth (Garraway Rice 1923); Kensington (*Inventaria Archaeologia* 1960, GB52, 5); and Great St Thomas Apostle (Anon 1933).

c) The dimensions of the irregularly shaped copper ingot fragment are 47 × 45mm; it is 22mm thick and weighs 119.87g. Although both faces are flat it appears to be marginally plano-convex in section. Such ingot fragments are a common component of Late Bronze Age hoards.

d) Small segment of a sword blade measuring 40mm in length, and tapering from 32mm to 22mm in width; it is 6mm thick at the midrib and weighs 33.14g. The midrib is defined by twin grooves which peter away towards the tip; the bevel on both edges is also backed by a further groove. In long section the blade has been bent in two separate planes, presumably to create a small enough fragment to fit into a crucible for re-cycling.

On the face of it, the narrow, tapering blade, groove-defined midrib and groove-backed edge bevel are reminiscent of Carp's Tongue swords, fragments of which occur as scrap in hoards concentrated in the south-east (see O'Connor 1980, 188 and Needham 1990, 74 and fig 17d). Equally, however, it could form part of a less exotic, leaf-shaped sword blade. The small size and atypicality of the fragment makes definitive identification difficult, although it can, like the other pieces, probably be accommodated within the Ewart Park Carp's Tongue phase of the Late Bronze Age (LBA 2/3; 9th-8th centuries BC).

Discussion

It is clear from their close association that the first three pieces (sickle fragment, gouge and ingot fragment) comprise a small hoard, although it is by no means certain that they represent the

totality of the hoard as originally deposited. This is underlined by the sword fragment found three metres away which could be considered an outlier – not impossible in terms of its likely affinities and date, and the size, weight and condition of the piece itself. Either way the association of scrapped pieces and ingot fragment serve to confirm this as a small founders' hoard in Needham's terms (1990, 138-140 especially fig 42), and dated, like so many others, to the Ewart Park phase of the Late Bronze Age. Its deposition within the 'sandy peat' layer suggests that, at the time of its disposal, this portion of the modern foreshore was at least seasonally terrestrial. Sherds of LBA pottery and burnt flint have been recovered from around low water mark on this area of the foreshore by members of the Wandsworth Historical Society over many years (Pamela Greenwood, pers comm). Moreover, a second, larger, founder's hoard from Wandsworth, comprising eight socketed axes, a socketed gouge and eight fragments of copper ingot, was found buried in sand '150 yards south of the Thames' on the site of the Wandsworth, Wimbledon and Epsom District Gas Company (Garraway Rice 1923). Other small metal caches from the intertidal zone include a rare Wilburton scrap hoard from Syon (Needham & Burgess 1980, 445 & Fig 2; Needham 1987, 121, Fig 5.15, Nos 2-18), and a Ewart Park hoard, comprising a socketed axe and two pieces of copper ingot, found on the Surrey bank during repair works to the Grosvenor Road railway bridge at Battersea (Lawrence 1929, 92).

27. Small Late Bronze Age hoard comprising five copper alloy socketed axes found by Mr S. Czoborick in the vicinity of plots 28-29 on a building site in Disraeli Road, Park Royal (c.TQ 204 831), probably in February 1975 (MoL 74.405/1-5) and initially reported to D. Gareth Davies at Verulamium Museum. The axes were located with the aid of a metal detector and lay in an apparently undisturbed context along with what appear, from the finder's description, to have been fragments of copper ingot, the latter not retained by the finder. Site watching undertaken in advance of the subsequent development of an adjacent plot (at TQ 204 830) located several small features cut into the natural London Clay. None were definitely prehistoric and several contained medieval pottery (Richardson 1985, 47). The findspot lies just below the 30m contour on the south side of the

Brent valley; the River Brent itself is just over a kilometre distant to the north-west.

a) Unfortunately, the first axe, largest of the five, was stolen while out on loan in 1984. However, measurements taken from the drawing made shortly before the theft show that it was 84mm in length and had a surviving width of 43mm at the expanded blade (one of whose tips was missing), with a square-sectioned mouth.

b) Complete socketed axe 80mm in length, 40mm in width at the blade edge and weighing 147.37g. It has a square-sectioned mouth flanked by a low collar, with low casting flashes surviving down both sides and around the loop, from the underside of which projects a small spur. There is a single internal rib on either face. The exterior of one face has a lustrous, dark olive-green patina; much of the other is a metallic brown-black. One tip of the blade is damaged while the edge has been nicked in one place (and a metal sample taken from the area adjacent). The olive-green patina has been chipped in several places at the mouth and just below the collar, but this apart the axe is in a solid, stable condition.

c) Complete socketed axe 79mm in length, 35mm in width at the blade edge and weighing 138.51g. It has a square-sectioned mouth flanked by a low collar with the remains of casting flashes surviving down both sides. There is a single internal rib on either face. It has a patchy, cracked, olive-brown patina which has broken away at the blade edge, from whence a metal sample has been taken, and around the mouth and loop. Although in poor condition, it is solid and stable.

d) Complete socketed axe 68mm in length, 42mm in width at the expanded blade edge and weighing 99.06g. It has a square-sectioned mouth flanked by a low collar, and with the remains of low casting flashes surviving down both sides and around the loop. There is a single internal rib on either face. It is in similar condition to axe *b* and has a lustrous olive-green patina which has been chipped in several places. The expanded cutting edge is much damaged, and a metal sample has been taken from it. One face of the blade shows signs of cracking, which may be evidence of a faulty casting.

e) Complete socketed axe 54mm in length, 34mm in width at the blade edge and weighing 50.09g. Like the others it too has a square-sectioned mouth, although the collar visible on the others is virtually absent; casting flashes survive down

both faces and around the loop. It has a lustrous, mottled olive-green/reed green patina which has been chipped in several places around the socket mouth. The cutting edge has been chipped too and a metal sample removed.

Discussion

With their simple square-sectioned mouths flanked by low collars and plain undecorated blades, the five Park Royal pieces are typical of the sort of 'south-eastern' socketed axes well represented in local hoards (eg Petters Sports Field (Needham 1990, 28–31, his Class A)). It is unfortunate that the finder did not retain what sound like associated fragments of copper ingot deposited with the axes. It seems likely from this, and from the damaged condition of the axes themselves, that the find should be regarded as a small founder's hoard deposited in an area of London Clay not hitherto noted for Bronze Age activity. The Park Royal cache can be added to other hoards recorded from 'dry' locations in west London (eg Needham & Burgess 1980, 448, fig 4) though these, like those from Kensington, Southall, Hounslow, and the lost hoard from Starveall Farm, West Drayton, have usually been recovered from the terrace gravels.

The 'spur' projecting from the underside of axe *b* is a casting detail present on a number of implements. It would seem to indicate a realisation on the part of Bronze Age smiths that loops were prone to miscast if the passage of molten metal around the mould cavity was interrupted by a pocket of gas trapped in the void for the loop. To obviate this, a small 'overflow' chamber was added to the base of the loop to ensure that the mould at this point was fully taken up by the metal (see Needham (1993a, 44) for discussion of this point). The internal ribs on axes *b*, *c* and *d* (it is uncertain whether this feature was present on the lost axe *a*) have also been noted on a number of socketed axes. Their purpose was presumably to aid hafting.

28. Late Bronze Age tanged copper alloy awl from the Middlesex foreshore of the Thames in front of Hurlingham Park, Fulham (TQ 2480 7556) found by Bob Wells and reported in October 1992. The object lay amongst shingle at a point close to low water.

The awl measures 82mm in overall length and weighs 12.57g. The tapering point is faceted and 42mm in length; the tang is roughly square in

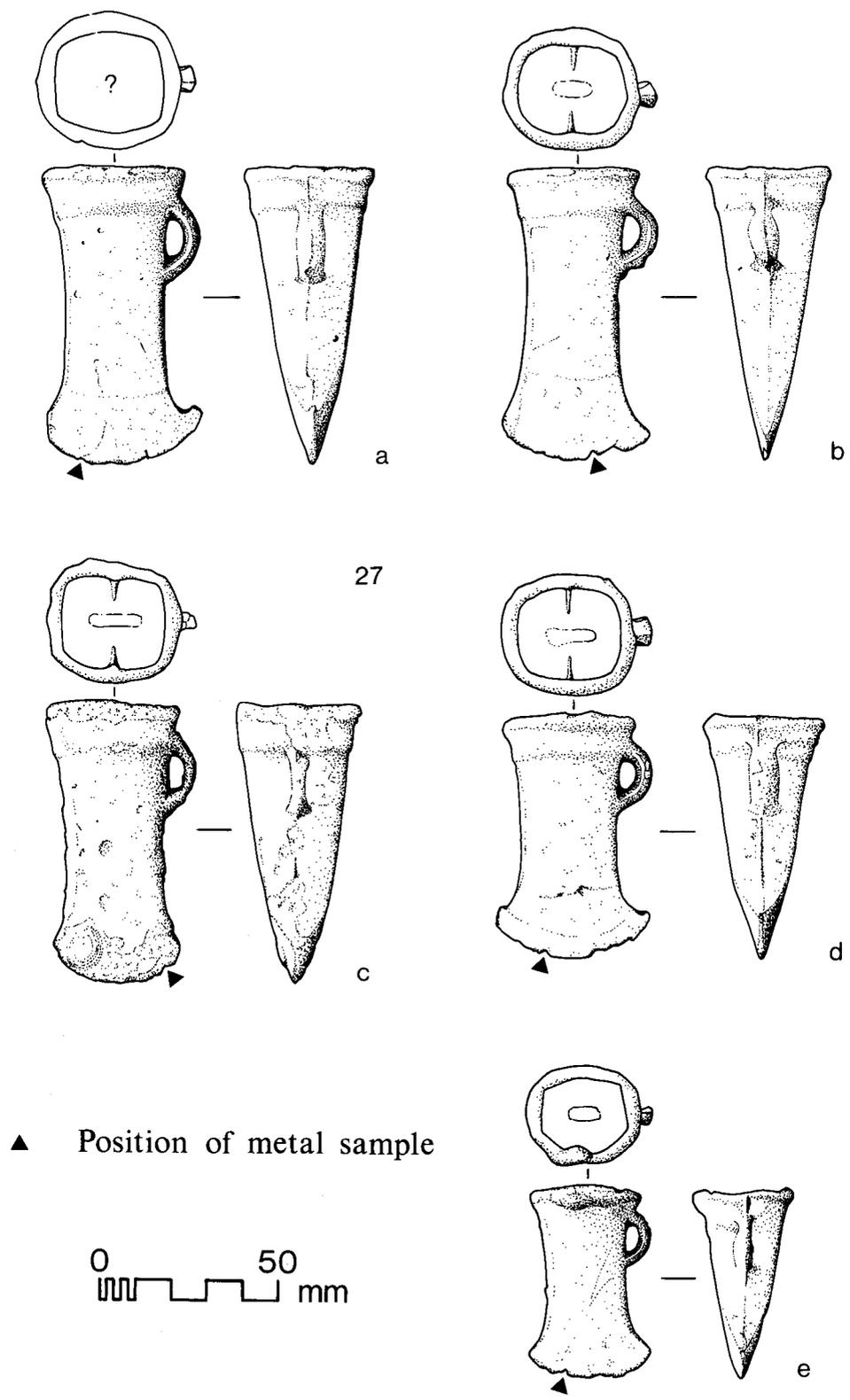


Fig 10. Late Bronze Age metal hoard No. 27 a-e, scale 1:2

section. The piece is in excellent condition, with no sign of surface corrosion; it has a dark bronze surface, with several areas of darker patination along the tang and close to the base of the point.

Awls of robust form are an increasingly common feature of Middle and Late Bronze Age settlement assemblages (eg Needham 1986, 141–3), and several can be cited from the London area, eg from the LBA sites at Runnymede Bridge and Beddington Sewage Works.

29. Rim sherd of flint-tempered pottery vessel recovered from a point three-quarters of the way down the Thames foreshore at Vauxhall (c.TQ 2950 7767) by Jonathan Cotton in August 1993 (MoL 95.290/6).

The sherd measures 65 × 83mm and is 7–8mm thick. It is of a grey-black, sandy fabric sparsely tempered with crushed burnt flint < 2mm across. It belongs to a weakly-shouldered jar with a short, flared rim, a form familiar during the Late Bronze Age-Early Iron Age. Its most notable feature comprises a line of inverted triangular impressions placed high on the shoulder, each impression measuring approximately 7mm in width at the base and 6–8mm high.

Although decoration at the shoulder is common on vessels of this type, it generally takes the form of finger-tipping or use of the finger-nail. The triangular motifs used here are less common, and reminiscent of continental *Kerbschnitt* ('cut out') decorated vessels (Nigel Brown, pers comm). While not common, there are a number of British parallels for the Vauxhall piece, of which the closest geographically comes from the Thames at Hammersmith (MoL C943). However, less care was taken with the decoration of this latter vessel, for the impressions are widely and irregularly spaced and less precisely executed, though the apex of the triangles point downwards. On other British pieces the situation is reversed: thus the examples from Scarborough (Smith 1928, pl 21, No. 11), Fengate (Hawkes & Fell 1943, Fig 3, C3) and Stonea (Jackson & Potter 1996, Fig 86.53) all have upward pointing triangular decoration.

IRON AGE (Figs 11, 12)

30. Incomplete copper alloy brooch of La Tène IB(?b) form purportedly found 'Thames, Hammersmith' by R. Irving sometime during the 1980s. The piece was originally offered for sale

to the Museum of London, but was not acquired. Its present whereabouts are unknown. However, two photographs and brief notes taken at the time by Peter Stott allows the following description to be placed on record. (The drawing published here on Fig 11 is likewise taken from the photograph.)

The brooch measures 53mm in length and has a solid, low, plain bow of apparently rounded cross-section and a four-coil 'spring' with external chord; the foot is missing, but is likely to have re-curved to meet the bow in a knobbed or snouted terminal. Whether the pin was truly sprung or merely hinged is not clear from the photographs, although the copper alloy terminal of what must be an axial-bar running through the coils of the 'spring' perhaps suggests the latter. Apart from its missing foot, the piece appears to be in a condition consistent with that of other river finds, and there seems no reason to doubt the veracity of its reported findspot.

The presence of an axial-bar is the main point of interest here, and is a feature matched on a number of other La Tène fibulae, including one of the five other early brooches known from this particular stretch of the river (eg Hull & Hawkes 1987, Nos 4282; 3084; 5359; 2925 & 2926). A number of these, and other small objects such as ring-headed pins (see No. 30 below), were found amongst a series of wooden piles (the so-called Hammersmith 'pile-dwellings') which extended upstream and downstream of Hammersmith Bridge on both sides of the river (eg Lawrence 1929, 85). The brooch discussed here can, like the majority of the others from this stretch, be dated to the 4th-3rd centuries BC.

31. Head of a cast, copper alloy ring-headed pin found with the aid of a metal detector on the Middlesex foreshore of the Thames at Syon (TQ 1780 7680) by John Gibson around 1976 or 1977 (MoL 95.533/6). The findspot lies a little way upstream from 'Old England', and close to where the same finder had previously recovered a small brooch of La Tène IBc form (Cotton 1979, 182, brooch B; now MoL 95.533/8).

The head of the pin measures 27mm in diameter and comprises a series of 11 moulded knobs or bosses; the overall length of the head and surviving shaft is 34mm, and weighs 21.93g. There is a now empty dished setting immediately below the head, on the angled shoulder of the shank, which perhaps held a coral stud. The shank of the pin is also missing, having broken

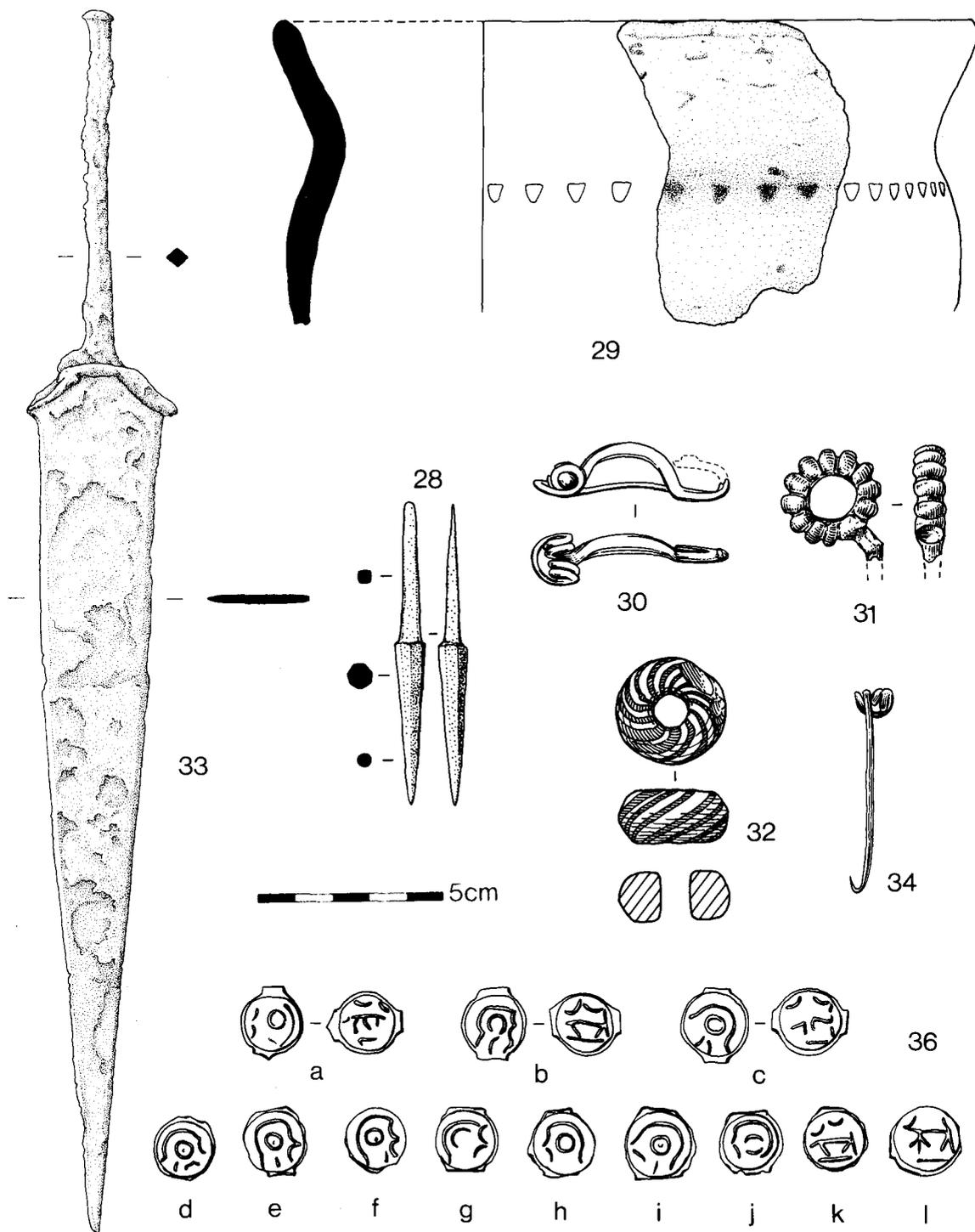


Fig 11. Late Bronze Age and Iron Age artefacts Nos 28-34, 36, scale 1:2

off just below the shoulder at the point where a lateral perforation – presumably to hold a further decorative stud – created a weakness. The length of the shank cannot be determined, although in view of the heavy multiple mouldings at the head it must have been of reasonable size to counterbalance the weight.

The ring-headed pin appears to have been a British form developing from the Swan's-neck type – the latter incorporating a shoulder at the top of the shank but not extending to create a closed, ring-shaped terminal. Copper alloy ring-headed pins are not all that common, and the Syon example is of particular interest in view of the heaviness of the mouldings at its head. In this it is reminiscent of the knobbed armlets from Mount Batten, Plymouth, thought to be of Hallstatt date (Cunliffe 1988, 61–2), and those from Cowlam, Arras and Raisthorpe, which are dated to the early La Tène period (Stead 1979, 72–6).

Locally, ring-headed pins have been recovered from the Thames at Hammersmith (*eg* Smith 1905, 345–6; Dunning 1934), and examples – including a particularly elaborate one featuring coral inlay – are in the British Museum and the Museum of London. Further afield, Fox illustrates a pin from Danes Graves, Yorkshire which has a coral bead or stud at the shoulder (1958, plate 9b); likewise another from Cold Kitchen Hill, Wiltshire (1958, fig 14). Such pins can be dated to the 4th–3rd centuries BC, though the knobs on our piece which are reminiscent of the Hallstatt-inspired armlets suggest that an even earlier date is not out of the question.

32. Glass bead found close to low water ('2m back from 0.0 OD') on the Surrey foreshore of the Thames at Wandsworth (TQ 2457 7556) by Bob Wells and reported to the Museum of London in October 1992.

The bead is of annular form with a diameter of 29mm, is 13mm thick and has a central perforation 8.5mm in diameter. It weighs 15.51g and has a blue ground with white 'whirls' emanating from the perforation. Its relatively large size, annular shape, colour and design identify it as an example of Guido's Class 7, Type a (1978, 57), often referred to as a 'Celtic Whirl' or 'whirl-decorated (ring) bead' (Henderson 1995, 156).

Type a is the most common of the three types of Class 7 beads, the latter defined by the colour of the ground – Type a being purple or blue. As

a class such beads are not particularly common in Britain, and occur more frequently in European oppida (Henderson 1995, 156). Of the 16 Type a beads listed by Guido, two have been found in Essex, one from Billericay (held in Chelmsford Museum, Acc No. B18.513) and the other, in private ownership, from Kelvedon. (Another has since been recovered from the so-called 'warrior' grave at Stanway, Colchester (Philip Crummy, pers comm).) However, their distribution in Britain is otherwise centred round the Iron Age trading route of the Bristol Channel, with a few examples from Ireland. This is the first example recorded from London.

'Celtic Whirls' are usually dated 150 BC–AD 50, though as Henderson (1987a, 162) makes clear, few have been recovered from stratified contexts. There are slightly earlier examples, such as that from Walesland Rath in Pembrokeshire, associated with a C14 date of 210–90 BC, while later finds include a fragment from Caerleon in a context dated AD 130–230. A further fragmentary piece has been recovered from Hengistbury Head (Henderson 1987a, 160, No. 127) and dated to the 2nd–1st century BC; the Stanway grave dates to the middle decades of the first century AD.

No evidence for the manufacture of such beads in the form of furnaces has been recovered either in this country or abroad, although a lump of raw purple glass was recovered during the recent excavations at Hengistbury Head (Henderson 1987a, 161 & 181–3; for the likely manufacturing technique for whirl-decorated beads see Henderson 1995, 156); others have come from continental sites such as Manching (*eg* Sievers 1991, 445–7). It is assumed that early examples found in Britain would have been imported. Local production of beads may have been underway by the last century or so BC, initially copying continental types, followed by the production of distinctive local versions (*eg* Henderson 1987b). As with other 'precious' or 'symbolic' items, beads may have been treasured across a number of generations. Often found singly, they could have functioned as hair ornaments, dress fasteners, parts of necklaces or even as talismans. Although limited, the evidence also suggests that they may have been worn by both sexes.

33. Iron dagger found on the Surrey foreshore of the Thames at Putney (TQ 244 757) by Bob Wells in the spring of 1990 (MoL 91.166). When found the dagger was heavily encrusted with

ferruginous concretion and bent into an S shape; only the tip of the blade and the knob of the hilt were visible. It lay on the surface close to low water some 'eight yards from the east [*ie* downstream] side of Putney Railway Bridge'. The finder noted that it might have been disturbed by the flotilla following the Oxford-Cambridge boat-race, which had taken place the previous day.

The dagger has since been straightened out during conservation and now has an overall length of 332mm, with a width at the hilt-guard of 42mm; it weighs 65.7g. The long slender blade is 230mm in length and of exaggeratedly pointed triangular shape; it has an unusually flattened cross-section 3mm thick with bevelled edges. The handle springs from an arched hilt-guard and comprises a square-sectioned tang some 95mm in length, the end of which has been flattened into a knob. No trace now survives of the organic hilt-plates.

Its campanulate hilt-guard marks it out as an Iron Age weapon, though in the absence of precise parallels a general La Tène III date is the best that can be offered at present (Ian Stead, pers comm). Jope notes a couple of late daggers from Camerton and Kingsdown Camp, Mells, both Somerset (1961, 340-1), though their blades, while triangular in shape, are shorter and have a marked mid-rib. None of the daggers from the lake villages are especially close in form either, although one of the two fragments from Meare Village East published by Coles appears from the illustration to have a flattened blade in cross-section (1987, 120 No. I 20). As such the Putney piece stands apart from the well known group of earlier Hallstatt D and La Tène I daggers in sheaths recorded from the west London reaches of the Thames (Jope 1961; Macdonald 1978), two of which come from Wandsworth just downstream (Jope 1961, nos 19 & 22). The bending of the blade is a feature noted on a number of iron weapons, as for example at Llyn Cerrig Bach in Anglesey, though it is a trait more commonly noticed on continental cult sites (*eg* Gournay-sur-Aronde (Brunaux 1988, 127)). Merrifield also draws attention to a cache of Late Iron Age/early Roman tools recovered from Lea gravels at Waltham Abbey, some of which had been destroyed by bending, perhaps to despatch them to the spirit world (1987, 29-30, pl 8).

34. Copper alloy pin and four coil spring of a La Tène III (probably 'Nauheim derivative') brooch

found on the Middlesex foreshore of the Thames at Syon (*c.*TQ 1725 7625) by Michael Spanswick in the late 1980s. The bow and catch-plate are missing, while the spring consists of four coils with an internal chord. The pin is complete although the tip has been bent back on itself, perhaps to facilitate use as a fish-hook. When straight, the pin would have measured some 62mm in length.

Brooches of this type span the period 100 BC-AD 50, and occur in both copper alloy and iron. The form is based on that of the Nauheim type, which is common on continental sites of the period though rare in Britain. A number of 'Nauheim derivatives' are known from the London area, both from the Thames and the City - the latter usually in association with post-Conquest material.

35. A 'multiple find' of potin coins (?a scattered hoard) was discovered off the downstream tip of Isleworth Eyot on the Middlesex foreshore of the Thames (centred TQ 1680 7600) by John Gibson and others in 1976-7. At least 25 coins were recovered with the aid of metal detectors from a spine of gravel running out from a brick retaining wall on the north-eastern side of the Eyot adjacent to the main channel. A majority of the coins appear to have come from various points beyond low water. Finds ceased when a barge ran aground and churned up the bank (information from finder). The brick retaining wall has since been extended across the tip of the Eyot; no further finds were reported during this work.

None of the coins are now available for study, although there is no doubting their identification as potins. A lipped terret (Cotton 1978) was amongst other objects recovered from this spot (see also No. 19 above).

36. A hoard (or hoards) of potin coins was found on the Surrey foreshore of the Thames between Putney and Barn Elms (TQ 235 763) by John Gibson and others with the aid of metal detectors during 1976-7. The findspot lay just upstream of the Beverley Brook at a point close to low water. A watching brief carried out by the Wandsworth Historical Society along the course of a pipe-trench being dug to the rear of the foreshore in this area revealed unstratified sherds of sand-tempered later Middle Iron Age pottery, part of a rotary quernstone and a biconical spindlewhorl in a glauconitic fabric, together with a pit containing sherds of pottery and part

of a possible copper alloy terret ring (Pamela Greenwood, pers comm).

An initial find of some 12 coins from a restricted area on the edge of a small gravel ridge by John Gibson was followed by a further nocturnal search by a person or persons unknown which reputedly recovered 'upwards of a hundred coins' from the same area (John Gibson, pers comm). The first find appeared to have been buried as a small cache; it is unclear whether the subsequent find was from this or a separate deposit close by. In any event none of the coins are now available for study, although three of the first group were seen and sketch-recorded by Pamela Greenwood of the Wandsworth Historical Society (two are Allen Class I, type B and one Allen Class I, type L4) (No. 36, a-c). However, a polaroid photograph of nine coins in the archives of the Wandsworth Historical Society is marked 'photo from Seaby's Nov 1976. Sold to them as coming from the foreshore near Putney Bridge but more probably from Barn Elms' (Fig 11, No. 36, d-l). Haselgrove (1987, 288) records '8+' coins of Class I type coming onto the market from 'a restricted area of the foreshore, close to Putney Bridge'.

In addition to the multiple finds recorded above, a number of single finds of potin coins (Fig 12) have also been reported. All were found with the aid of metal detectors.

37. Potin prototype from the Middlesex foreshore of the Thames at Hammersmith, just downstream of Chiswick Eyot (TQ 2214 7815), reported with No. 38 below by a Mr Smith in 1980. It has a thick, heavy flan 15mm in diameter and weighs 3.2g. Based on Gaulish copies of the 2nd century BC coinage of Massalia (modern Marseille) (John Kent, pers comm), the obverse shows a bust of Apollo to the left, and the reverse a 'butting bull' to the right.

38. A Class I potin, Allen type L (1971, 135) from the Middlesex foreshore of the Thames at Hammersmith, just downstream of Chiswick Eyot (TQ 2214 7815), was reported by a Mr Smith in 1980. It weighs 1.1g and was apparently found 'with one or two other Celtic coins', including No. 37 above.

39. An incomplete Class I potin, Allen type L (1971, 135) from the Middlesex foreshore of the Thames at Syon (TQ 1735 7634) was reported to the West London Archaeological Field Group around 1977. The Neolithic blade knife (No. 18

above) was found here 'while sieving for coins', while another, halved, potin was recovered from the same general locality around 1980 (Richard Hill, pers comm).

40. A Class I potin, Allen type F1 (1971, 134) was found in spoil dumped at Dagenham but taken from the Billingsgate Lorry Park on the Middlesex bank of the Thames in the City; it was recovered by Mr M. Butcher and reported in November 1984. The coin weighs 1.84g.

41. A Class II potin, Allen type M2 (1971, 135) from the Surrey foreshore of the Thames at Barn Elms (TQ 233 765) was found by John Gibson in 1976. It was recovered from a point close to low water and upstream of the multiple find No. 36 above.

42. An incomplete Class II potin, Allen type P1 (1971, 135) from the Surrey foreshore of the Thames at Battersea Park was reported by Mr R. Boneurty in 1980. The context in which it lay was 'apparently disturbed' with 'gravel and rubble obviously artificially deposited'.

43. A Class II potin, Allen type P1 (1971, 135) from the Middlesex foreshore of the Thames at London Bridge (TQ 328 807) was reported by Ron Hooper in November 1984. It was found 'deep within the foreshore'.

Discussion

The coins described above belong to a class of 'chill-cast high-tin bronze' coinage thought to originate in north Kent in the late 2nd or early 1st century BC and to have achieved its *floruit* in the decades either side of Caesar's British expeditions in the middle of the first century BC. The two classes, I and II, based on differences in size, weight and details of the design, were subdivided into 15 types (A-O) by Allen (1971). More recently Van Arsdell (1989, 76-79) has deduced five different stages spanning the period c.100-35 BC: prototype (Allen type A), experimental (Allen types B-D), innovative (Allen types E-G), optimisation (Allen types H-L) and adjustment (Allen types M-O), although the 'unilinear chronological validity' of either scheme remains doubtful (Haselgrove 1987, 248). The most recent discussion of the problem of the function, dating and classification of the potin coinage may be found in Hobbs (1966, 6.17) (John Kent, pers comm).

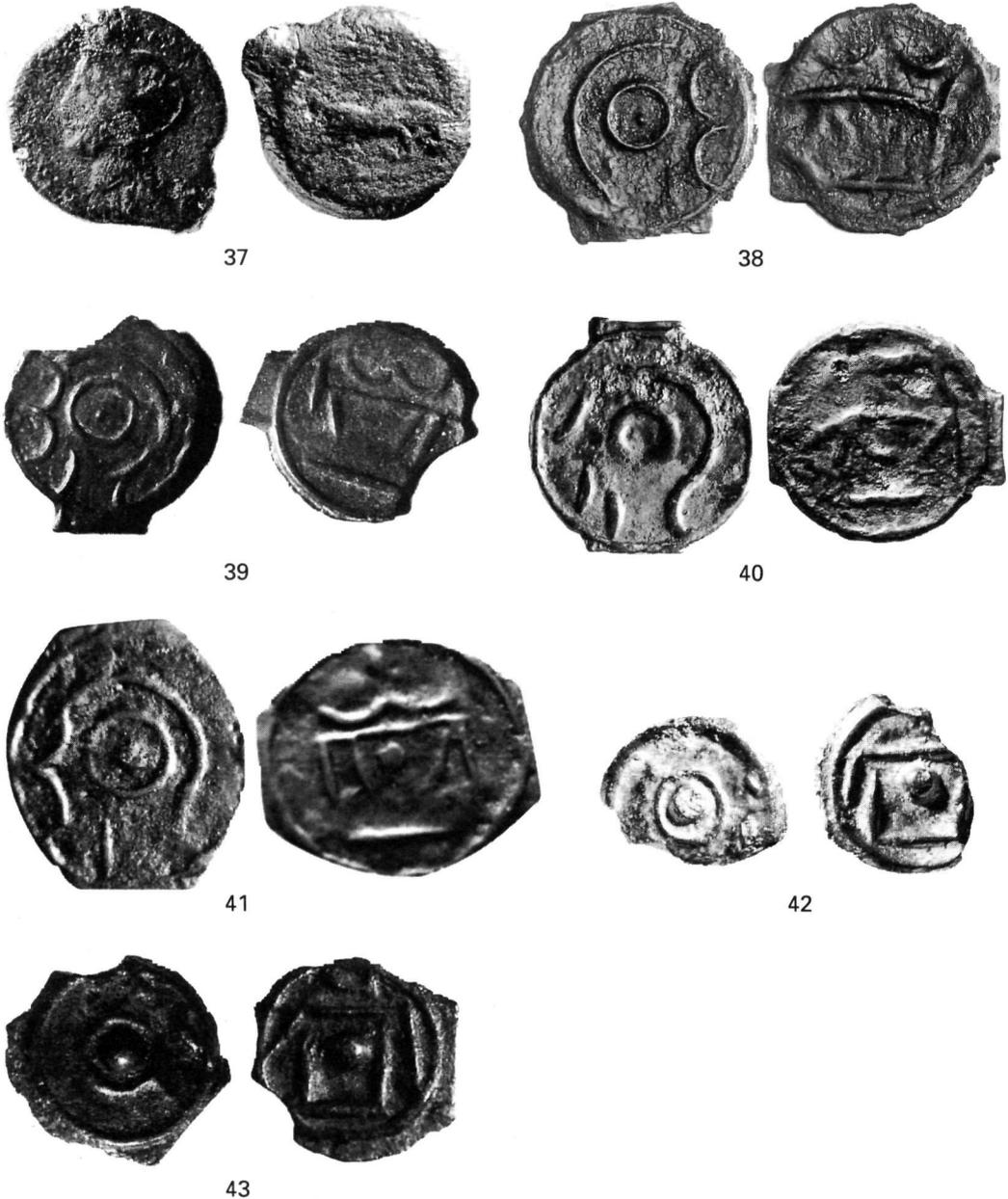


Fig 12. Iron Age potin coins, obverse and reverse of Nos 37-43, scale 2:1

Numbers of these coins (including several large hoards) have been recovered from the west London Thames and areas adjacent, although away from the river few have been found in meaningful contexts within the area. Five potins (one Class I, two Class II and two fragmentary pieces) were recovered from various Late Iron Age features at Lower Warbank, Keston (Philp

1991, 140-1), two Class II pieces came from the Farningham Hill enclosure (one each from the main south east enclosure ditch and Pit 10; Philp 1984, 35), while three Class Is were recovered during recent excavations at Uphall Camp, Ilford (one was stratified with late Middle Iron Age pottery) (Greenwood 1989, 100 & Fig 8; Pamela Greenwood, pers comm). Single examples have

been reported from Beddington Sewage Works (Class II, unstratified; Kent nd) and further out in Essex at Stifford Clays (Class I from Ditch 105) and Ardale School (Class II from Ditch 1317) (Wilkinson 1988, 69).

Of special interest amongst the coins listed here is the single thick, heavy piece from Chiswick (No. 37 above), which is likely to fall early within the series, say c.100 BC, and the one, possibly two, caches from the Putney/Barn Elms reach (No. 36 above), together with the 'multiple find' (?scattered hoard) from Isleworth Eyot (No. 35 above). The Chiswick coin represents a first or second generation British version of the first cast 'Massalia imitations' of Central Gaul (Haselgrove 1988, 102), best known in Britain from the hoards at Folkestone (Haselgrove 1987, 279) and West Thurrock (Van Arsdell 1989, 320–8). Although their distribution in Britain 'appears wider than that of the earliest British potin derived from them' (Haselgrove 1987, 248; Haselgrove 1988, Fig 1), few have been found in the London area hitherto.

It is particularly unfortunate that so little information regarding the composition of the hoard finds exists, beyond the few coins recorded by Pamela Greenwood from the first small Putney/Barn Elms cache, which appear to be of Class I type (Haselgrove 1987, 288). The reputed subsequent discovery of 'upwards of a hundred coins' from the same findspot is of particular interest in view of the handful of large so-called 'flight' hoards of Class I potins already known from the west London area, eg St James's Park ('sizeable'), Eel Pie Island, Brentford (266+) and Sunbury (359+), the latter apparently deposited with three pottery vessels (Allen 1971, 148; Tyers 1996, 139–40). Other more recent, if farther-flung, additions include the small caches from New Addington near Croydon (Fitzpatrick 1990) and from the Airport Catering Site at Stanstead (Priddy 1988, 269) both, curiously enough, composed of Class II potins.

CONCLUSION

There are a number of points to emerge from study of the objects published here. First, the expected emphasis on finds from the modern Thames foreshore; secondly the recovery of land finds from areas of seemingly difficult geology, such as the London Clay; and thirdly the presence of hoards of various types from both zones.

A glance at the range of objects dealt with reveals that a majority were recovered from the traditionally prolific reaches of the foreshore such as Syon, Putney and Wandsworth, though this is here taken to reflect the activities of individual searchers. Thus recent activity in less well-known localities such as Battersea, Vauxhall and Bermondsey has been equally successful (the first named writer of this report recovered the material from Vauxhall – Nos 2, 8, 9 & 29 above – on two short visits). Accelerating erosion of the foreshore in a number of localities is also offering an unrepeatable opportunity for careful recording of objects in context, as work by individuals (eg Hill 1996), local societies (eg Cowie & Eastmond 1997) and the Thames Archaeological Survey (Webber 1995) is currently demonstrating.

Closer scrutiny of the foreshore finds suggests that there is no longer any guarantee that the objects themselves were necessarily originally deposited in the *waters* of the Thames, as has been automatically assumed in the past. Indeed, a number of the finds may well have been lost on, and/or deliberately buried in, deposits which were at least seasonally terrestrial. Equally, landward excavations carried out behind the modern foreshore in riverside localities such as Isleworth (Chris Bell, pers comm) [see also paper: *An Archaeological Excavation on Land adjacent to Snowey Fielder Waye, Isleworth* in this volume], Chiswick (Dave Lakin, pers comm) [see also *Excavations at Corney Reach, Chiswick W4* in this volume] and north Southwark have identified prehistoric cut features sealed by later deposits, from which, given other circumstances, material could have been poached by the river. This has clear implications for the ways in which Thames finds as a whole are interpreted, and underlines the necessity of paying close and careful attention to the exact position and circumstance of each new discovery (eg Haughey 1996).

This point is nowhere more important than in the areas of the modern foreshore which have been subjected to alteration in the recent past. Lawrence, for example, drew attention to the dumping of dredged material from London Bridge further upstream at Hammersmith and Wandsworth (1929, 72), while at least one of the the gravel pits at Ham is known to have been backfilled with dredgings taken from the river at Chelsea (eg Anon 1961, 225). Similarly, recent documentary research has demonstrated that the downstream end of the Battersea reach has received prodigious quantities of dredged and

excavated material, barged in from Woolwich, the London Docks and the Royal Exchange, among other places, since at least the 1820s (Cotton 1996, 93), such that the circumstances of any finds recovered from the locality require especially rigorous scrutiny. The Class II potin coin (No. 42 above) from the Surrey foreshore in front of Battersea Park is a case in point, having been recovered from an 'apparently disturbed' context along with 'gravel and rubble obviously artificially deposited', so too the palstave published previously (Cotton & Needham 1991, 45-6).

The common denominator among the few pieces found away from the Thames appears to be the drainage pattern of the tributary streams. Thus the findspots of the two adzes from Enfield/Southgate lie close to eastward-flowing tributaries of the Lea; the barbed-and-tanged arrowhead from Pinner joins a small number of other Bronze Age finds recovered from a complex range of soils around the head of the Pinn; and the stone axe from Hampstead and the Late Bronze Age hoard from Park Royal both fall within the Brent catchment. Opportunities for archaeological fieldwork within such localities are often limited but, as the later prehistoric ditches found during recent MoLAS excavations on equally unpromising geology close to the headwaters of another small stream, the River Effra, at Upper Tulse Hill demonstrate (Penny Bruce, pers comm), they can be surprisingly informative.

The Late Bronze Age hoard from Park Royal is one of a number now known from Greater London (eg Needham & Burgess 1980, 448, Fig 4), although it is still somewhat unusual in that the findspot and circumstances of its discovery are tolerably well known (even if the possible ingot fragments which accompanied the axes are not!). Traditionally, Late Bronze Age hoards are divided into utilitarian/non-votive (*ie* axes and tools), and non-utilitarian/votive (*ie* weapons) (Bradley 1990, 10-14). By this yardstick both 'founder's composed' from Park Royal and Wandsworth, composed principally of utilitarian items, are non-votive. Yet such functionalist labelling surely underplays the amount of overlap between the supernatural and secular worlds likely to have existed in prehistory (eg Needham 1990, 137), for doubtless even apparently 'utilitarian' acts of deposition would have been accompanied by careful, non-utilitarian observances and hedged about by social taboos regarding unlawful recovery. Besides which we

still have little idea of the status and function that such collections of artefacts held in contemporary prehistoric society, or why their burial and non-retrieval should peak at this time. It might be noted that these hoards coincide with a diverse interest in elaborate structured deposition which is beginning to be recognised elsewhere at sites such as Runnymede Bridge, Flag Fen and Potterne (Needham 1993b, 60-6), suggesting that such hoards are simply the most visible manifestations of a much wider social phenomenon, and one hitherto more extensively documented for the ensuing Iron Age (eg Wait 1985; Hill 1995). Deposits of Bronze Age metalwork are therefore perhaps best interpreted on their particular merits, emphasising again the need to pay close attention to the circumstances surrounding individual discoveries. In this context it is particularly unfortunate that the relationship between the pair of Middle Bronze Age side-looped spearheads and the wooden piles at Nine Elms, Vauxhall remains so uncertain. It would be satisfying to report that they represent a special foundation or 'event-marking' deposit similar to that observed at Testwood Lakes, Southampton, where a complete rapier was recovered from silts pre-dating one of the Bronze Age timber 'jetties' (Fitzpatrick *et al* 1996, 10). It is possible that future fieldwork will help to clarify the situation at Vauxhall.

Finally, the recovery of the potin cache(s) from Barn Elms is worthy of note, especially when the potentially contemporary stratified deposits behind the modern foreshore (Pamela Greenwood, pers comm) are taken into account. Is it possible to suggest the presence here of a later Middle Iron Age/Late Iron Age site close to the Thames-Beverley Brook confluence? Such a settlement would appear to fit the pattern of Thames-side occupation which is beginning to emerge during the Middle-Late Iron Age, as stray features and pottery from a range of localities demonstrate. Taken together, this scattered evidence is clearly not yet sufficient to confirm or deny, let alone pinpoint, John Kent's postulated west London *oppidum* (1978, 57-8), though the tenor of his suggestion begins to look prescient.

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AN ARCHAEOLOGICAL EXCAVATION ON LAND ADJACENT TO SNOWY FIELDER WAYE, ISLEWORTH, LONDON BOROUGH OF HOUNSLOW, MIDDLESEX

Christopher Bell

With contributions by A. Boyle, P. Bradley, M. Robinson, J. Timby, I. Wain, R. Wilson and illustrations by Paul Hughes

SUMMARY

An archaeological evaluation, followed by a small area excavation, was carried out in connection with a development of a nursing home on land adjacent to Snowy Fielder Waye, Isleworth in the London Borough of Hounslow. Archaeological deposits representing evidence of later prehistoric occupation were revealed. This occupation was characterised by two ditches, one of which was associated with a buried bank and early soil horizon, a large Late Bronze Age/Early Iron Age midden pit, a Middle Iron Age gully and a probable Early or Middle Iron Age cremation. A significant assemblage of transitional Late Bronze/Early Iron Age pottery was recovered, along with smaller quantities of Middle Iron Age pottery, fragments of loomweights, animal bone, flints and charred plant remains. The excavation also established the existence of a relict stream course running under the western boundary of the site. This revealed that the site once comprised one of the gravel islands close to the river which are known to have been a favoured location for prehistoric occupation throughout the Thames Valley. Although only a small number of features survived on this site these deposits provide direct evidence of prehistoric riverside settlement which is suggested by the many artefacts recovered from this stretch of the Thames, but which has rarely been found by excavations in this area.

INTRODUCTION

This report details the findings of an excavation undertaken by the Oxford Archaeological Unit on an area of wasteland between Snowy Fielder Waye and Hepple Close, Isleworth, London Borough of Hounslow, Middlesex (NGR TQ 1662 7620) in February 1996. The archaeological work was commissioned by Prestoplan Design and Build Ltd as part of the conditions of planning to develop the site as a nursing home. The excavation was preceded by an evaluation (incorporating a desktop assessment) which was carried out in January 1996. The evaluation established the existence of significant, and well-preserved archaeological deposits on the site, representing later prehistoric occupation. An excavation proposal was subsequently prepared by the Oxford Archaeological Unit in consultation with English Heritage, and the excavation took place over a period of 13 days the following month, immediately prior to the construction of the new building.

LOCATION AND TOPOGRAPHY

The site is situated to the NE of the village of Isleworth and lies close to the River Thames

which borders Isleworth to the E (Fig 1). At the time of excavation the site was a small strip of flattish waste ground, measuring 80m in length and 40m in width, which until recently had been an orchard and was not known to have been disturbed by any previous developments. The level of the ground surface in the central area of the site is situated at 4.7m OD, sloping away gradually towards the eastern and western boundaries. The underlying geology of the site comprises river sands and gravel.

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

I. Wain

The area of investigation at Snowy Fielder Way, Isleworth lies on the first gravel terrace just to the N of the historic centre of Isleworth village, a Domesday village which historically clustered along the Thames.

Syon House, a 16th-century manor house built upon the site of a 15th-century Bridgetine abbey, and its Grade II-listed park lie immediately to the NW. Mill River lies to the S of the development area and to the S of Mill River is the site of Isleworth Manor House, a 13th-century moated manor house. Little is known about the development site in the medieval period although it may have formed part of the lands of Isleworth manor and may in turn have passed, along with the other lands of the manor, to the Bridgetine abbey on its foundation in 1414. On the 17th and 18th-century maps consulted the development site lies in the open fields of Isleworth immediately outside the boundary of Syon Park.

As marked on the Greater London Sites and Monuments Record (GLSMR) the site contains no recorded archaeological remains and there is very little recorded archaeology in its immediate area. However there is evidence of multi-period archaeological activity in the area around the river and to the N of the site. In addition evidence of multi-period activity ranging from Palaeolithic to early medieval has been recovered from the river in the vicinity of the site, mostly in the form of chance finds from the foreshore, or material dredged from the Thames. Much of the surrounding area is now built up and largely residential so excavation in the vicinity of the site has been limited. However a concerted

programme of excavations in the late 1960s and 1970s at Brentford, which lies just over 1km to the N of the site, uncovered evidence for the Roman and medieval settlement of the area (Canham 1978).

No prehistoric settlement sites have hitherto been recognised in the area although the quantity of prehistoric finds from the river, and the presence of unstratified prehistoric finds on sites in the area, did indicate the general prehistoric potential of the development site. With the exception of the large quantity of Mesolithic and Bronze Age finds from the river, the evidence of prehistoric activity in the area has hitherto been dominated by Neolithic material: both the large concentrations of prehistoric material recovered from excavations in the area in the last 20 years have been ascribed Neolithic dates. A Department of Greater London Archaeology (DGLA) excavation in 1975 (GLSMR No. 050608, NGR TQ 1664 7690) recovered unstratified material including 144 flint flakes or implements and 97 Neolithic flint-tempered potsherds during excavations at a site close to the London Road. An excavation just to the north of Brentford High Street (Canham 1978, Site 4) revealed 181 struck flints and 105 sherds of flint-tempered Neolithic pottery contained within the brickearth deposits. This excavation also revealed one small prehistoric gully. Unstratified prehistoric material has also been recovered from recent excavations at the London Road Filling Station site (GLSMR No. 052322) to the NW and during the excavation of Isleworth Manor House (GLSMR No. 052685) to the S of Snowy Fielder Way. Iron Age activity is suggested by the discovery of Late Iron Age pottery (GLSMR No. 050234) in deposits sealed by a Roman wattle hut on the edge of the Thames foreshore.

Considerable Mesolithic, Bronze Age and Iron Age activity in the area as a whole is suggested by the large quantity of prehistoric artefacts which have been discovered during periodic dredging of the river or recovered from the Thames foreshore. These include quantities of Mesolithic and Neolithic flint implements and a large number of high-quality Bronze Age and Iron Age objects, such as swords, daggers, horse equipment, axes and bronze buckets. Although many of these may have been votive deposits of communities situated away from the river, the quantity of multi-period finds from this stretch of the Thames does suggest a scale of prehistoric activity higher than that suggested by excavation

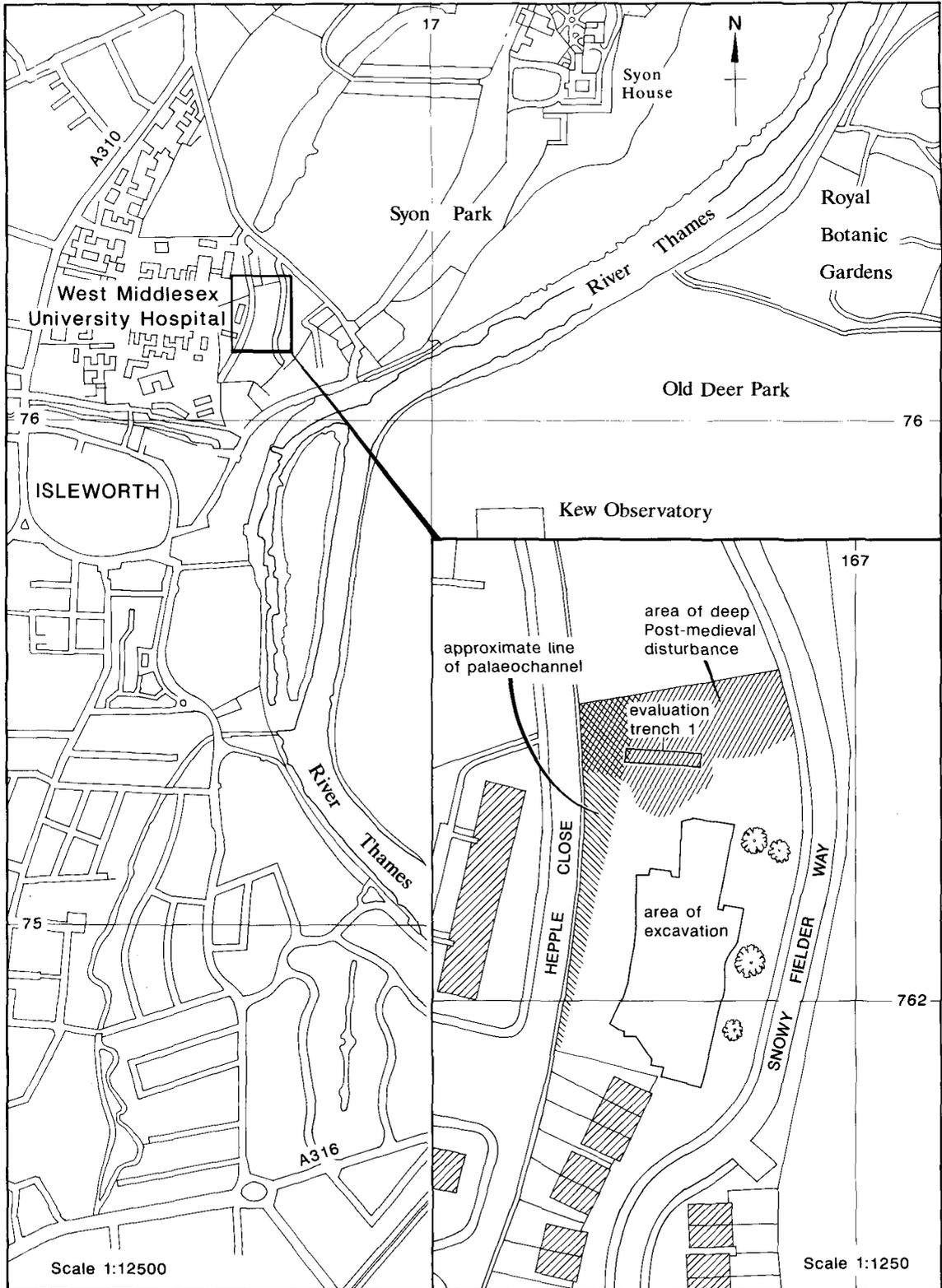


Fig 1. Site location, with inset showing area of excavation and approximate line of palaeochannel

alone. The apparent absence of archaeological sites may be attributable to the generally residential nature of, and the consequent low level of archaeological investigation in, the area around the development site. In addition, Canham (1978, 147) has suggested that the absence of prehistoric evidence in the archaeological sites of the area may be attributable to the substantial rise in the water table since the later prehistoric period. This would have had the effect of either burying sites beneath layers of alluvium or washing away all evidence of riverside settlement.

THE EVALUATION

The evaluation, which took place over a period of four days in January 1996, comprised three machine-excavated trial trenches measuring 15m in length and 1m in width which were positioned within the footprint of the proposed new building.

A fairly uniform layer of greyish brown sandy silt [204/314] was observed in all three trenches at a depth of between 0.6–1m below the present ground surface and this directly overlay the natural sand. This deposit appeared to represent a buried soil horizon extending in a strip measuring 20–25m in width through the central area of the site. The only finds recovered from the buried soil were two very small fragments of late prehistoric pottery, and although these were too small to provide positive dating, the dating of the subsequent deposits in the stratified sequence indicated that this soil horizon was no later than Iron Age in date. Part of a deep clay-filled feature [118], fills [113] and [114] was discovered in the evaluation trench located at the N end of the site (Trench 1). It appeared to be the edge of a palaeochannel (old river or stream course) running underneath the western boundary of the site (Fig 1 and Fig 3, section 1).

A small ditch [207] (Fig 3, section 11) was located, running parallel 25m E of the palaeochannel and this appeared to form the eastern boundary of the early soil horizon. This ditch was undated; however, the fact that the buried soil material had eroded into the ditch fill [211] indicated that the early soil horizon and the ditch were broadly contemporary.

The early soil horizon and ditch had later become buried beneath extensive deposits of what appeared to be redeposited natural subsoil [203/302/112/116] and [237] to [242], Fig 3,

sections 11 and 12). These deposits seemed to represent upcast or levelled-out bank material which had derived from the creation of a large earthwork cut into the subsoil. An extension was therefore made to the evaluation trench extending toward the eastern boundary of the site in order to try to locate this possible earthwork, and this indeed revealed the existence of a large, N-S aligned ditch [217].

Part of a wide gully [305] was discovered at the southern end of the site, cut into the top of the levelled-out upcast material. A quantity of Middle Iron Age pottery sherds, fragments of triangular loomweights and fragments of animal bone were recovered from the gully, which lay only 0.3m below the present ground surface and was directly overlain by the present topsoil. The finds recovered from the Iron Age gully were in a good state of preservation and the pottery assemblage consisted of large unabraded sherds.

Some shallow disturbance had been caused by tree-root action and post-medieval ploughing throughout the site. However, only the northern end of the site had been seriously affected by deep post-medieval disturbance.

THE EXCAVATION

Methodology

The excavation trench was largely confined to the central area of the site where the proposed building was to be situated, as the areas along the western boundary and at the front of the site would not be affected by the development. The trees in these areas were also to be retained, and the shape of the excavation trench was partly dictated by the need to avoid these existing trees and their root systems (Fig 1). The area of excavation was stripped of topsoil using a mechanical excavator under archaeological supervision and the resulting surface was cleaned by hand. All exposed archaeological features at this level were then completely excavated. The area of deep post-medieval disturbance at the northern end of the site and the area next to the western boundary where the trees were to be retained were used to store the excavated soil.

Deeper excavation was then limited to the areas where extensive disturbance would be caused by the foundations of the proposed building, thus leaving the deeper archaeological

deposits in the unaffected areas of the site preserved *in situ*.

The deeper areas of excavation that were undertaken consisted of two trenches across the line of the two ditches partially exposed in the evaluation, and a 2m wide trench along the line of the western foundation of the proposed building which was excavated to expose the early buried soil horizon (Fig 2). This trench was machine excavated down to the top of the buried soil horizon, and then alternate 2m squares were excavated by hand through the soil and the resulting spoil was dry-sieved to recover artefacts. The areas of natural subsoil exposed underneath the buried soil were carefully cleaned by hand to observe whether any ard marks were visible.

Soil samples for environmental analysis were taken from all of the archaeological features that were discovered on the site and also from the buried soil horizon. In addition column samples for molluscan analysis were taken through the backfill of the two ditches and also through the buried soil horizon and overlying bank material.

Archaeological description (Figs 2-4)

The Iron Age gully [305], partially exposed during the evaluation, turned out to be a wide gully measuring 3m in length. It contained a dense concentration of Iron Age pottery, fragments of loomweights and animal bone throughout its length. It was uncertain whether a shallow feature [344] which cut the gully was a tree-throw hole or the remains of a pit. The only find recovered from this feature was a fragment of animal bone. A large irregular pit [227], partly disturbed by tree-root action was discovered towards the eastern boundary of the site, cut into the top of natural subsoil. This feature, measuring approximately 3m in width and 0.80m in depth, produced an assemblage of over 1,600 sherds of Late Bronze Age/Early Iron Age pottery, along with a smaller number of loomweight fragments, fragments of animal bone and burnt flint. A single human infant long bone was also recovered from this feature. A small feature [229] containing the partial remains of an Iron Age pot, apparently buried whole in an upright position, was found just to the N of the large pit. A small number of burnt bone fragments lay within the surviving base of the pot, and were also scattered in the immediate vicinity. This feature therefore appeared to be the remains of a cremation burial

in situ, which had been much truncated by later ploughing. A number of other shallow features excavated at this level were of a post-medieval date, consisting of recent cultivation furrows [270, 271, 337] and [339] small pits [311] and [335] and a fence line [312].

In the deeper trench excavated across the N end of the site (section 11), what appeared to be the remains of a small bank [206] could be observed overlying the early soil horizon [204] in the area along the W of the earlier ditch [207], located in the evaluation. A distinctive deposit of greyish clay silt [209] which formed part of the backfill along the W edge of the ditch was very similar material to that which formed the bank, and this deposit therefore appeared to represent bank material which had slumped or been washed back into the ditch. The remaining layers of backfill in the ditch consisted of sterile deposits of sand and silt [210], [212] and [245]. No finds were recovered from the ditch. The deeper section excavated across the S end of the site (section 12) revealed that this earlier ditch did not extend through to this half of the site.

The larger ditch [217/306], also partially exposed in the evaluation, could be observed running continuously through the entire length of the site in a N-S alignment and measured 3m in width and 1.1m in depth. Although two large sections were excavated by hand through this ditch the only finds recovered from it were two small sherds of Middle Iron Age pottery, two fragments of tile and a fragment of lava quernstone, all of which came from the upper fills of the ditch and may have been intrusive due to the heavy tree-root disturbance at this level. A small irregular feature [236] was located on the W edge of the ditch, which was cut into the lower layers of backfill but overlain by the later fills. This feature appeared to be a tree-throw pit, apparently belonging to a tree which must have been growing in the hollow of the partially filled ditch.

Ten 2m square test pits were excavated by hand through the buried soil [204/314], and all of the resulting spoil was dry-sieved. However, the only finds to be recovered from this process were two small fragments of human bone. A small number of flints that were recovered from the sieving were later identified as natural. No ard marks or other evidence of cultivation could be observed in any of the areas exposed beneath the buried soil, but a number of tree-throw pits could be observed in the top of the soil horizon.

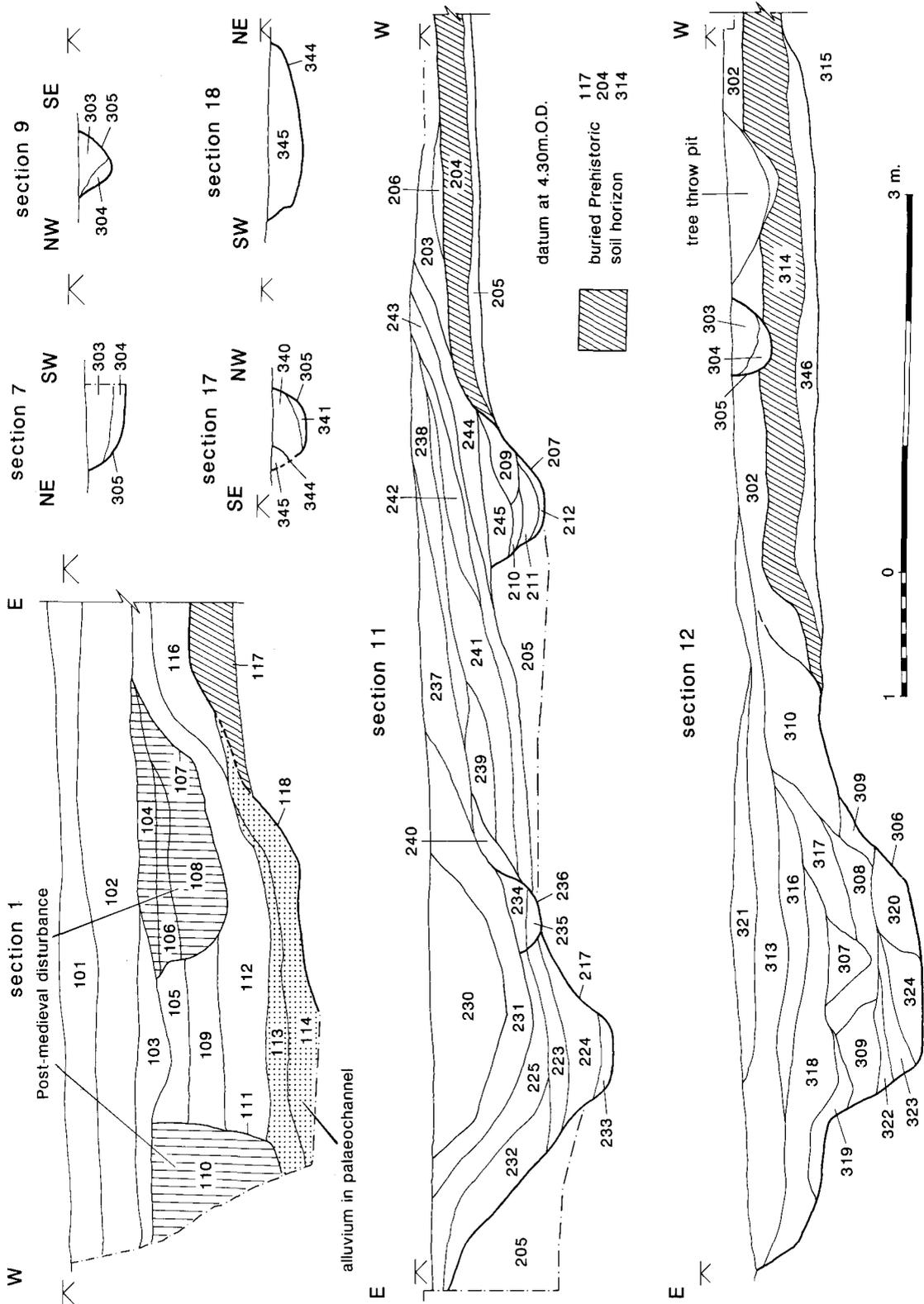


Fig 3. Sections through excavated features

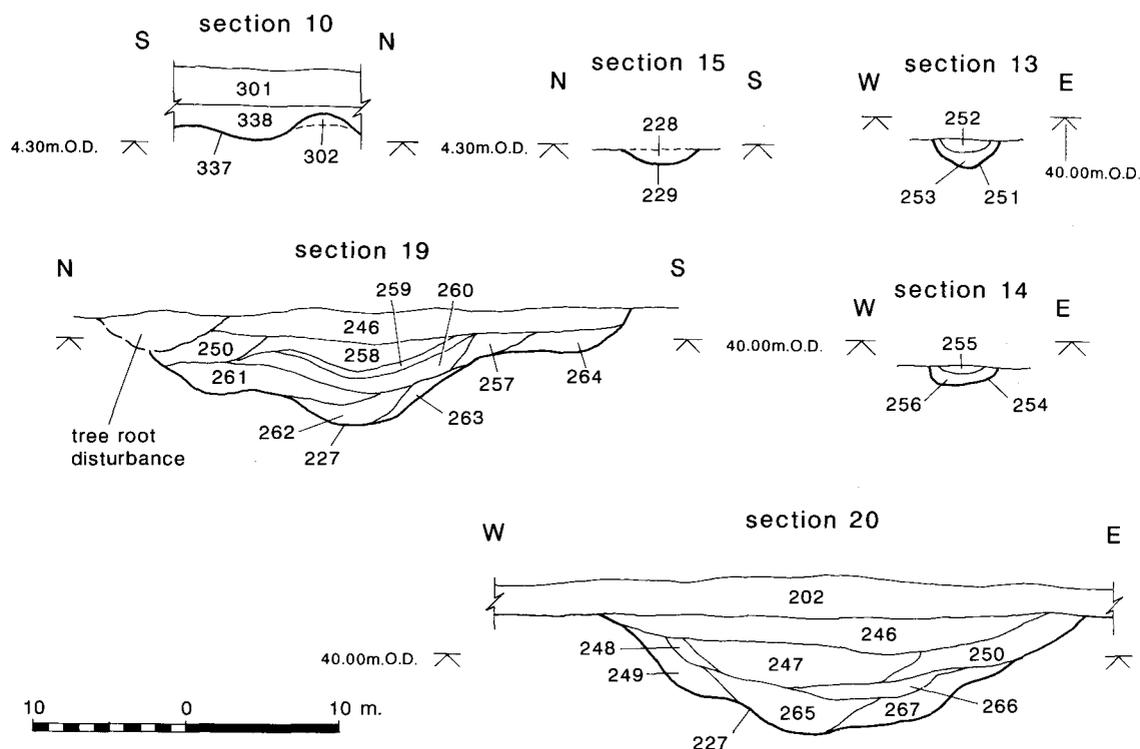


Fig. 4. Sections through excavated features

Two slightly more regular features [251 and 254] cut into the buried soil, were excavated in the central area of the site, but these contained very sterile fills and may also have been tree-throw pits.

The depth of the palaeochannel [118] discovered in evaluation trench 1, and its location along the western boundary of the site, meant that no further excavation of this feature was undertaken. However, 'a substantial peaty layer' was observed during an archaeological watching brief undertaken by the West London Archaeological Field Group during the construction of houses in Hepple Close in the area to the south of the site. This almost certainly represented the continuation of the channel and appears to confirm its N-S alignment.

THE ARTEFACTS

The pottery

J. R. Timby

Introduction

The excavations produced a pottery assemblage of some 1,783 sherds, 2.1 kg in weight, 514

EVEs. With the exception of a small number of post-medieval sherds, the entire group dates to the later prehistoric period. The bulk of the assemblage, 93.5% by sherd count, came from a single large pit [227] dating to the later Bronze Age/Early Iron Age transition period. A small quantity of Middle Iron Age pottery was also recovered, mainly from gully [305].

The material was of variable condition with a number of large unabraded sherds, some joining. The overall average sherd size of just 12g is a consequence of a large quantity of very small pieces resulting from more friable fabrics. Most of the forms and fabrics can be paralleled with material from adjacent sites suggesting fairly localised manufacture. However, the presence of fossil-shell tempered wares may indicate the movement of clays, or finished goods, from slightly further afield.

Methodology

The assemblage was sorted into fabric types based on the principal inclusions present, and quantified by sherd count, weight and estimated vessel equivalent for each excavated context.

Details of form, decoration, surface finish and the presence of any residues were noted in accordance with the guidelines suggested by the PCRG (1992). Sherds falling into the size category of 4–10mm were broadly counted and weighed but not sorted into fabrics. In the following report the fabrics and forms are discussed first, followed by a description of the two main groups. The report concludes with a discussion of the assemblage in broader regional terms.

Fabrics

The sherds were sorted macroscopically with the aid of a binocular microscope ($\times 20$) on the basis of the principal inclusions present in the clay. Wares were then further sub-divided according to particle frequency and size range. The parameters chosen to define individual fabrics were by necessity fairly broad to encapsulate the diverse range of minor variations typical in prehistoric pottery.

In total 23 separate fabrics were identified which fall into seven main ware groups: flint (fabrics F1–3); flint with ferruginous inclusions (FI1–2); wares containing marked organic material (SO, SO1, FO, O1, O2); ferruginous wares (I1, SI); sandy wares (S1–7); limestone/chalk (L1) and fossil-shell (H1–3). The commonest fabric by far (see Table 1) is the flint with ferruginous inclusions which accounts for 49% by weight of the total assemblage and 53% by weight of the material from the pit. The ferruginous grains probably occur naturally in the clay rather than selected as deliberate tempering material. Some confusion of identification with this material and grog may have

Table 1. Quantities and relative percentages of the main fabric groups

Fabric group	No	%	Wt	%	EVE	%
Flint	231	18	3,184	15	89	18
Flint/iron	608	47	10,146	49	134	26.5
Organic	45	3	593	3	64	12.5
Sandy	170	13	2,151	10	135	7
Sand/iron	101	8	2,024	10	35	7
Limestone	1	*	15	*	0	0
Shell	148	11	2,549	12	48	9.5
TOTAL	1,304	100	20,662	100	505	100

* = less than 1%

occurred in the past. Thin-section analysis of comparable fabrics from Caesar's Camp, Heathrow, reinforce the likelihood of the natural origin of the iron (Williams 1993, 351). A similar fabric is also noted in the assemblage from Weston Wood, Albury (Russell 1989, 18).

The second commonest group is the flint-tempered group accounting for 15% by weight followed by the sandy, iron and shell groups accounting for 10–12% each.

Whilst some overlap is apparent between some of the earlier and later groups the Middle Iron Age assemblage includes a number of fabrics not represented in the earlier material and vice-versa. Fabrics which specifically appear to belong to the later Bronze Age-Early Iron Age include the flint, limestone/chalk and fossil shell-tempered wares. The Middle Iron Age group sees a greater diversity of sandy wares, more widespread of the use, or inclusion of, organic matter and the continued exploitation of the ferruginous clays.

Forms

Late Bronze Age-Early Iron Age

The range of forms present in the assemblage is surprisingly limited. There are only 92 rim sherds present, just 5% of the group. The majority of these come from carinated bowls in both fineware and slightly coarser wares. The most frequent examples occurred in the finer fabrics F1 and S3. The form typically shows a flaring neck above a carination and a rounded body (Figs 5 and 6, 3, 6, 9–10, 12, 21, 23–4, and 26). The carination varies from sharply defined angular examples to more poorly defined types (eg Fig 5.16).

Approximately 9% of the assemblage by count comprised finewares. Of the 92 rim sherds, 28 (30%) have some form of finger, or stick, impressions on the outer lip, which occasionally gives a cabled effect to the thinner walled vessels (eg Fig 6.36). Similarly 22 body sherds show similar depressions around the girth of the vessels on the carination. Only six sherds display any form of incised decoration (eg Fig 5.7, 6.28, 6.20, 6.30); three sherds have both incised lines and finger depressions (Fig 5.1, 5.12, 6.20), and two

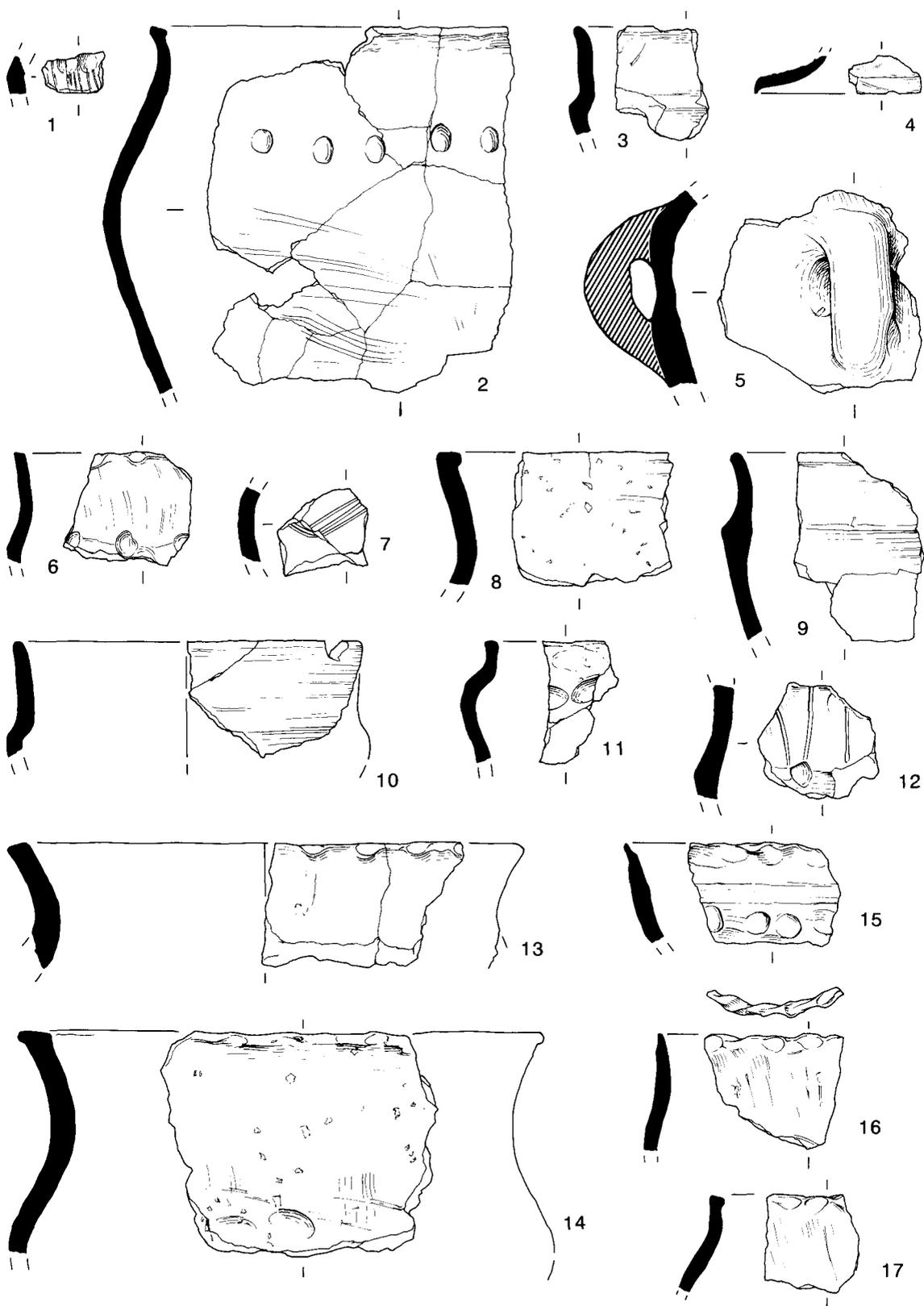


Fig 5. Pottery illustrations

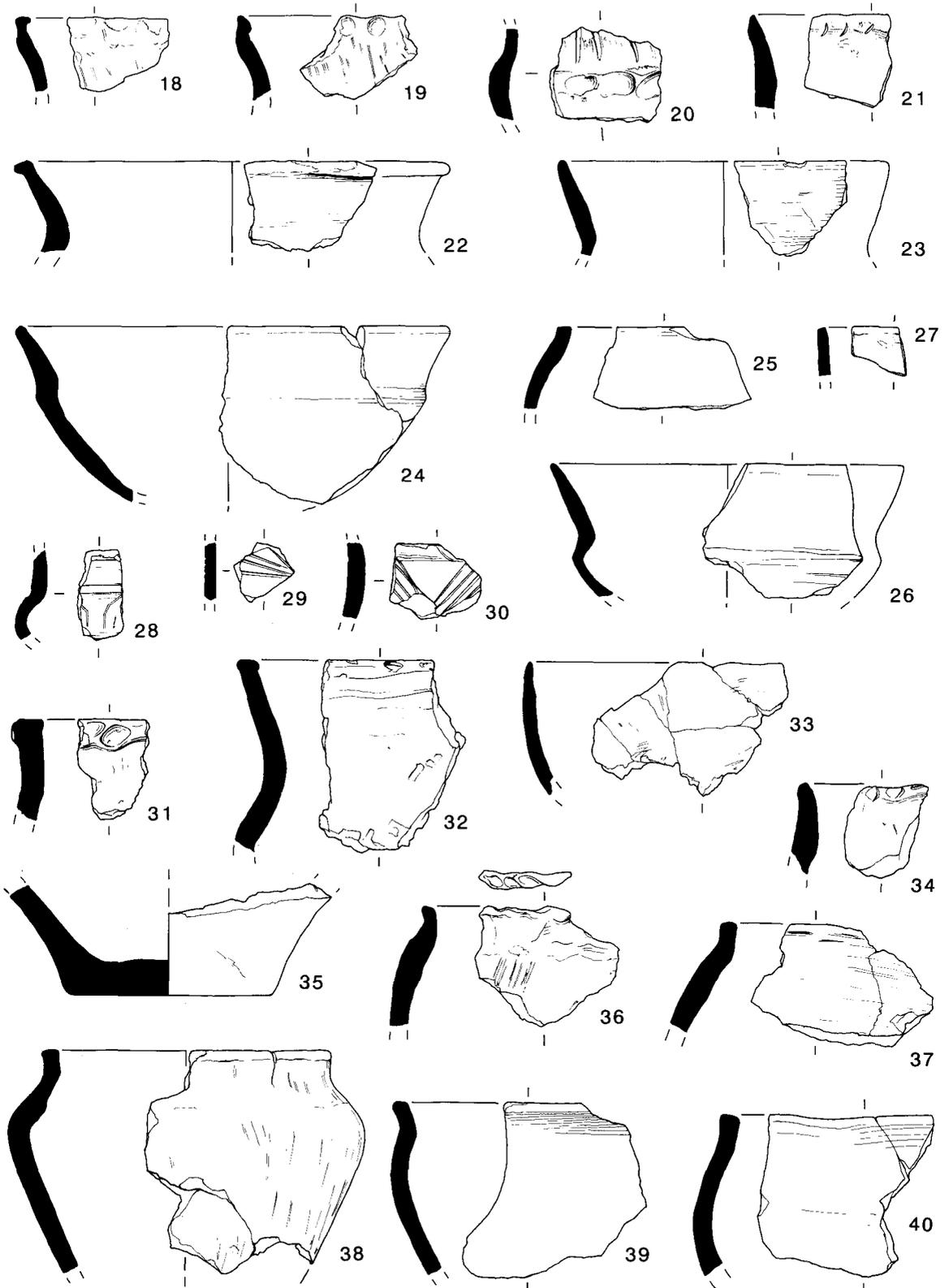


Fig 6. Pottery illustrations

sherds (Fig 6.21, 6.34) have finger-nail impressions below the rim.

A large number of thicker-walled, roughly finished, body sherds suggest large plain, slack-sided, unfeathered jars. A few rims showed slightly flattened, expanded tops, often with finger or stick depressions on the outer lip. Some of these appear to belong to globular bodied, high shouldered vessels, with everted rims, often with a slight internal lip. At least three bases from closed forms are present with heavily flint gritted undersides, a feature seen elsewhere on material of similar date, for example Stanwell (O'Connell 1990, 50).

Other vessels present include curved wall or convex-sided bowls (Fig 6.33-4) with simple rims usually with finger depressions. A single lid was noted (Fig 5.4). Only one handled vessel could be recognised (Fig 5.5), although a thickening on a sherd from [248] might also suggest the beginnings of a handle springing.

Middle Iron Age

Vessels are almost exclusively restricted to bowl forms with simple everted rims and ovoid or globular bodies (Fig 6.36-9). The distinction between fine and coarsewares is no longer so apparent although a number of the vessels have a burnished finish.

Description of fabrics and forms

In the following descriptions the fabrics are divided into those exclusively of Late Bronze/Early Iron Age date; those which appear to span the Early to Middle Iron Age, and those exclusively of Middle Iron Age date.

Late Bronze Age-Early Iron Age

FLINT

F1: A dark brown to black fine ware. The smooth, finely sandy, paste contains a sparse scatter of very finely crushed, white flint. No. 98; wt 1,439g; EVE 57.

Forms: The fabric mainly was mainly used for finewares. Forms include angular carinated bowls (Fig 6.24-5), shouldered jars (Fig 6.25) and a lid (Fig 5.4). Wall thickness 6-8mm. Smooth burnished finish. One sherd from [248] has a red haematite finish, another from [247] has incised decoration applied possibly after firing (Fig 6.28), two sherds from [260] and [247] show incised chevron decoration (Figs 5.7, 6.29). One body sherd from [247] shows finger depressions.

F2: Moderately hard, reddish-brown, brown or black coarse ware. The paste contains a sparse to moderate frequency of ill-sorted angular calcined flint up to 4mm in size. Sparse rounded grains of iron. No. 131; wt 1,715g; EVE 28.

Forms: Bipartite vessels with finger depressions on the carination (Fig 5.6) and necked, globular-bodied bowls (Fig 5.11, 5.15). Decoration includes both impressed and incised types (Figs 5.1, 6.20). Larger thicker walled (11mm) vessels. One from [247] has a lime deposit on the interior surface. Some of the vessels show wipe marks but otherwise the surfaces are plain.

F3: A dark grey-brown, hard fabric with a reddish-brown core. Sparse to moderate occurrence of fine white angular flint not more than 1mm in size intermixed with occasional round quartz sand grains. No. 2; wt 30g; EVE 4.

Forms: Vessels with a matt finish.

FLINT AND IRON

F11: A hard ware, generally with orange-brown surfaces, dark brown interior and grey core. The paste contains a sparse frequency of white angular flint not more than 2mm across in size, and occasional rounded grains of iron up to 1.5mm across. No. 84; wt 1,151g; EVE 58.

Forms: Simple flared rims from carinated bowls (Fig 5.9, 5.16). Finger-tip impressed slightly expanded rims (Fig 5.17). Carinated body sherds with finger depressions on the carination. Surfaces are vertically smoothed with visible wipe-marks. Two vessels from [247] show blackened residue on the interior surface.

F12: A black to brown moderately hard ware with a marked ferruginous content. The paste contains a sparse frequency of white angular calcined flint, up to 7mm, but mainly finer and occasional rounded grains of quartz sand. No. 524; wt 8,995g; EVE 76.

Forms: Slightly flaring rim, ovoid jars with finger depressed outer edges (Figs 5.2, 6.18), a handled jar (Fig 5.5) and concave-rim shouldered jars (Fig 6.19). Surfaces tend to be matt and slightly rough. Decoration includes the use of finger depressions and incised lines (Fig 5.12).

SHELL

H1: Red-brown ware with a dark grey core. The fabric is characterised by frequent coarse fossil shell, some fragments up to 10mm. No. 96; wt 1,781g; EVE 29.

Forms: Large flared wall vessels with a matt surface finish (Fig 5.8) and large jars with externally expanded finger-tipped rims (Figs 5.14, 6.31).

H2: A reddish-brown ware with a grey core. Fine sandy textured paste with sparse shell and red-brown iron. The shell often occurs as voids on the surfaces. No. 52; wt 768g; EVE 19.

Forms: Flared rim jars with finger-tipped rims (Figs 5.13, 6.32).

ORGANIC

O1: Hard grey, brown, or orange ware distinguished by a hackley fracture and the presence of variable amounts of organic matter in the clay. Other inclusions include iron, quartz sand and rare calcareous inclusions/voids. No. 34; wt 191g; EVE 28.

Forms: Small hemispherical bowls (Fig 6.33).

FO: A dark brown ware with a fine sandy texture. The slightly micaceous clay contains a sparse scatter of fine, white, angular, flint and occasional organic impressions. No. 2; wt 40g; EVE 15.

Forms: Carinated bowls (Fig 5.3). The surfaces often show wiping marks suggesting the use of straw or twigs.

LIMESTONE/CHALK

Lr: A very hard, dark brown well-fired ware. The paste contains sparse quartz sand, and a moderate frequency of ferruginous grains and a sparse scatter of rounded calcareous inclusions up to 3-4mm across. Smooth burnished finish. No. 1; wt 15g; EVE o.
No featured sherds.

Early Iron Age-Middle Iron Age

IRON

Ir: A generally thick-walled ware with a fine sandy texture characterised by frequent ferruginous inclusions probably naturally occurring in the clays, and no visible added temper. Rare sub-angular quartz grains up to 5mm in size and occasional organic impressions. No. 94; wt 1,806g; EVE 35.
Forms: Shouldered bowls and flared rim carinated bowls (Fig 6.23) and flared rim closed forms (Fig 6.22). Vessels are roughly trimmed and wiped multi-directionally. A globular-bodied bowl with a finger cabled rim featured amongst the Middle Iron Age assemblage (Fig 6.36). The vessel used as a cremation urn from [228] (Fig 6.35) occurred in this fabric.

SAND

Si: A mid-orange to dark brown ware with a dark grey core. A hard fabric with a sparse to moderate frequency of ill-sorted fine quartz sand. Various other inclusions occur in variable amounts, notably angular white, grey or red flint, organic matter and sparse iron grains. No. 68; wt 853g; EVE 24.

Forms: Flat bases. Simple rims with finger-nail impressions below the rim (Fig 6.34). Matt, roughly smoothed off surfaces. Other vessels include flared rim carinated bowls (Fig 6.21) and a plain rim from a small bowl or cup came from [247] (Fig 6.27).

S2: Compact medium fine sandy ware, brown or black in colour. The paste contains a common frequency of fine ill-sorted sub-angular quartz sand. Rare angular flint and rounded red-brown iron. No. 28; wt 340g; EVE 6.

Forms: Closed vessels with smooth burnished surfaces.

S3: A fine dark brown or black ware, with a reddish brown or black core. The paste is finely sandy with fine mica. No. 60; wt 718g; EVE 88.

Forms: Flaring simple rim carinated bowls (Fig 5.10, 6.26). Includes bowl body sherd with incised quadruple line pendants (Fig 6.30). Very smooth finish with traces of a fine burnish on both internal and external surfaces.

Middle Iron Age

SAND

S4: Orange-brown ware with a dark brown core. Fine sandy, slightly micaceous paste with only occasional visible quartz grains visible. Sparse grains of iron, angular flint and organic matter. No. 6; wt 24g; EVE o. No featured sherds.

S5: A hard, medium sandy ware. Reddish brown exterior and black core and interior surface. The paste shows a sparse to moderate frequency of ill-sorted rounded to sub-angular quartz with sparse rounded grains of red-brown iron and occasional flint. No. 3; wt 21g; EVE o. No featured sherds.

S6: A hard, fine, dense sandy ware. The paste shows a slightly ill-sorted common frequency of fine, rounded to sub-angular quartz sand, individual grains visible at x20 magnification and a moderate frequency of orange brown ferruginous grains. Rare angular fragments of flint also occur. The fine grains give a slightly sparkling quality to the ware possibly aided by the presence of fine mica although not macroscopically detectable. No. 3; wt 112g; EVE 5.

Forms: Globular bowls (Fig 6.39).

SIr: A hard, dark brown ware with a sandy texture. At x20 sparse fine rounded grains of quartz are visible in a finer sandy background along with larger rounded grains of red-brown iron. No. 7; wt 218g; EVE o.

Forms: Ovoid bowl with a burnished finish (Fig 6.37).

ORGANIC

O2: Moderately soft (can scratch with finger-nail) fine sandy micaceous fabric. Under the microscope occasional rounded grains of quartz sand and red-brown iron are visible along with blackened voids from organic material. No. 4; wt 55g; EVE 9.

Forms: High shouldered bowls with small everted rims (Fig 6.38).

Discussion of groups

Pit 227 (Late Bronze Age-Early Iron Age)

Pit 227 accounted for 93.5% by sherd number of the entire assemblage; 91% by weight. A summary of the individual ware groups is shown in Table 2. Out of the total of 22 fabrics identified above, 16 featured amongst the assemblage from this feature. The missing fabrics, probably all of later date are O2, SI and S5-7. The commonest fabric is the ferruginous flint tempered ware (FI) accounting for 38% by count followed by flint tempered ware (14% by count). A moderately high proportion of small unclassified sherds accounted for 25% by count of the group but only 1.5% by weight. These also affect the average sherd size of 12g. If these sherds are

Table 2. Relative proportions of main fabric groups from pit 227

Fabric group	No	%	Wt	%	EVE	%
Flint	227	14	3,164	17	6	2
Flint/iron	607	38	10,144	53	134	43
Organic	34	2	223	1	43	14
Sandy	138	9	1,724	9	109	35
Iron/sand	48	3	938	5	18	6
Limestone	1	*	15	*	0	0
Shell	148	9	2,549	13	1	*
Not classified	404	25	294	1.5	0	0
TOTAL	1,607	100	19,051	100	311	100

* = less than 1%

removed from the equation the average sherd size rises to 16g.

The pit contained a slightly diverse and curious mix of wares. Joins were evident both within and between layers, for example [247] and [258] reinforcing the excavator's interpretation of the single period fill. However, the wares show a mixture of archaic later Bronze Age elements, for example the flint-tempered wares, mixed with traits more typical of the Early Iron Age. A single post-medieval sherd from [246/(226)] indicates some contamination of the upper fill but other sherds from this context are consistent with material from below.

Of the 1,645 sherds, 80 were rims and approximately 30 were base sherds. A small proportion of the wares, c.50, 3% by count, are decorated, mainly with finger impressed or finger-tip depression, but two show impressed finger-nail decoration and four have incised decoration. A sherd from [247] appears to have been incised after firing. A single haematite-coated sherd was present in [248]. Forms are moderately diverse including both coarse and finewares; largely carinated bowls, shouldered jars and also a single lid. Three base sherds show flint gritting on the underside. Evidence of use is indicated by exterior sooting on a vessel in fabric O1 [262] and internal lime deposits on a vessels from [268] fabric FI2, and [247], fabric F2.

The only other contexts producing comparable material to pit [227] include the early buried soil horizon [204] which had two very small pieces of fabric S3.

Gully [305] (Middle Iron Age)

A much smaller group of material typified, by the group from gully [305], dates to the Middle Iron Age. The assemblage comprises 96 sherds in mainly sandy, ferruginous, or sand and organic-tempered fabrics. New fabrics not found in the earlier material include O2, S5-7 and SI. Some overlap with fabrics I1, S2, S3, which also occur in pit [227], may reflect continued use of the same clay sources. Sandy wares account for 24% by weight of the gully group, organic wares for 28% and ferruginous wares for 46%. The shelly wares do not feature here.

Many of the vessels display a burnished finish. The commonest forms are plain high shouldered ovoid bowls and jars.

Further Middle Iron Age sherds were recovered

from [317] and [318]. A single vessel from [228] had been used as a cremation urn. Unfortunately only the base survived and the fabric, I1, is one that features in both Pit [227] and the Middle Iron Age gully [305]. Its date, therefore, cannot be categorically proven either way on ceramic grounds alone.

General discussion

In conclusion, it is suggested that the assemblage from the large pit [227] belongs to the later stages of the later Bronze Age/Early Iron Age transitional phase, moving from Barrett's (1980) plain ware phase into his 'decorated' phase. Elements of both traditions are present here from a single pit deposit. The plain ware phase considered to extend down to the 8th century BC (Barrett 1980, 306-9) is characterised amongst other things by angular bowls, cups and large angular, or rounded, jars. Many of the forms continued into the next phase but with increased use of decoration.

Evidence from sites elsewhere in the locality indicate a general progression from flint tempered wares typical of the later Bronze Age through to sandy wares in the Iron Age period (Longley 1980, 65; O'Connell 1986, 72). Curiously although most of the fabric traditions (*ie* the tempering agents used) can be paralleled on all the Late Bronze Age sites in the general locality, in particular the use of flint, sand and organic matter, for example Jewson's Yard, Uxbridge (Barclay 1995), Weston Wood, Albury (Russell 1989, 18-20), Heathrow 1969 (Canham 1978), Caesar's Camp, Heathrow (Grimes and Close-Brooks 1993, 350), and slightly further afield, Ivinghoe Beacon, Bucks (Waugh 1968, 219), the heavily shell-tempered fabrics and the single limestone-tempered sherd found at Snowy Fielder Waye are less easy to parallel. A shell with flint fabric was present amongst the material from Stanwell, although very rare (O'Connell 1990, 50, fabric 11). The use of ferruginous clays has been noted in the vessels from Caesar's Camp (Grimes & Close-Brooks 1993, 350). Shell-gritted wares are better documented from Early Iron Age sites like Wittenham Clumps (Hingley 1979-80, 33) and Ashville, Abingdon (De Roche 1978, 40-74) to the W. Petrological analysis, however, would be required to assess whether the Berkshire/Oxfordshire fabrics share a similar source to the Middlesex sherds or whether the

latter have a Tertiary, rather than a Jurassic, source.

Several other Late Bronze Age and Early Iron Age sites are known in the locality although there are few settlement sites in Surrey to the S which show continuity from the Late Bronze Age into the Iron Age (Needham 1987, 134). Comparisons with sites like Stanwell (O'Connell 1990), Caesar's Camp (Grimes & Close-Brooks 1993), and Heathrow 1969 (Canham 1978) which are regarded as dating to this transitional period, that is the 10th–8th centuries BC, show many similarities with the Snowy Fielder Waye group. Approximately 5.6% of the comparably sized assemblage from Stanwell was decorated compared to 3% at Snowy Fielder Waye. Several of these sites are dated by metalwork associations or radio-carbon dates (see Grimes & Close-Brooks 1993, 355–6 for recent review). It has been noted that in the Middle Thames the later Bronze Age repertoire as typified by Runnymede Bridge (Longley 1980, 73) and Petters Sports Field, Egham (O'Connell 1986) are succeeded by vessels characterised by taller, sometimes flaring, rims to jars and bowls with greater use of finger-tip decoration and perhaps some incised decoration (Grimes & Close-Brooks 1993, 355). Such vessels can be found at both the Heathrow sites (Grimes & Close-Brooks 1993; Canham 1978) which are suggested to date to the 9th or 8th centuries BC. The fabric repertoire however, seems considerably more limited with just flint and flint and 'grog' noted at Heathrow 1969; flint, ironstone and flint and a fine micaceous fabric at the Late Bronze Age enclosure at Carshalton (Adkins & Needham 1985, 18ff). The assemblage from Carshalton also suggested to date to the 10th–8th centuries similarly shows some overlap with Snowy Fielder Waye, notably in the presence of loop-handled jars, slack-sided and slightly ovoid jars, but lacks the sharply carinated bowls, the use of finger-pressed shoulders or bodies and sherds with incised decoration, and has instead greater emphasis on bucket and barrel-shaped vessels perhaps suggesting it is slightly earlier in date. The emphasis on the flint based fabrics support this hypothesis. The introduction of the shell tempered wares, various decorative elements and triangular loomweights (see below) in the Snowy Fielder Waye group suggest it is slightly later than sites like Carshalton and Stanwell, but contemporary with Caesar's Camp and the Runnymede Bridge

settlement giving pit [227] a *terminus post quem* around the 8th century BC.

Gully [305] which contained most of the remaining wares, showed a different spectrum of fabrics and forms characteristic of the Middle Iron Age period. Flint and shell tempered wares are almost completely absent. The trend suggests an increase in sandy wares and to this extent the middle Iron Age material from Snowy Fielder Waye is also similar to that from Caesar's Camp, Heathrow (Grimes & Close-Brooks 1993, 356–7). Further fragments of triangular loomweight were also associated with this material.

Catalogue of illustrated sherds

Nos 1–34 Pit 227

1. Small carinated bodysherd decorated with finger depressions followed by scratched vertical parallel lines. Fabric F2. [262].
2. Large slightly globular-bodied bowl with a slightly expanded, roughly finished rim. The upper body is decorated with fairly deep finger depressions. Dark reddish brown to dark grey with a grey core. Fabric FI2. [257].
3. Carinated bowl in a dark brown ware with a dark grey core. Traces of burnt residue on the exterior. Fabric FO1. [261].
4. Lid. Dark grey-brown. Smoothed interior, exterior surface discoloured and slightly pocked. Fabric F1. [261].
5. Bodysherd from a moderately large vessel with a loop handle. Dark orange to dark grey exterior, dark grey interior and core. Sparse scatter angular flint, common frequency red-brown ferruginous inclusions. The body of the vessel has been horizontally scraped smooth. Fabric FI2. [260].
6. Rim from a carinated bowl with finger tipping on the rim exterior and carination. Roughly smoothed exterior. Dark brown to black ware. Fabric F2. [260].
7. Two joining bodysherds decorated with incised line decoration, probably part of a three-line chevron. Fabric F1. [260].
8. Bowl with a flared upper wall and a slightly expanded rim. Fabric H1. [259].
9. Rim and bodysherd from a carinated bowl. Dark grey-brown surfaces and core. Burnished exterior and interior surfaces. Fabric F9. [259].
10. Carinated bowl with smooth black surfaces marked by slightly haphazard tooled burnishing lines. Fabric S3. [259].
11. Necked bowl with a globular body decorated with finger depressions on the upper zone. Dark brown ware with a dark grey core. Fabric F2. [259].
12. Bodysherd from a carinated vessel with finger depressions on the carination and decorated with vertical incised lines on the upper zone. Brown-orange exterior, dark grey core and interior. Fabric FI2. [258].
13. Two joining rimsherds from a wide-mouthed bowl decorated with intermittent finger-tipping on the exterior lip of the rim. Dark orange fabric with a dark grey-brown core. Fabric H2. [258] and [247].
14. Large diameter flared wall, slackly-carinated bowl with an expanded flattened rim. Decorated with finger-tipping on

the rim edge and on the zone immediately above the carination. Reddish-brown to grey exterior, dark grey interior and core. Fabric H1. [247].

15. Bowl decorated with finger depressions immediately below the rim and mid way down the body. Dark reddish-brown to grey fabric with a dark grey core. Fabric F2. [247]

16. Flared rim with finger-tip decoration from a slackly-carinated bowl. Blackened residue on the interior surface. The exterior has been roughly smoothed leaving irregular striations. Fabric F2. [247].

17. Rim with a finger-tipped decoration. Blackened residue on the interior face. Fabric FI1. [247].

18. Flared rim vessel with a finger-pinched rim. Fabric FI2. [247].

19. Concave rim with a finger pinched rim. The surface has been roughly smoothed vertically. Fabric FI2. [247].

20. Bodysherd decorated with finger depressions on the carination and irregular incised vertical lines on the upper zone. Mid brown to dark black-brown exterior, dark grey core and interior. Fabric F2. [247].

21. Slightly flared rim from a carinated vessel. Decorated with finger-nail impressions immediately below the rim. Mid brown to grey surfaces, dark grey core. Fabric S1. [247].

22. Flared rim vessel with a slightly expanded rim. Dark grey brown smooth surfaces and dark grey brown core. Very ferruginous clay with a sparse scatter of very fine flint. Fabric I1. [247].

23. Plain flared rim from a tripartite bowl. Pale brown burnished surfaces, dark grey core. Fabric I1. [247].

24. Carinated bowl. Dark grey brown ware. Smoothed exterior and interior surfaces but no trace of burnish. Fabric F1. [247].

25. Ovoid-shaped vessel with a slightly squared rim. Smoothed dark grey surfaces. Fabric F1. [247].

26. Flared rim carinated bowl. Smoothed, burnished surfaces. Black surfaces with a dark grey inner core with a brown exterior rind. Fabric S3. [247].

27. Simple, vertical rim from a small bowl or cup. Dark brown surfaces with a dark grey core. Fabric S1. [247].

28. Bodysherd from a necked, round-bodied bowl. The body is decorated with incised lines which appear to be scratched in after the vessel had dried but possibly before firing. Pale brown burnished exterior, dark grey core and interior. Fabric F1. [247].

29. Bodysherd decorated with three slightly diverging incised lines probably from a chevron-style decorative scheme. Fabric F1. [247].

30. Bodysherd from a fineware bowl with incised chevron-style decoration. Fabric S3. [248].

31. Rimsherd in a dark orange vesicular fabric. Slightly expanded top with finger depressions on the outer lip. Fabric H1. [246].

32. Rimsherd. Flaring rim with a flat, slightly expanded top from a slackly-carinated bowl. Dark orange exterior/interior, dark grey core. Fabric H2. [226].

33. Small hemispherical bowl in a thin-walled, dark brown ware with a dark grey core. The surfaces are only roughly finished. Fabric O1. [226].

34. Simple rim bowl decorated with finger-nail impressions on the exterior rim edge. Dark black-brown ware. Fabric S1. [268].

Pottery from other selected contexts

35. Two joining baseshersds from a closed vessel used as a cremation urn. Dark brown very ferruginous clay with a dark

grey core. Fabric I1 with a small amount of organic matter. [228].

36. Finger-tipped cabled rim from a globular bodied bowl, Dark brown to black in colour. Fabric I1. [303].

37. Ovoid bowl with a small everted rim with a slightly bevelled internal face. Fine smooth black ware burnished on both the interior and exterior walls. Fabric S1. [303].

38. High shouldered jar with a simple rim. Dark brown sandy ware. The exterior surface shows fine vertical striations where the walls have been smoothed off. Fabric SO1. [303].

39. Bowl in a dark grey-black fine sandy ware. The exterior shows slightly uneven firing. Fabric S6. [340].

40. Globular bowl in a dark brown sandy ware with a black core. Very smooth surfaces. Fabric S6. [317].

The fired clay

J. R. Timby

Approximately 300 pieces of fired clay weighing 4.9kg were recovered from the site. At least 81% of this by weight could be identified as belonging to triangular perforated loomweights, the remainder were too fragmentary to identify to form.

Loomweights

At least four fabrics could be discerned amongst the loomweight fragments:

LW1 Light brown surfaces with a black poorly fired core. The sandy texture clay contains a sparse scatter of coarse, angular calcined flint pebbles up to 20mm across and sparse iron.

LW2 Orange-brown in colour with a black interior. A very fine textured sandy clay with a scatter of red-orange ferruginous inclusions and elongated blackened voids from vegetative matter.

LW3 Orange-brown exterior with a black core. The sandy fabric is characterised by frequent red-orange ferruginous inclusions and little else.

LW4 Dark reddish-orange with a reddish-black core. Hard ferruginous, slightly sandy clay with frequent organic impressions on the surfaces.

1. Fragment of a triangular loomweight. Fabric LW2. [317] (Fig 7).

The loomweight fragments were exceptionally fragmented but clearly belonged to a triangular form with perforations across the corners rather than the annular, or pyramidal types more commonly associated with Middle and later Bronze Age assemblages. Fabric LW1 accounted for 34% by weight of the identified fragments; fabric LW2 for 39%, fabric LW3 for 14% and LW4 for 13%. All four fabrics were present in pit [227] which accounted for 83% of all the loomweight fragments. It may be of some significance that all the fragments came from

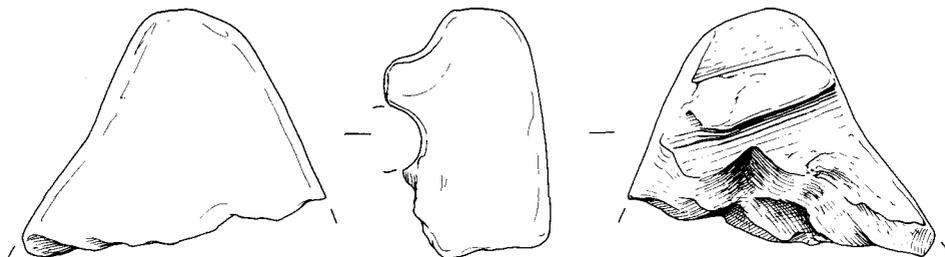


Fig 7. Triangular loomweight

layer [258] and above with no examples from the lower fills. The remaining fragments from [303] in gully [305] and layer [317] were in fabric LW2. The fragment from [317] had a groove across the apex (Fig 7).

Triangular loomweights of comparable type were present at Heathrow (Grimes & Close-Brooks 1993, fig 33), whilst later Bronze Age sites such as Weston Wood, Albury have annular or cylindrical weights (Russell 1989, 43).

The worked flint

P. Bradley

Fourteen pieces of worked flint and 141 pieces of burnt unworked flint were recovered (Table 3). The flint has the appearance of derived material, being dark brown or grey in colour with a worn pebble cortex. Burnt unworked flint is heavily calcined. The majority of the flint is hard-hammer struck. Hinge fractures and other accidents of debitage were noted. A Mid-Late

Table 3. Assemblage composition

Context	Flakes	Blades, blade-like flakes	Burnt unworked	Total
104	1	—	—	1
226	—	—	1	1
228	1	—	1	2
247	3	2	—	5
248	—	3	—	3
249	1	—	—	1
258	—	—	75	75
259	1	—	20	21
260	—	—	44	44
263	1	—	—	1
303	1	—	—	1
Total	9	5	141	155

Bronze Age date for this material would be consistent with these technological traits. A total of 8.9kg of burnt unworked flint was recovered and it consists of small to medium sized pebbles which show varying degrees of burning. Five blades and blade-like flakes were recovered from contexts [247] and [248]. Some of these pieces were soft-hammer struck and had previous parallel blade scars on their dorsal faces. One or two blades and blade-like flakes have used edges. This material would seem to belong to more careful reduction strategy, however given the quantity of material and lack of diagnostic retouched forms it would be unwise to speculate regarding the dating of this small group.

THE ENVIRONMENTAL EVIDENCE

The animal bone

R. Wilson

Bones from the excavation were examined and identified as for previous reports on other Thames Valley sites (Wilson 1978, 1993).

Slightly fewer than 500 fragments were recorded and the overall results of classification of bones from dated deposits are summarised in Table 4. Sieved and unsieved bone groups from the major features are presented separately, although group samples are small.

In Table 4 the sieved bones appear sufficiently numerous to indicate that small, unidentified and burnt fragments and possibly sheep and pig bones are under represented in the normally excavated assemblages. On the other hand, unidentifiable and small fragments amount to 74% of the normal bone groups and indicate a reasonable recovery of identifiable bones.

All the common Iron Age domestic species except dog were identified but this exception is

Table 4. Frequency of bone fragments

Period Feature	EIA Pit	MIA Gully	IA Pit	%	Sieved samples		Total
Number	247	303	226 +		247	303	
Cattle	13	5	1	26	—	—	—
Sheep	31	12	—	58	7	3	10
Pig	7	—	—	9	4	—	4
Horse	1	2	1	5	—	—	—
Deer	—	A	—	1	—	—	—
Identified total	52	19 + A	2		11	3	14
Unidentified	83	105	27		127	54	181
Total	135	124 + A	29		138	57	195
Burnt fragments	—	2	10		19	2	21

A = Antler fragment

almost certainly an outcome of the small-sized groups of bones collected. Nevertheless the absence of bird and fish bones in the sieved groups appears to be another example of the paucity of such material at most Iron Age sites.

All parts of the skeletons of the domestic species are represented in the bone groups yet no animal skulls or articulated bone groups are present. This and the species information suggest scattered debris which was domestic refuse and not involved with ritual processes. Typically such loose and fine debris is associated with Iron Age houses and hearths (Wilson 1994) so probably these structures once occurred adjacent to, or above the level of, the surviving pit and gully.

Five moderately complete mandibles of sheep, cattle and pig indicate that a mixture of young and older animals were slaughtered at the site. This conclusion and the percentages of species identified is typical of Iron Age sites in southern England. However, it would take larger samples of bones than the above to show up variability that could be accepted confidently as showing genuine differences in ecology and culture with sites elsewhere.

The human bone

A. Boyle

A small quantity of human bone was recovered from the remains of an Iron Age pottery vessel. This deposit comprised nine fragments of white and well calcined bone with a total weight of 2g. None of the fragments were certainly identified as human although a single fragment may represent tibia shaft. The largest fragment

measured 17mm. A single fragment of burnt flint was also contained within the deposit.

A single bone was recovered from the fill of pit [227]. It was broken and incomplete and has been identified as a portion of radius of a neonate.

Two fragments of unburnt bone were recovered from layer [204] during dry-sieving and have been identified as probable human long bone shaft.

The charred plant remains and molluscs

M. Robinson

Seventeen samples from Late Bronze Age to Iron Age contexts at Snowy Fielder Way were floated onto a 0.25mm mesh to recover charred plant remains. Significant quantities of charred remains were noted in five samples. These were sorted in detail and the charred material was identified. The results for charred seeds and chaff are listed in Table 5 and for charcoal in Table 6. The fragments of *Alnus/Corylus* sp. charcoal were too small to be identified more closely.

A column sample was taken for mollusc analysis through a buried pre-Iron Age soil [204]. Samples of 0.5kg were sieved down to 0.5mm and sorted for shells. The molluscs were identified and the results are listed in Table 7. *Cecilioides acicula* has been excluded from the totals because it is a burrowing mollusc. Shells were also identified from the flots for charred remains from two undated ditches and their presence recorded.

The only samples to contain charred seeds and chaff were from the fill of a large Late Bronze Age/Early Iron Age pit [227]. The only rich assemblage from this pit, Sample 27, was

Table 5. Charred plant remains (excluding charcoal)

			No. of Items			
			Pit 227			
Sample Context			19 + 24	22	27	3
Sample Volume (litres)			261	260	259	247
			11	10	10	40
Cereal Grain						
<i>Triticum spelta</i> L.		spelt wheat	—	—	6	1
<i>Triticum</i> sp.	- short grain	wheat	—	—	2	—
<i>Triticum</i> sp.		wheat	—	—	3	1
<i>Hordeum</i> sp.		barley	—	—	—	1
cereal indet.			—	3	21	5
Total Cereal Grain			0	3	32	8
Cereal Chaff						
<i>Triticum spelta</i> L.	- glume	spelt wheat	—	—	18	3
<i>T. dicoccum</i> Shubl. or <i>spelta</i> L.	- glume	emmer or spelt wheat	—	4	191	9
<i>Avena</i> sp.	- awn	oat	—	—	5	—
Total Chaff (excluding awns)			0	4	209	12
Weed Seeds						
<i>Stellaria media</i> sp.		chickweed	—	—	1	—
Caryophyllaceae indet.			1	—	—	—
<i>Chenopodium album</i> L.		fat hen	—	—	2	—
<i>Vicia</i> or <i>Lathyrus</i> sp.		vetch or tare	—	—	1	—
<i>Polygonum aviculare</i> agg.		knotgrass	—	—	2	—
<i>P. persicaria</i> L.		redshank	1	—	1	—
<i>Rumex acetosella</i> agg.		sheep's sorrel	—	—	2	—
<i>Hyoscyamus niger</i> L.		henbane	—	—	—	1
<i>Valerianella dentata</i> (L.) Pol.		corn salad	—	—	—	1
<i>Tripleurospermum inodorum</i> (L.) Sch.		scentsless mayweed	—	—	1	—
<i>Bromus</i> cf. <i>secalinus</i> L.		brome	1	2	30	—
Gramineae indet.		grass	1	—	2	—
weed indet.			1	—	5	2
Total Weed Seeds			5	2	47	4
Total no. of items per litre (excluding awns)			0.5	0.9	28.8	0.6

Table 6. Charcoal

		Presence					
		Cremation 229		Pit 227			
Sample Context		28	228	19 + 24	22	27	3
		28	228	261	260	259	247
<i>Alnus/Corylus</i> sp.	alder/hazel	+	—	—	—	+	—
	tp.	—	—	—	—	—	—
<i>Quercus</i> sp.	oak	+	+	+	+	+	+
Pomoideae indet.	hawthorn etc	—	+	—	—	—	+

dominated by the glumes of hulled wheat including *Triticum spelta* (spelt wheat). There were no certain remains of *Triticum dicoccum* (emmer wheat). Further upstream at Runnymede, spelt wheat chaff outnumbered emmer wheat chaff by a ratio of 3:1 in Late Bronze Age deposits (Greig 1991, 254). Spelt wheat might be expected

to have been the main wheat in the region throughout the Iron Age.

Cereal grain was also present in Sample 27. Some of the grain could be attributed to spelt wheat but there were also two short somewhat rounded wheat grains. It is not uncommon for a few short grains of wheat to be found in

Table 7. Mollusca

Sample Context	Column 12: Min No. Individ.					Presence			
	12.5 204	12.4 204	12.3 204	12.2 206	12.1 203	11 209	20 233	6 224	5 223
<i>Valvata cristata</i> (Müll.)	3	—	2	—	—	—	—	—	—
<i>V. piscinalis</i> (Müll.)	1	1	—	—	—	+	—	—	—
<i>Bithynia tentaculata</i> (L.)	6	1	3	—	—	—	—	—	—
<i>Bithynia</i> sp.	11	1	—	6	—	+	—	—	—
<i>Carychium</i> sp.	3	13	20	—	—	+	—	—	—
<i>Physa fontinalis</i> (L.)	—	—	1	—	—	—	—	—	—
<i>Lymnaea palustris</i> (Müll.)	—	—	—	—	—	—	—	—	+
<i>L. stagnalis</i> (L.)	1	—	—	—	—	—	—	—	—
<i>L. peregra</i> (Müll.)	1	—	—	—	—	—	—	—	—
<i>Planorbis planorbis</i> (L.)	1	—	—	—	—	—	—	+	—
<i>Anisus leucostoma</i> (Milt.)	3	1	—	—	—	+	+	+	+
<i>Bathyomphalus contortus</i> (L.)	—	—	—	—	—	+	—	—	—
<i>Armiger crista</i> (L.)	3	—	1	—	—	—	—	—	—
<i>Succinea</i> or <i>Oxyloma</i> sp.	—	3	2	2	—	—	—	—	—
<i>Cochlicopa</i> sp.	6	11	8	1	—	+	—	—	—
<i>Vertigo antiwertigo</i> (Drap.)	1	—	—	—	—	—	—	—	—
<i>Pupilla muscorum</i> (L.)	—	5	2	—	—	+	—	—	—
<i>Vallonia costata</i> (Müll.)	—	2	1	—	—	+	—	—	—
<i>V. pulchella</i> (Müll.)	10	20	18	1	—	+	—	—	—
<i>Vallonia</i> sp.	15	16	23	1	—	+	—	—	—
<i>Punctum pygmaeum</i> (Drap.)	—	1	2	—	—	+	—	—	—
<i>Discus rotundatus</i> (Müll.)	—	—	—	—	—	—	—	+	—
<i>Nesovirea hammonis</i> (Ström)	2	—	1	1	—	+	—	—	—
<i>Aegopinella nitidula</i> (Drap.)	—	—	—	—	—	—	—	+	—
<i>Limax</i> or <i>Deroceras</i> sp.	1	1	1	5	—	—	—	—	—
<i>Euconulus alderi</i> (Gray)	—	1	—	—	—	—	—	—	—
<i>Cecilioides acicula</i> (Müll.)	—	4	6	1	5	—	—	—	—
<i>Clausilia bidentata</i> (Ström)	—	—	—	—	—	—	—	+	—
<i>Trichia hispida</i> (L.) or <i>plebeia</i> (Drap.)	20	35	39	4	1	+	—	+	—
<i>Sphaerium</i> sp.	1	1	2	1	—	—	—	—	—
<i>Pisidium</i> sp.	1	—	—	—	—	—	—	—	—
Total excluding <i>Cecilioides acicula</i>	90	113	126	22	1				

assemblages of spelt wheat. They have tended to be regarded as being from a free-threshing wheat, probably bread wheat (*Triticum aestivum*), growing as a minor component of the crop. However, one of the grains showed evidence that it had been charred while tightly held within the spikelet. It had longitudinal impressions from the glumes and the tip had burst. This would suggest that the grain was from a hulled wheat, perhaps a short grained variety or mutant of spelt wheat.

The cereal grain in Sample 27 was outnumbered by weed seeds as well as by chaff. The seeds were all from plants which readily grow as arable weeds and have been recorded from Iron Age contexts, *Bromus cf. secalinus* (brome grass) being the most numerous. Allowing that chaff tends to be under-represented in comparison with grain in charred assemblages because it is more vulnerable to complete oxidation on burning, the charred material in Sample 27 was

probably debris from the final cleaning of a crop of spelt wheat following the de-husking of the grain.

The other charred assemblages from [227] were too small to say much about other than that their origin was also probably cereal processing. Sample 3, however, added *Hordeum* sp. (barley) to the crop record.

The charcoal from pit [227] was mostly *Quercus* sp. (oak) but Pomoideae indet. (hawthorn, apple etc) and a small quantity of *Alnus/Corylus* tp. (alder/hazel tp.) charcoal were also present. The cremation pit [229] contained small quantities of oak and hawthorn tp. charcoal.

The molluscs from the buried pre-Iron Age soil [204], confirmed it to have been a soil and suggested that it had been formed from alluvial sediment. Samples 12.5, 12.4 and 12.3 all contained shells of flowing aquatic molluscs, particularly *Bithynia tentaculata* but also *Valvata*

cristata, *V. piscinalis* and *Sphaerium* sp. These shells, however, were outnumbered by shells of terrestrial species, mostly *Vallonia pulchella*, *Trichia hispida* or *plebeia*, *Carychium* sp. and *Cochlicopa* sp. Such a fauna would be characteristic of damp grassland that is not being closely grazed. There was a slight dry ground element, represented by *Pupilla muscorum* and *Vallonia costata*, but woodland species were absent. The open grassland conditions indicated by the terrestrial molluscs would suggest a Neolithic or more recent date for the soil. The assemblages from [204] were very similar to some which have been recorded from alluvial sediments on the floodplain of the Upper Thames Valley and have been interpreted as accumulating on seasonally inundated hay meadow (Robinson 1988). Such an assemblage could also have formed in a soil that had developed from an alluvial sediment after the cessation of flooding.

Samples 12.2 and 12.1 were from the deposits which sealed the buried soil [203 and 206]. The molluscs from them would be consistent with their interpretation as redeposited alluvial sediments, perhaps the upcast of a ditch.

The shells from Sample 11, from the fill of ditch [207], were similar to those from the buried soil which was cut by the ditch. It is possible that the shells had been derived from this soil. The molluscs from ditch [217] gave more interesting results. The samples from this ditch, Samples 20, 6 and 5 all contained shells of *Anisus leucostoma*, which probably reflected stagnant water in the ditch bottom. However, Sample 6 also contained shells of the shade-loving terrestrial species *Discus rotundatus*, *Aegopinella nitidula* and *Clausilia bidentata*. Open country species were absent. It is possible that there had been an episode of woodland regeneration on the site but similar results would also be expected if there had been a rather overgrown hedge alongside the ditch.

DISCUSSION

The small size of the area of excavation, and the very small number of features that survived on the site, means that interpretation of the probable function of the features and the nature of the occupation they represent is somewhat limited. Additionally, detailed comparison with other sites has not been possible. Nevertheless, the scarcity of any deposits relating to Bronze and Iron Age occupation in the London area generally makes these deposits a significant discovery and the size

of the pottery assemblage that was recovered enhances its importance. This is equally applicable on a national level as in general evidence relating to the transitional Late Bronze Age/Early Iron Age period, and Early to Middle Iron Age funerary activity is uncommon.

The palaeochannel and the prehistoric topography

Ancient river and stream courses once bisected the lower-lying ground close to the Thames creating gravel islands, and these islands of fertile land are known to have been a favoured location for prehistoric occupation throughout the Thames Valley, *eg* at Runnymede (Needham 1991), Dorney (Allen & Welsh 1996), Wallingford (Lambrick 1992) and Yarnton (Hey & Bell 1996; Hey *in press*). It is possible that two lakes in Syon Park, to the N of the site, are exploiting a former oxbow of the river and the line of the southern lake correlates very closely to the line of the palaeochannel discovered along the western boundary of the site. However, this lake is an 18th-century creation (VCH 1962), and there is no evidence from earlier maps of the area (*eg* map of Isleworth hundred 1635 and Rocque's map of 1746) to suggest the existence of any previous topographical feature on this line. It therefore remains uncertain whether the site once lay on part of the larger island on which Syon House stands, or formed part of a separate, smaller island. In addition to the discovery of a palaeochannel running under the western boundary of this site, there is some suggestion from the topography that a palaeochannel also ran through the area to the E of the site. An allotment situated on the opposite side of Snowy Fielder Waye lies within a noticeable hollow which is prone to seasonal flooding and this could imply that the site once comprised a quite narrow island of land, or possibly lay at the tip of an island.

The rise in the water table in the late prehistoric and Roman period, seemingly due to a combination of climatic change, tree clearance, and the intensification of cultivation leading to soil erosion and the subsequent silting up of many of the river and stream channels (Lambrick 1992), resulted in periodic flooding and later alluviation over these lower-lying areas. This led to the abandonment or shift of many of these riverside settlements. This may also have been

the fate of prehistoric settlement in this area and, as will later be discussed, the character of some of the deposits discovered on this site may reflect the problem of a rising water table.

The buried soil horizon and early ditch

[207] (Fig 3, sections 1, 11 and 12)

The buried soil layer discovered throughout the western half of the site would appear to be an original prehistoric soil horizon. The evidence from the excavation and molluscan analysis suggests that this is an old ground surface as opposed to a ploughsoil and is of a Neolithic or later date. The only dateable finds recovered from the buried soil were two very small fragments of possible Late Bronze Age/Early Iron Age pottery, and although these are so small they could easily be intrusive, the lack of any flints from this layer would also appear to suggest that it is more likely to be later prehistoric. The two fragments of human bone recovered from sieving came from the top of this soil horizon. The date and origin of the fragments is uncertain but the fact that they are small and abraded may indicate that they lay on this ground surface for some time.

Little can be said about the function of ditch [207] other than it appears to be some form of boundary contemporary with the early soil horizon. Although the finds and the stratigraphic sequence suggest this ditch and the early soil horizon could be broadly contemporary with the Late Bronze Age/Early Iron Age midden pit [227], it is not known whether they represent an associated phase of activity, and, therefore, whether this ditch is associated with the occupation activity or formed part of an earlier field system remains uncertain. Although this N-S aligned ditch and bank is not very substantial, the continuity and enlargement of this boundary represented by the cutting of larger ditch [217], implies that the boundary itself was of some significance.

Midden pit [227] (Fig 4, sections 19 and 20)

The large pit discovered close to the E edge of the excavation trench which contained large quantities of domestic refuse, clearly represents midden activity associated with Late Bronze Age/Early Iron Age occupation. However, the

very large assemblage of densely concentrated pottery which forms the bulk of the midden material within this pit would not appear to be representative of ordinary mixed domestic refuse, and there is therefore some suggestion that this material may have been deliberately selected and deposited. The character of the pit, and of the backfilling, also suggests that the deposition of this material represents the primary function of this feature (*ie* it is clearly not a grain storage pit or other such reused feature). It is often difficult to establish what constitutes deliberate or 'ritually' deposited material (currently a topic of much debate, *eg* Hill 1995 & Thomas 1991), as concentrations of artefacts or of a certain category of artefact could simply reflect the debris of a particular activity. It also remains uncertain whether this feature genuinely represents a deliberate deposit as there are no contemporary features on the site with which to compare it. Nevertheless, by any standards this is a very large assemblage of pottery from this period to be recovered from a single pit and there is no evidence to suggest that it is associated with pottery production or other specific activity. If this feature does represent a 'deliberate deposit' it is possible that its occurrence is connected to the boundary represented by the two ditches immediately to the W. However, Iron Age pit alignments containing apparently deliberately deposited material have also been discovered along the edge of natural boundaries, including river channels (*eg* Pollard 1996), so alternatively this feature may have been located in regard to the edge of the palaeochannel which, it is suggested, runs through the area to the E of the site (and it is even possible that this pit may also once have formed part of an alignment of such features).

Cremation [228] (Fig 4, section 15)

As only the very base of the cremation pot survived it could not be stated with certainty whether the pot is Early or Middle Iron Age in date and its spatial relationship to the other Iron Age features does not appear to provide any further evidence to resolve this issue. However, its position may suggest that this feature respected the boundary represented by the two ditches.

Although a small number of Early Iron Age cremations are known to have been buried below barrow mounds (Cunliffe 1991, 499) the majority

of Iron Age cremations are late in date and many belong to the 'Belgic' Aylesford-Swarling tradition which is largely confined to the SE of England (Wait 1981) and dates from around the beginning of the 1st century BC. Further Early and Middle Iron Age examples include a cremation from beneath the primary rampart at the Caburn hillfort in Sussex and a simple burial in a small pottery vessel from a shallow hollow at Park Brow, Sussex (Whimster 1981, 35).

At Yarnnton Cresswell Field small quantities of cremated bone were recovered from a small group of pits and postholes. There is some suggestion at this stage that the cremated bone may actually derive from Iron Age rather than Bronze Age contexts. If this proves to be the case then it would be very interesting as Iron Age cremations are largely unknown in the Thames valley. At least one fragment has already been identified as human (Boyle in preparation).

Gully [305] (Fig 2 and Fig 3, sections 7, 9, 11 and 12)

The Middle Iron Age 'gully segment' [305] is a slightly curious feature. When only part of this feature was exposed in the evaluation it was presumed from its character that it was part of a penannular house gully. However, when fully exposed it was revealed that it comprised a linear feature, measuring 3m in length, 0.70m in width and 0.40m in depth. It was at first thought that this was all that remained of a more extensive feature which had been partially ploughed out, but the surviving depth of the feature and its clearly defined terminus, appeared to indicate that this was not the case, and there were no other associated features discovered in the vicinity to suggest that it was part of any form of discontinuous ditched enclosure.

Although this feature does not appear to be part of a house gully, the dense concentration of domestic refuse in the backfill still suggests that it lay in close proximity to an Iron Age dwelling(s) and its function was therefore almost certainly related to some form of domestic activity. Similar types of features lying in close proximity to Iron Age structures have been recorded on a number of other settlement sites of this period throughout the Thames Valley, including the nearby site of Heathrow (Grimes & Close-Brooks 1993) where some of these features also contained a combination of pottery and loomweights. At Mingies

Ditch (Allen & Robinson 1993), an Iron Age settlement site excavated in the Upper Thames Valley, these features were referred to as 'bath-shaped pits' and molluscan and soil analysis of the fills suggested that they had been open and partly overgrown for some time before becoming backfilled. This would also appear to have been the case with the feature on this site [305], where the lower fill [304/341/343] contained very few finds and appeared to represent a period of natural silting. In marked contrast the upper fill [303/340] contained a large quantity of domestic refuse apparently representing later, deliberate, backfilling. Although a number of explanations have been suggested for these features, including sawing pits, clay-mixing pits and even some form of kiln, none of these interpretations seem entirely satisfactory and in many cases these suggestions reflect the nature of the backfill, which may in fact be secondary and unrelated to the original function of the feature.

Ditch [217/306] (Fig 2 and Fig 3, sections 11 and 12)

Both the dating and the interpretation of this ditch is somewhat problematic. The ditch clearly represents a phase of activity which is later than that represented by the early soil horizon [204] and smaller ditch [207], as these were buried beneath what appear to be the upcast material produced from the creation of this larger ditch. The interpretation of the deposits of silt and sand in the area to west of the ditch as upcast material appeared to be confirmed by the molluscan and soil analysis. Although it appears in section that the ditch is cut from the top of the upcast material, this impression would of course be created by the hollow above the ditch filling up to the height of the bank or upcast material to the side of the ditch. If, as seems most likely, this material does derive from the ditch, the existence of the Middle Iron Age feature [305] cut into this upcast material indicates that the ditch must also be later prehistoric in date. However, no dating evidence was recovered from the lower fills of the ditch to resolve this issue. Two sherds of Middle Iron Age pottery were recovered from the upper fills, but these were associated with two fragments of medieval tile and a small fragment of lava quernstone. Although the presence of some or all of these finds could simply be due to contamination by the tree-root

action at this level, the loamy fills in the top of the ditch from which they were recovered were very different in character from the sterile silty fills towards the bottom. Therefore, these later layers may represent a much later infilling of the hollow above the ditch, which occurred only when the site was returned to cultivation in the medieval or post-medieval period. Further evidence of this occurrence would appear to be demonstrated by the existence of the tree-throw pit [236] which cut into the lower fills of the ditch, but was overlain by the later fills. This implies that a stable ground surface supporting vegetation formed in the hollow along the partially backfilled ditch and that the ditch therefore remained open as an earthwork for some time. An example of this type of action can be seen at the nearby site at Heathrow (Grimes & Close-Brooks 1993), where the prehistoric earthwork enclosure known as Caesar's Camp survived virtually undisturbed until it was levelled by ploughing at the beginning of the present century.

On balance the evidence appears to suggest that this ditch is contemporary with the Iron Age occupation, though whether it simply defined a linear boundary or formed part of an earthwork enclosure is unknown. It is possible that this feature was created as a response to the problem of the rising water table and served as a flood barrier and drainage ditch, protecting the area to the W of the ditch from the flooding river to the E. The spreading of the upcast material across the site burying the original soil horizon in the area to the W of the ditch (possibly within the enclosure) may also have been a deliberate measure aimed at raising the ground level in order to offset the effects of a rising water table. This interpretation correlates with the existence of the Middle Iron Age feature [305] associated with a dwelling located on this raised platform created to the W of the ditch. Although the Late Bronze Age/Early Iron Age midden pit [227] occurs on the opposite side of the ditch, this feature is clearly related to an earlier phase of the settlement, though in any event the midden activity represented by this feature may have been deliberately located outside any dwelling enclosure or boundary. This might also be true of the funerary activity represented by the cremation [228], and the existence of this feature apparently located adjacent to this boundary may also be significant in suggesting that the ditch is contemporary with the Iron Age

occupation. The lack of any artefacts at the bottom of the ditch may either be due to the ditch having been periodically cleaned out, or, more likely, that any material was simply flushed out whenever the ditch flooded.

CONCLUSIONS

Though only a small number of Late Bronze and Iron Age features were discovered during the excavation, a significant assemblage of pottery and other artefacts were recovered, and the character and quantity of the finds indicates that this activity is clearly related to occupation. Although no postholes, or other features, relating to Bronze or Iron Age structures were discovered this was almost certainly due to the truncation of shallower features, such as postholes, by post-medieval ploughing, as demonstrated by the depth of truncation of the *in situ* cremation pot, of which only the bottom 50–100mm survived.

The artefact assemblages and the charred plant remains recovered from the features provide evidence of crop production and cereal processing, animal husbandry and weaving, implying that this was a mixed farming community. However, it is unclear whether this represents a permanent settlement, or seasonal and periodic occupation on this site. Although the animal bone assemblages from the Late Bronze Age/Early Iron Age pit and the Middle Iron Age gully were fairly small, both contained a high percentage of sheep bones and large quantities of loomweight fragments. It would therefore be reasonable to suggest that wool production and weaving played a particularly important part in the economy of this community, and appears to imply a continuity in the nature of this settlement from the Early to Middle Iron Age, which may also suggest a continuity in the settlement itself.

The discovery of these remains would appear to provide direct evidence of the prehistoric riverside settlement in this area which is suggested by the large number of artefacts recovered from this stretch of the Thames, but which previously has rarely been uncovered by excavation. Along with the many recent discoveries of Bronze Age activity close to the Thames and its tributaries in this region (Meddens 1996; Thomas & Rackham 1996), these remains represent increasing evidence for prehistoric occupation in the London area, and, as has previously been suspected (Merriman 1992), these gravel islands, or eyots,

may have formed the focus of this activity reflecting a pattern being increasingly established throughout much of the Thames Valley.

In addition to suggestions that many of the remains relating to prehistoric settlement in this area have been destroyed by continuous development or buried beneath alluvial sediments, the evidence from this site suggests that medieval and post-medieval ploughing in these areas of fertile land will also have played a major factor in the destruction of these deposits.

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EXCAVATIONS AT CORNEY REACH, CHISWICK W₄, 1989–1995

D. Lakin

With contributions by J. Cotton, J. Sidell, J. A. Giorgi, A. Pipe, J. Conheeny, K. Rielly

SUMMARY

Excavations at three adjacent sites on the left bank of the Thames at Corney Reach, Chiswick, produced scattered but consistent evidence of prehistoric activity in the area, including a small but notable quantity of stratified Neolithic pottery.

A single feature of Roman date indicated the possibility of a Roman farm or settlement nearby. A single inhumation of Saxon date suggested occupation nearby in the post-Roman period. Evidence of later, medieval, activity was limited to scatters of pottery, tile and coins.

More substantial remains of cellars, drains and terracing associated with Corney House illustrated the post-medieval development of Chiswick.

INTRODUCTION

This paper draws together the results of three excavations in Chiswick (London Borough of Hounslow), two undertaken by the Museum of London Archaeology Service and one by its predecessor, the Department of Greater London Archaeology. The two most recently excavated sites are Pumping Station Road, Corney Reach (PSR 94, TQ 2146 7742) and the former Valor Works, Corney Reach (VCR 95, TQ 2150 7725). The earlier excavation was at the former LEP Depot, Corney Reach (LEP 89, TQ 2153 7763).

These sites form a continuous bloc, c.500m long and up to 125m wide, along the left bank of the Thames stretching south from St Nicholas's church and the historic core of Chiswick (see Fig 1). The average modern ground level in this area was c.5.00m OD. This may be compared to

a high tide level in the adjacent stretch of the River Thames of c.7.50m OD (from PLA tables, 1996).

The excavations took place as formerly derelict industrial land was redeveloped for residential use. The location of trenches was largely restricted to areas where the proposed buildings were likely to destroy all archaeological deposits. As a consequence it can be seen from Fig 2 that the proportion of the total area of the three sites examined was quite small (2,200m² from a total of 48,000m² or c.4.5%). The size and location of the excavated areas is potentially of some significance when considering the results of the investigations.

A variation in the degree of truncation by modern features was observed between the three



Fig 1. Site location

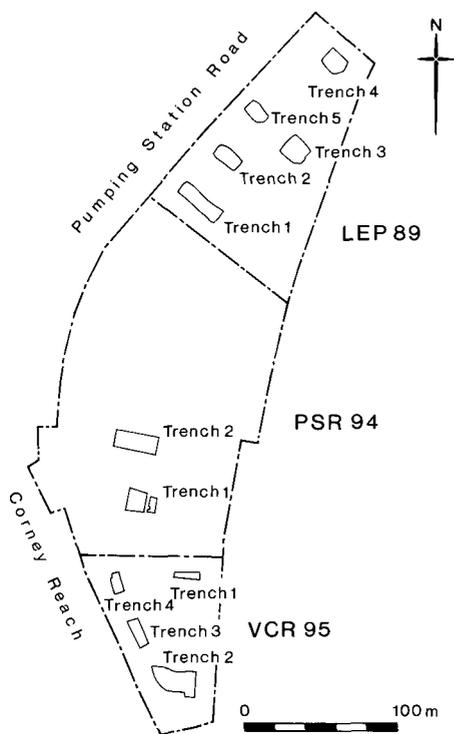


Fig 2. Trench locations

sites. At the LEP Depot (LEP 89) little truncation had taken place and an archaeological sequence of considerable depth survived. On Pumping Station Road (PSR 94) concrete settling tanks associated with a sewage works had destroyed all but the deepest deposits. At the former Valor Works (VCR 95) the use of the site as a rubbish dump in the late 19th century had disturbed some of the latest deposits but, in general, had not been as destructive as the contemporary activity to the north.

It should be noted here that the worked flint, Roman and medieval pottery from the LEP site was not available for study at the time of writing. However a brief report on the struck flint had previously been prepared and that report is used here.

RESULTS (Figs 3–4)

River terrace gravels were observed on two of the three sites. At the former Valor Works the gravels were seen to outcrop at a maximum height of 2.70m OD shelving gently towards the present river at a slope of $\approx 1:25$ m. On the

western part of the site the gravels were overlaid by a brickearth deposit up to 0.75m thick. On Pumping Station Road gravels were noted at a maximum height of 2.83m OD. On this site the brickearth cap had largely been truncated by modern activity and where it existed was no more than ≈ 0.200 m thick. On the former LEP site excavation ceased when sterile sandy deposits were reached at 1.03m to 2.10m OD. Neither gravel nor brickearth was noted on this site.

Prehistoric

The earliest features noted on these sites can be dated to the Neolithic period (notwithstanding a radiocarbon date of 8150 ± 60 BP from one of the pits discovered at the former Valor Works – which may be explained by contamination). A range of features from all three sites yielded datable material of this period. Other features, lacking datable finds, have been interpreted as belonging to this period on the basis of the apparent similarity of their form and function to the dated features.

Seven securely dated features were noted. Two shallow circular pits were recorded in the northern part of the former Valor Works (VCR 95 contexts [022]–[025]). These were cut into the brickearth and contained struck flint and Peterborough Ware. They also contained a considerable quantity of burnt flint nodules and charcoal and were interpreted as possible cooking pits.

Charred grain and hazelnut fragments were also recovered from these pits, for further details of these see the environmental section below; on the former LEP site two features could be securely dated to the Neolithic period (LEP89 contexts [260, 276,]); a pit and a short gully in one trench, and a length of ditch in another. In this case the fill of the gully contained a quantity of charcoal, although the pit did not.

A ditch terminal and two pits on the former Valor Works (VCR 95 [022, 024, 054, 055]) and a gully and further ditch terminal at Pumping Station Road (PSR 94 [017,018]) yielded less specifically datable worked flints and waste flakes attributable to the Neolithic to Bronze Age and no pottery.

A further five pits on the former Valor Works contained large quantities of burnt flint and charcoal and were similar in form to the supposed cooking pits. Four pits/gullies at Pumping Station

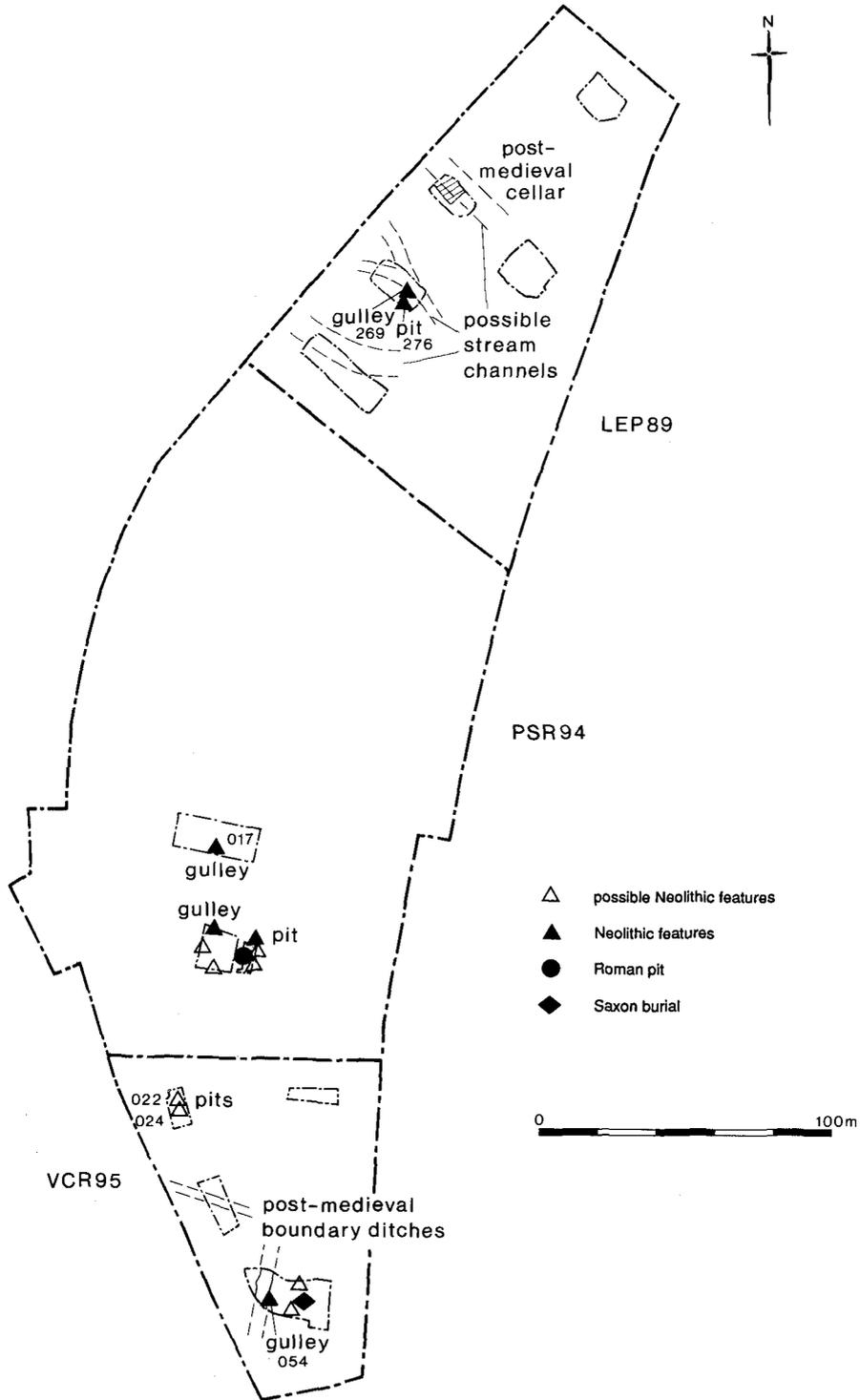


Fig 3. Distribution of archaeological features

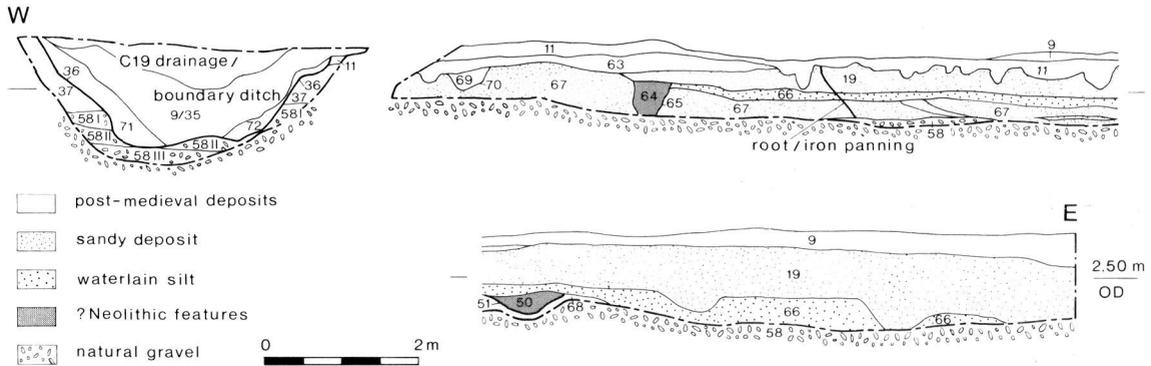


Fig 4. South facing section of Trench 2 (VCR95)

Road likewise lacked datable finds but were similar, at least in form, to the nearby dated features. On the former LEP site worked flints were also found redeposited in later soil horizons and features.

While the features noted above were generally attributable to the same period it should not be assumed that all were contemporary. In the southern part of the former Valor Works a layer of firm waterlaid silt clay up to 180mm thick extended over much of the area of excavation. This deposit seems to have followed a scouring or erosional event in the river regime and seals one of the cooking pits while in turn being cut by at least two of the other cooking pits. Clearly in this case morphologically similar features were not contemporary and there is no reason to suppose that any of the other 'Neolithic' features need be contemporary either.

No further prehistoric activity was indicated on any of the sites and the Neolithic features noted on the LEP site were sealed by silty deposits within stream channels running south-eastwards towards the Thames.

Roman

The next period of activity is indicated by a pit of Roman date discovered at Pumping Station Road. The pit contained a quantity of roof tile, a scrap of lead waste and animal bone. The tile fragments were large and unabraded, suggesting that they had come from a structure located only a short distance away. The tile fragments were tentatively dated to the 1st or early 2nd century AD.

No further features of Roman date were noted on any of the sites although a residual scatter of

Roman ceramic building material and pottery was recovered from later deposits on both the Valor Works and LEP Depot sites.

Saxon

At the extreme southern end of the former Valor Works an isolated inhumation burial was encountered. The body lay in a shallow grave cut into a yellow sandy deposit which sealed the prehistoric features noted above. The grave was aligned east/west and the body lay with its head to the west. No traces of a coffin were found and no diagnostic finds were recovered, although a corroded iron object was found between the legs. An accelerated mass spectrometry (ams) date of AD450–820 was obtained from skeletal material from the burial (the uncalibrated date obtained from the sample was 1380 +/- 80 BP which gives dates of AD560–720 or 740–760 at 68.2% confidence or AD450–820 at 95.4%).

Medieval and post-medieval

Truncation at the Pumping Station Road site had been so extensive that no remains later than Roman date survived. However at the former Valor Works site an extensive deposit of apparently riverworked sand and silt was noted which contained finds, both ceramic and non-ceramic, of medieval date and may have sealed the burial noted above. At the LEP site silting of the stream channels continued during the medieval period and was complete by the 17th century.

The silted channels were sealed by substantial

dumps of soil, including clay and organic material, perhaps suggesting an attempt to landscape the area. At the northern end of the LEP site a brick cellar with a wooden floor was cut through the landscaping dumps (Fig 5). A vaulted tunnel or conduit, 1.50m high, ran south-westwards from the cellar for a couple of metres, at which point it had been truncated by later activity. The function of the tunnel is unclear but in the absence of any other means of access to the cellar it may have served as an entrance. The cellar was backfilled in the late 18th or early 19th century.

On the site of the former Valor Works the riverworked sand and silt deposits of medieval date were cut by a series of shallow trenches running north to south parallel to the line of the modern river. These were sealed by a deposit of brick rubble which may have served as an area of hardstanding at the margin of the river. On the western part of the site drainage ditches were laid out, apparently defining areas of cultivation. These activities seem to have been contemporary with the landscaping and subsequent construction

on the LEP site. The drainage ditches seem to have been infilled after 1900.

PREHISTORIC FINDS

J. Cotton

Introduction

This section considers the struck flint, burnt flint and pottery from the three adjacent sites, LEP89, PSR94 and VCR95.

Although each site produced small groups of prehistoric material (see Table 1), neither the struck nor burnt flint from LEP89 has been located, and is not therefore considered here. However, references to the struck flint, contained in the developer report (Lewis 1989), have been incorporated below.

The material from the three sites derives from three main context groupings: a) alluvial sands and silts; b) small pits and gullies cutting the sands and silts, and c) demonstrably post-prehistoric and unstratified contexts.



Fig 5. Cellar of Corney House in the course of excavation

Table 1. Summary of prehistoric finds from LEP89, PSR94 and VCR95

Context	Struck flint	Burnt flint	Pottery	Charcoal	Context type
LEP89					
103	?	?	Y	?	?
260	Y	?	Y	?	Pit
?276	Y	?	—	?	Gully
504	?	?	Y	?	?
508	?	?	Y	?	?
PSR94					
001	Y	Y	Y	—	Pit
010	Y	—	—	—	Gully
017	Y	Y	Y	—	Gully
999	Y	—	—	—	Unstratified
VCR95					
	Y	—	—	—	Unstratified
001	Y	Y	—	—	Inhumation
009	—	Y	—	—	Silt layer
011	—	Y	—	—	Rubble layer
019	Y	Y	—	—	Sandy layer
022	Y	Y	Y	Y	Pit
024	Y	Y	Y	Y	Pit
031	—	Y	—	—	?
037	Y	Y	—	—	Sandy layer
052	—	Y	—	Y	Pit
054	Y	Y	—	Y	Gully
059	—	Y	—	—	Sandy layer
060	Y	Y	—	—	Silt layer
064	—	Y	—	—	Pit

Struck flint

Small amounts of struck flint were recovered from a range of contexts on all three sites, although, as noted above, not all was available for inspection.

With one or two possible exceptions, all of the struck flint examined from PSR94 and VCR95 was knapped from local river gravel cobbles of variable size and quality. Several pieces are lightly patinated and four have been burnt.

LEP89

No flintwork was available for examination from this site, although the developer report prepared shortly after completion of the fieldwork (Lewis 1989) records that struck flint was recovered from Trench 2. This included 'flakes, blades and cores displaying Mesolithic characteristics' from the fine grained alluvial sediments overlying river terrace gravels; 'flint tools' associated with a few sherds of Peterborough Neolithic pottery from a small pit (=context [260]); and 'flint artefacts including a small serrated ... saw' from a shallow

gully adjacent (=?context [276]), both features cutting into the alluvial sediments.

PSR94 and VCR95

Ten struck flints were recovered from PSR94 and a further 39 from VCR95, the majority comprising small secondary and tertiary flakes/spalls (see Table 2). Most interesting are the few pieces recovered from a series of pits and gullies cutting into the 'natural' alluvial silts, although with the exception of one small convex scraper worked on the distal end of a cortical flake from VCR95 [054], and one broken edge-damaged blade from PSR94 [017], there were no distinctive or particularly diagnostic artefacts. However, the recovery of Peterborough pottery from one small pit (VCR95 [022]), and references to 'flint tools' associated with further sherds from LEP89 [260], suggests that some of the material is likely to date to the Neolithic. The now missing material from the alluvial silts at LEP89 may have been somewhat earlier in date judging from the comments contained in Lewis 1989.

Table 2. *Struck flint from PSR94 and VCR95*

Context	Flakes/frags	Blades/frags	Core frag	Misc waste	Scraper	Total
PSR94						
001	1	1	—	—	—	2
010	1	1	—	—	—	2
017	3	1	—	—	—	4
999	2	—	—	—	—	2
VCR95						
	1	—	—	—	—	1
001	9	3	2	3	—	17
019	3	—	—	2	—	5
022	2	—	—	—	—	2
024	7	—	—	—	—	7
037	2	—	—	—	—	2
054	—	1	—	—	1	2
060	3	—	—	—	—	3

Table 3. *Burnt flint from PSR94 and VCR95*

Context	Nos	Weight (gm)
PSR94		
001	2	12.30
017	4	44.10
VCR95		
001	14	86.58
009	4	22.81
011	4	56.12
019	2	64.42
022	56	755.53
024	11	70.19
031	2	22.03
037	17	249.04
052	122	1690.39
054	15	236.75
059	1	19.02
060	5	35.51
064	41	499.30

Catalogue of illustrated flintwork (Fig 6)

1. Blade section of good quality, dark grey-brown flint, with both proximal and distal ends missing. Microscopic examination revealed use damage along both lateral edges, which may have caused the distal end to snap off. PSR94 [017] (gully).
2. Small convex scraper worked on the distal end of a squat cortical flake of smoky, grey-brown flint. The worn and abraded nature of the cortex suggests that the raw material was a rolled river cobble. VCR95 [054] (gully).

Burnt flint

Most contexts produced a few fragments of burnt flint. However, in terms of quantity, VCR95 [022] and [052] are exceptional. Context [022] produced a few sherds of diagnostic Neolithic

Table 4. *Hand-made pottery from LEP89, PSR94, VCR95*

Context	Sherds	Weight	Date/affinities
LEP89			
103	1	5.50	Prehistoric
260	3	15.07	Peterborough Neolithic (Mortlake Ware)
504	1	2.84	?Saxon
508	1	11.48	Prehistoric
PSR94			
001	6	25.86	Prehistoric
017	2	2.80	?Saxon
VCR95			
022	9	62.84	Peterborough Neolithic (Fengate Ware)
024	4	8.72	Prehistoric

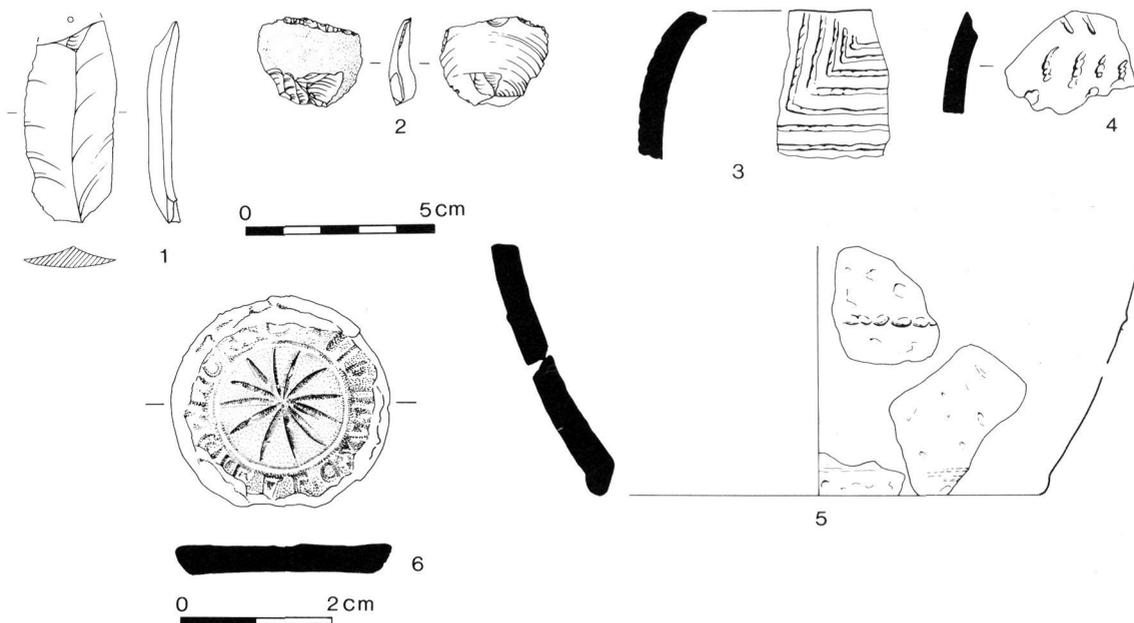


Fig 6. 1) Flint blade section (PSR94 [017]; 2) Flint scraper (VCR95 [054]; 3) Fengate ware bowl (VCR95 [022]; 4) Fengate ware bowl (VCR95 [022]; 5) Mortlake ware bowl (LEP89 [260]; 6) Lead seal matrix (VCR95 <16>)

pottery and [052] has a single, possibly aberrant, radiocarbon determination of $8150 \pm 60\text{bp}$.

Pottery

A combined total of 27 sherds of hand-made pottery weighing 135.11g were recovered from the three sites, mainly from a small series of shallow features cutting into alluvial silts. On the basis of fabric and decoration, the majority can be considered prehistoric. (Two vegetable tempered sherds from LEP89 [504] and PSR94 [017] could be Saxon.) None of the sherds were of any size, and all had suffered varying degrees of surface abrasion.

With the exception of the two vegetable tempered sherds, the material falls into two broad fabric groups: flint tempered and grog tempered.

Flint tempered

The flint tempered material includes a group of three sherds from LEP89 [260], at least one of which bears traces of impressed herringbone decoration of Peterborough Neolithic type (probably Mortlake Ware). A handful of other

undecorated body sherds from LEP89 [103] and [508] and PSR94 [001] are not as diagnostic, although certainly prehistoric in date.

Grog tempered

The grog tempered material all comes from VCR95, of which that from context [022], a small pit, is of most interest. This includes sherds from at least two small Peterborough Neolithic bowls (Fengate Ware). The first has twisted cord decoration on, and possibly on top of, the inturned, collared rim (a second, undecorated sherd may belong to the lower wall of the same vessel), and the second, comprising three non-joining sherds, has possible worn traces of finger-pinched rusticated decoration. A few scraps of undecorated grog tempered pottery from context [024] close by are not otherwise diagnostic.

Catalogue of illustrated sherds (Fig 6)

3. Group of three small sherds (combined weight 22.37g) comprising part of the lower wall and flat base of a Peterborough Neolithic (Fengate Ware) bowl with random ?finger-pinched/rusticated decoration carried down to the base. Brittle sandy matrix (?brickearth) tempered with grog

pellets; core and interior fired yellow-brown, the exterior a patchy red-brown. VCR95 [022] (small pit).

4. Sherd of small, thin-walled Peterborough Neolithic (Fengate Ware) bowl with inturned, collared rim (weight 11.21g), with vertical and horizontal rows of twisted cord decoration arranged in opposed, probably triangular zones. There is a suggestion of a single strand of twisted cord decoration encircling the top of the rim. Brittle sandy matrix (?brickearth) tempered with grog pellets; core and interior surface fired grey-black, the exterior a patchy grey-brown. VCR95 [022] (small pit). A second thicker, undecorated body sherd from [022] may belong to the same vessel.

5. Small body sherd of thin-walled Peterborough Neolithic (Mortlake Ware) bowl (weight 6.54g), with two horizontal rows of impressed decoration arranged in characteristic herringbone formation. It is possible that one row of impressions makes use of twisted cord; the other does not. Laminated sandy matrix irregularly tempered with crushed burnt flint; the core and internal surface are fired grey-black, the exterior buff-brown. LEP89 [260] (small pit). A second smaller sherd with abraded exterior surface from [260] may form part of the same vessel.

OTHER FINDS

Roman pottery

Roman pottery was recovered in small quantities from the former Valor Works and was entirely residual within later contexts and so will not be considered here. No Roman pottery was recovered from Pumping Station Road.

Roman ceramic building material

Nine fragments of building material were recovered from PSR94 [003] (three brick, one *imbrex* and five *tegulae*). All of the tiles were very similar in fabric (group 2815; type 2452; some near 3006 or 2459a) suggesting a common origin. Tiles in this fabric were made at a number of tile kilns to the north and south-east of London so a precise origin cannot be determined. None of the tiles can be closely dated although the fabric type would suggest a date in either the 1st century or the first half of the 2nd century AD. The fragments are fairly large with only moderate degrees of abrasion, suggesting that they derive from a structure situated close by.

Two fragments of *tegula* were recovered from the former Valor works but were residual within later deposits.

Medieval pottery

Two groups of medieval pottery dating to 1150–1300 and 1270–1500 were recovered from the former Valor Works. These groups were small and consisted of abraded fragments; it is therefore not proposed to discuss them further here.

Medieval ceramic building material

Peg tiles

Pre-15th-century tiles (fabric 2271) characterised by a thin cross-section and evidence of splash glaze were recovered from the upper sandy deposit sealing the Saxon burial at the former Valor Works. These tiles were probably made at tile kilns close to London (tile-making is recorded at Stepney from 1366 and at Woolwich from the late 14th century).

Curved ridge tile

A curved ridge tile fragment (fabric 2586) with splash glaze decoration was recovered from the same deposit as the peg tiles.

Floor tile

A Penn floor tile (fabric 1810) dating to c.1350–1390 was recovered from the former Valor Works. This example was decorated with Eames design E2230/Hohler design P52. Unstratified.

Metal finds

Iron

VCR 95 <21> Horseshoe, corroded, 4 nail holes per side, 14th–18th century from upper sandy deposit

Lead

PSR 94 <?> Folded fragment of lead sheet, 80gm, evidence of cut marks from Roman pit
VCR 95 <12> Plug (ceramic vessel repair) fragments of reddish shelly fabric adhere, from upper sandy deposit

- <13> Cloth Seal, two-disc type:XXX/III. // incomplete privy mark; weavers /clothiers seal?C16th century, from upper sandy deposit
- <16> Seal (matrix for stamping wax etc) corroded, tab broken off, (S RICHARDI [??IOSEPH] (lombardic letters), around 12 pointed star)?14th century, surname possibly Jewish, from upper sandy deposit (Fig 6, no. 6)

Silver

- VCR 95 <15> Coin, long-cross halfpenny of Henry III (1247–72), mint- moneyer uncertain- ... (I) RIO..., from upper sandy deposit

Other finds

- VCR 95 <23> Hone (?) amorphous broken fragment of schist – probably not Eidsborg – from upper sandy deposit

THE ENVIRONMENTAL EVIDENCE

Introduction

Biological samples were collected from all three sites, with the aims of characterising the local environment and commenting upon any human activities. However, biological material was only present in small quantities. This is likely to be a result of poor preservational conditions (*ie* the acidity of the soil/sediments) and the low level of human activity on the sites.

Material was recovered from all the major phases of the site, though different categories tended to be recovered from individual phases. Optimum conditions for environmental analyses occur when different categories of material (*eg* plant remains, animal bones, mollusc shells *etc*) are recovered together and can be interpreted as a whole. The assemblages from Corney Reach are unusual in that different categories of biological material were preserved in different phases.

The environmental remains from LEP8g were all recovered from very poorly dated contexts and are not included in the following description of material from the site.

The sedimentary sequence (VCR95)

J. Sidell

A detailed field description was made of the sedimentary sequence revealed on this site (Sidell 1995), in order to establish whether the site had been prone to flooding from the Thames. Sand and gravel units (presumed to be Pleistocene) were found at the base of the section, overlaid by pockets of waterlaid clay-silts present in undulations in the surface of the sands and gravels. However, the greater part of the sequence appeared to demonstrate stable conditions, indicating that although the site is located close to the present foreshore, it has been dry and habitable for the majority of its history. One waterlaid unit was observed in the top of the section and is thought to be datable to the post-medieval period. It may result from a substantial flood.

The prehistoric plant remains (VCR95)

J. A. Giorgi

Seven samples were collected from the prehistoric features at VCR95. Five of the samples produced small quantities of charred plant remains. Possible cereal grain fragments were found in four samples from fills [024], [052] and [054]. However, only one grain fragment in fill [024] could be tentatively identified as barley (*cf* *Hordeum* sp.). Small quantities of hazelnut (*Corylus avellana*) shell fragments were found in sample residues from pitfills [022] and [024]. Wood charcoal was noted in variable quantities in all samples but with particularly large amounts in fills [022], [024] and [050]. Several uncharred seeds, *eg* goosefoot (*Chenopodium* spp.) and elder (*Sambucus* spp.), were found in fills [024] and [050] together with wood, root and stem fragments in all samples, although this material is probably intrusive given the nature of the soils at the site. Intrusive activity is also indicated by the presence of the terrestrial burrowing mollusc, *Cecilioides acicula*, in fill [052]. Additionally, this activity must have taken place quite recently as *Cecilioides* is thought to be an historic introduction to England (Evans 1972).

The sample residues contained mainly large quantities of flint gravels, including burnt flint clasts, especially in fills [022] and [050]. Fills [022], [024] and [054] also contained occasional

small fragments of brick/tile, coal/slag, pot and glass fragments, probably representing residues from recent intrusive activities.

The paucity of botanical remains from the site allows few comments to be made, and corresponds with the general limited plant data for the prehistoric period from this part of west London. The few charred remains suggest the consumption of cereals and hazelnuts. Similar remains have been found on several prehistoric sites on the west London gravels, with particularly large amounts of hazelnut fragments in Neolithic deposits, for instance at Holloway Lane and Wall Garden Farm, Sipson (Giorgi 1994).

The Roman animal bones (PSR94)

A. Pipe

A small assemblage (26 fragments/0.30kg) of hand-collected bones was recovered from the fill of the Roman pit [3] (Pipe 1994). The general condition of the bones was only moderately good with considerable fragmentation and surface erosion. As a result, identification to species and skeletal element was not always possible. The material was mainly identified to cattle (*Bos taurus*) (8 fragments/0.26kg) and the remaining eroded fragments were allocated to the approximate categories 'cattle-sized', 'sheep-sized' and unidentified mammal.

The cattle were represented by areas of good (*eg* upper limb), moderate (*eg* lower limb) and poor (*eg* head and foot) meat-bearing value. Although no tool marks suggestive of butchery or boneworking were recorded, this may be a result of the degree of surface erosion present. All epiphyses were fully fused and the only mandibular tooth recovered, a third molar, was fully erupted and in wear: all are indications that the remains were derived from adult animals. No measurements of greatest length were possible and therefore no stature estimates were calculated.

The observed characteristics of the bones appear to support an interpretation of the pit as a disposal point for domestic refuse with possibly some primary butchery waste resulting from initial carcass preparation. The small size of the sample does not justify comparison with other Roman sites either, or with the medieval and post-medieval material from Corney Reach.

The Saxon human bone (VCR95) (Fig 7)

J. Conheaney

The human bones (VCR95 [2]) recovered were those of a single articulated adult, lying supine and extended in a grave cut which could only be defined once the level of the bone itself had been reached. Other than the location (it was an isolated, shorefront burial), there was nothing unusual about the burial itself and the excavator was unable to form any impression from the archaeology to explain why the burial had been

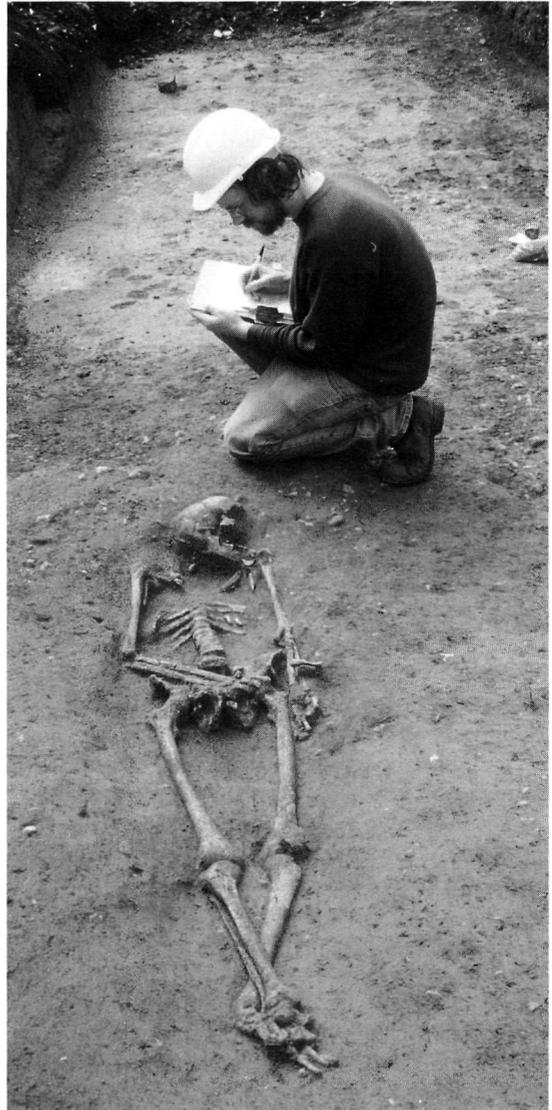


Fig 7. Saxon inhumation in course of excavation

placed here. One supposition is that the remains could have been buried where they were discovered after being washed up on the bank. It is impossible to support or disprove this suggestion by examination of the bone alone. The anatomical correctness (articulated state) of the skeleton, and the lack of any erosional damage to the bones suggests that it represents, at the least, the possibly rapid burial of a whole corpse. The only associated find was an iron object, resembling a square-section peg, recovered from between the legs of the individual. It has not been possible to date the burial from analysis of the stratigraphic sequence, so, following detailed recording of the skeleton, samples from the right femur were sent to Beta Analytic Inc, Miami for dating by radiocarbon assay. The date obtained was AD 450–820 (calibrated using OXCAL v2.15 and quoted with two standard deviations).

Recovery of a single individual precludes any attempt at interpretation of human activity on the site, such as can be undertaken for a larger sample, following analysis of the remains. The aim of the analysis therefore was restricted to identification of the remains and commenting on any observations of interest. The remains were picked clean, being too fragile and friable to allow washing, and were recorded using standard osteological techniques (Conheaney forthcoming).

The bone was very poorly preserved with much of the surface cortex missing. The skull was particularly badly affected. Approximately 75% of the skeleton was present with all body parts represented to some degree (for a complete skeletal and dental catalogue see Conheaney 1995). All of the osteological traits used to estimate sex were very eroded, fragmented or damaged, if present at all. The individual was probably male, judging by the subpubic angle and subpubic concavity of the pelvis and the size of the femur head. Cranial traits were inconclusive with surviving scraps of the supraorbital ridges and the upper orbit margin resembling those of a probable female, while the shape of the mental eminence (chin) was quite masculine. As the pelvis is a more reliable indicator of sex than the skull, more weight was given to the pelvic traits and the overall sex assigned was probable male, although ideally it is desirable to have more traits than were available here to assign sex with accuracy.

Very little evidence survived by which to age the individual. All long bone ends present were

fully fused, indicating that the individual was fully mature. Tooth wear (following Brothwell 1972) placed the individual between 33–45 years of age, although with only one individual to assess it was not possible to say whether tooth wear would be more rapid or slower for this sample than that on which Brothwell based his tooth wear rates. It is therefore more accurate to say that the individual was a fully mature adult neither young or elderly, somewhere around middle age, rather than attempting to give a definite age range in years. The long bones were too fragmented to measure for an objective assessment of physique, but the individual appeared to have been tall and robust (Conheaney 1995 for the measurements which were possible). The only non-metric traits present were third trochanters and Poirier's facets on each femur. These traits are non-pathological variations between individuals in the morphology of specific bones, genetically and/or culturally determined and of no impact on the living person. In a larger sample they could be used to establish cultural or genetic relationships between burials, but clearly with only one individual here that it not possible.

Most pathology present was of a degenerative nature. This is a common finding in the majority of archaeological material. The tenth thoracic vertebrae to the fourth lumbar had slight to moderate development of osteophytes around the margins of the vertebral bodies. These bony outcrops are very common today in anybody of middle age onwards and are due to the effects of everyday wear and tear accumulating with age. The individual may have been unaware of their presence. Similarly, there was moderate development of osteophytes on the posterior margins of the articular surface on both femoral heads, and corresponding disruption of the bone surface on the rims of both acetabuli. The femurs were otherwise healthy. Again this is probably simple degeneration due to age. It is impossible to predict whether or not bony changes to this degree would have caused the individual discomfort in life as in modern clinical practice, some individuals with gross changes to the hip may feel no pain, whereas others with slight remodelling report severe pain.

The eleventh thoracic vertebrae through to the second lumbar had slight Schmorl's nodes and the third and fourth lumbar vertebrae had moderately developed nodes. Schmorl's nodes

are lesions in the surface of the vertebral body caused by degeneration of the intervertebral disc, resulting in herniation of the disc and pressure erosion on one or more locations on the vertebral body (Ortner & Putschar 1985, 430). A popular explanation of the onset of Schmorl's nodes is over-lifting in immature individuals.

The only relatively unusual pathology present was the gross remodelling and fusion of the left distal fibula and tibia, the calcaneus, talus and probably first and second cuneiforms. The navicular and cuboid had craggy deposits of new bone and the third cuneiform and metatarsals were unaffected. The right ankle was not affected. The most likely explanation is therefore some sort of trauma to the left ankle followed by arthritic changes and fusion on healing. However, the bone is very eroded and damaged so it is impossible to be more specific about what may have happened to the ankle. A radiograph may help to further characterise this condition.

There were moderately severe interproximal caries on both mandibular first molars. This tooth is one of the most commonly affected by caries. The location of the caries may suggest that oral hygiene was not very rigorous, as this type of carie is likely to result when food becomes lodged in gaps between adjacent teeth and is left to rot and initiate decay of the enamel. It was possible to observe the alveolar bone around the mandibular molars only; the remainder was missing or eroded. There was moderate to severe alveolar recession and slight periodontal disease around all of the molars. Both of these conditions are to some extent age related and agree with the middle-aged estimate assigned to this individual. Poor oral hygiene can often be a contributory factor to the onset of periodontal disease through the build up of calculus deposits around the teeth. The total absence of calculus in this individual is most likely due to poor preservation rather than a true representation of the state of the individual's dentition in life as most older individuals, particularly those with periodontal disease, would have deposits present to some degree.

The poorly preserved remains were those of a middle aged adult, probably male. The poor preservation severely limited the amount of information recoverable from the skeleton, and apart from a remodelled and ankylosed left ankle there was little of note. Unfortunately, there was no evidence of any kind which would allow comment on the circumstances of the burial.

The medieval and post-medieval animal bones (VCR95)

K. Rielly

A small assemblage (110 fragments/1.17kg) was recovered from possibly waterlaid contexts dated to the medieval, early and late post medieval periods. Most of the bones are from the earliest period (63 fragments/0.7 kg), the later two periods providing 37 fragments/0.26kg and 9 fragments/0.21 kg respectively. The species represented in each period include cattle and pig. In addition, sheep/goat was found in the earlier two periods, and horse in the medieval period. Each of these species, excluding horse, was represented by a mix of skeletal parts and by a few bones with cut marks. While the butchery marks clearly show that these animals were used for their meat, the skeletal distributions show that these dumps contain both processing waste, *ie* heads and feet, and domestic waste *ie* the meat-rich bones. Hence it can be suggested that this area was used as a general dumping ground, possibly from a variety of sources.

The relatively poor ageing evidence will not allow for more than a cursory analysis of any ante-mortem use for these animals. In addition, the sample sizes are too small to warrant a detailed size analysis. However, no obviously large animals were noticed amongst the post medieval assemblage. This period saw an increase in size of the major domesticates due to better husbandry techniques and to the importation of new breeds (see Davis 1987, 178).

DISCUSSION

The topography of the Corney Reach sites has clearly had a considerable influence on their archaeological development. Until relatively recent times the area has been subject to periodic inundation. The earliest Neolithic features on the former Valor Works site were sealed by a flood horizon and the bulk of the deposits were composed of riverworked sands and silts (see Fig 4).

The absence of terrace gravels in the excavated areas of the LEP site suggests that it may have been located within an early branch or side channel of the river (J. S. C. Lewis, pers comm – nearby borehole data supports this contention which is to be the subject of a forthcoming article).

The small stream channels noted during the excavation of the LEP site (see Fig 3) seem to be a characteristic feature of the undeveloped Thames riverbank in west London. Similar features can still be seen on the left bank of the river at Syon Reach, upstream of Brentford (Canham 1978). The examples at the LEP site post-date the Neolithic period and had been filled in by the late 17th century.

The evidence for prehistoric activity at Corney Reach is limited to seven features containing datable prehistoric material (in fact all material dated to the Neolithic period) and a handful of other features which have been assigned a similar date by reason of their form. In total the prehistoric finds amount to 49 struck flints and 25 pottery sherds. Although there is clearly not enough evidence to support detailed discussion of prehistoric activity it should be noted that the density of features of prehistoric date is at least equal to that seen on recently excavated sites at Cranford Lane; Imperial College Sports Ground, Sipson Lane, Harlington and other sites on the west London gravels. When comparing the density of Neolithic features it is clear that the density of features at Corney Reach is much greater. The difficulty found in interpreting the nature and significance of the Corney Reach features is a consequence of the small area under examination. It is also worth emphasising here that the features were originally terrestrial, although subsequently affected by tidal activity.

What does the evidence from the Corney Reach sites suggest about the nature of activity in the area in the prehistoric period? The Neolithic pottery from the sites was exclusively Peterborough Ware, and the biological remains from the prehistoric features are indicative of food preparation. There is a possibility that such assemblages of pottery, flints and food remains are indicative of feasting – which could be considered a ritual activity.

How then does this compare with other sites? Earlier excavations on riverside sites at Twickenham, Putney and Brentford (Sanford 1970, Warren 1971, and Canham 1978) recovered significant assemblages of struck flint and pottery of Neolithic date. Only on the latter site were any prehistoric features noted. Peats of prehistoric date and scatters of flint and undiagnostic prehistoric pottery have been noted from Southwark and Lambeth (Hinton 1988. *NB*: huts, ard-marks and other substantial remains were encountered on sites which have yet to be fully

published, but see Bowsher, 1991 and Drummond-Murray, 1994). Extensive trackways of Bronze Age date have been found in peat deposits further downstream at Rainham. Evidence of domestic activity of Neolithic date is clearly therefore at a premium on riverside sites.

The best comparison with the Corney Reach sites can perhaps be made with inland sites, in particular with those sites excavated on the west London gravel terrace (MoLAS 1996). These inland sites have produced a greater range of features and have been much more comprehensively excavated, allowing a fuller study to be made of settlement and landscape development. Further study may allow comparison and contrast to be made between the ritual elements noted in west London and the findings from Corney Reach.

When considering the prehistoric finds from the sites it has to be said that the lithic material was too restricted for comment beyond that given above, except to note that most of it comprises small flakes struck from local river gravel cobbles.

As far as the pottery is concerned, Peterborough Neolithic material is well known if not well dated locally. The Mortlake Ware sherds from LEP89 [260] can be compared with others from both river and land findspots throughout the lower Thames valley (*eg* Grimes 1961; Smith 1974, 111–3 & Fig 15; Holgate 1988, 272–6, 280–4). The local paucity of diagnostic sherds of Fengate Ware renders the few scraps from VCR95 [022] somewhat more noteworthy. A few pieces have been recovered from the river hitherto (*eg* Wandsworth (Macdonald 1976, 25)) while at least two assemblages have been excavated on dry land sites at Baston Manor, Bromley (Smith 1973) and Stockley Park, Dawley (although the bulk of the material from these sites was in coarse flint-tempered, rather than grog-tempered fabrics). A further complete bowl of 'hybrid Mortlake/Fengate type' was recovered from the ditch of a small 'mortuary enclosure' at Lower Horton, Berkshire (Digby *nd*, 3–4; Ian Kinnes *pers comm*).

As an assemblage the finds from Corney Reach might bear comparison with an unpublished collection of prehistoric material, recovered from Chiswick Eyot. This material is currently held at the Gunnersbury Park Museum and comprises c.300 struck flints as well as sherds of Middle Neolithic Open Bowls, Fengate Ware and Beaker pottery.

Evidence for activity at Corney Reach in the Roman period is limited to one rubbish pit, and its contents and a scatter of pottery and building material residual within later deposits. However the presence of large unabraded sherds of tile in the fill of the pit does strongly suggest the presence of a building nearby. Activity in the area in the Roman period should not be unexpected given the proximity of the London-Staines-Silchester road (see Canham 1978 and Margary 1955). The road which passes closest to the site is Margary's road 40 (Akeman Street) which joins the principal Silchester route, road 4, in the western part of Chiswick. Nonetheless, the only additional evidence of Roman activity in the area comes from a thin scatter of pottery recovered from Chiswick Eyot, the nearest attested settlement being found at Brentford to the west.

The discovery of an isolated inhumation burial on the foreshore of the Thames is of some interest. The burial (Fig 7) has been assigned to the Saxon period on the basis of one accelerated mass spectrometry date from the skeletal material, and in the absence of corroborative finds the possibility of an anomalous date should be considered (the possible early to mid Saxon date of sherds found at two of the sites might add circumstantial weight, albeit that they were not found associated with the burial). However, if the dating is correct then the burial may form

part of a recently noted group of similar burials. Generally speaking inhumations have rarely been recovered from foreshore deposits in London: two late Saxon skeletons from Bull Wharf (BUF 90), Upper Thames Street, are an obvious comparison. These were present in alluvial units, were much better preserved and appear to have been deliberately placed. The derivation of the Corney Reach burial is not clear and the possibility, outlined above, that the body could have spent some time in the river before being interred should be considered. In this case the isolated nature of the interment might be explained by the need to dispose of a malodorous corpse close to the spot where it was found.

Evidence for medieval activity in the area comes from a widespread scatter of pottery, ceramic building material and other finds of 12th to 16th-century date from both the LEP Depot and the former Valor Works sites (it will be remembered that the Pumping Station Road site was too truncated for such material to survive). It is likely that this material was the result of manuring or casual loss since the absence of features of this date from any of the sites indicates that they lay outside the nucleus of the village, which was probably in the vicinity of St Nicholas's church.

The low-lying, periodically inundated, land criss-crossed with stream channels which characterised the Corney Reach sites until the end of



Fig 8. *Corney House* c.1675 by J Kniff

the medieval period was subject by the late 17th century to some 'improvement'. The stream channels noted on the LEP Depot were artificially levelled, probably to form part of the gardens of Corney House (see Knyff's painting of c.1675, Fig 8). The organic dumps on this site were probably the result of the continued terracing undertaken by the Duchess of Norfolk in the mid 18th century. The brick cellar with wooden floor (Fig 5) probably formed part of the late 18th-century house demolished by the Duke of Devonshire in 1832.

To the south of Corney House it appears that with the exception of the establishment of an area of hard-standing on the river's edge no attempt was made to landscape the area. By the early 19th century some drainage or boundary ditches had been laid out but this indicates no more than the fact that the area continued in semi-agricultural use.

CONCLUSION

The range of archaeological remains discovered on the Corney Reach sites was quite wide, a fact of some importance in an area where hitherto little fieldwork has been undertaken. Of particular note are the remains of Neolithic date. Although relatively few in number and difficult to interpret, they do nonetheless represent good evidence for Neolithic riverside activity. As discussed above, the density of prehistoric features at Corney Reach is notable and strongly indicates the high potential for further work in the area. The discoveries made here also point to the value of studying older river finds for the information they might provide for pinpointing other riverside settlements which have been the subject of erosion.

The remains from other periods, while in themselves insubstantial, do indicate subjects for further study as the archaeological development of the area becomes better known.

Finally, it is worth noting that the moderately high degree of disturbance likely from the recent industrial use of the sites was not as destructive of deposits as might initially have been predicted. Even on the most severely truncated site, at Pumping Station Road, it was possible to recover comprehensible features and datable material. The archaeological potential of similar sites which become available for redevelopment should perhaps be viewed very carefully.

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SOUTHWARK AND LONDON

Harvey Sheldon

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SUMMARY

This Presidential address takes the opportunity to review some of the archaeological evidence from Southwark and to suggest what light it throws on the Roman settlements on both banks of the Thames. The communities are separated, of course, by a river whose presence is likely to be as vital a factor for the existence of both of them, as it has been in more recent times.

THE ORIGINS OF THE SETTLEMENTS

It can be stated with a fair degree of confidence that there was no pre-Roman Southwark, much in the same way that we can be confident, whatever the antiquarian speculation, that there was no pre-Roman London. That means essentially that there was no substantial pre-Roman community established on the banks of the Thames in the sense that there was at Verulamium, some 24 miles to the north-west, or Camulodunum some 50 miles to the north-east. Archaeological investigations have failed to find evidence of a combination of a trading, manufacturing and distributing centre, established under the watchful eye of a kingly or aristocratic coin-minting leader. In short, there was no tribal power base here.

This doesn't mean that the area was unexploited and deserted in the later prehistoric period. Quite the reverse: archaeological investigations have revealed, particularly south of the river, a utilised though low-lying landscape. Ever since Kenyon's post-war work on bomb damaged Southwark sites, the first planned excavations in Southwark, prehistoric flints (and sherds of pottery) have had to be accounted for. The few

that were found in these early Southwark excavations were taken as indications of 'some sporadic' but unspecified 'use of the area in the Bronze and Iron Ages' (Kenyon 1959, 16) though she also concluded, (*ibid*, 15) conversely, 'that the actual Southwark area was unoccupied in the Iron Age'.

More flints and sherds were found in the relatively substantial excavations of the 1970s, on what, it was now becoming increasingly clear, were the low-lying sandy islands which characterised the more habitable land of north Southwark. One suggestion (Sheldon 1978, 20) was that they indicated the use of the wetland environment of marshes and mudflats close to the islands for such activities as fishing and fowling by farming communities probably established on the gravels to the south. Subsequently, burials have been found on the islands; a Bronze Age barrow with secondary cremations close to the foot of the medieval bridge and an Iron Age inhumation further south, perhaps indicating the use of these prominences for burial display (Heard *et al* 1990, 610).

More recently still, work on the eyots at Horsleydown and Bermondsey just east of Southwark has begun to indicate the presence of prehistoric farming settlements. For example, at Horsleydown, close to the Thames at Phoenix Wharf, near to Jacobs Island, evidence of ploughed fields has come to light. Here etched into the sand were indications of ard or heavy plough cultivation, the first recovered in central London. Similar evidence was found in 1994 at Wolseley Street some 250m to the north-east (Drummond-Murray *et al* 1994). At Phoenix Wharf the cultivation period was probably Bronze Age and the succeeding sequence of peats

and silts indicates that the low-lying area was abandoned presumably as river levels rose. Nevertheless, the evidence from Horsleydown suggests prehistoric occupation on the island continuing until late in the Iron Age particularly on the eastern side near to where a channel (now marked by St Saviour's Dock) ran into the Thames.

THE FIRST ROMAN PRESENCE

This brings us to the question of when the Roman armies might be expected to have arrived, and the reasons they were here.

A hypothesis held till not long ago was that this could be as early as AD 43 during the campaigns of the armies of Claudius. The invaders, Dio Cassius tells us, fought a battle on the Thames and awaited the arrival, for some weeks at least, of the Emperor who took command of his troops and advanced on Camulodunum to receive formal surrender from some of the Britons. Such activities as building a bridge – the first London Bridge – to link the land on both banks of the river could, it was reasoned, have taken place then. Work in Southwark since the 1970s has thrown this hypothesis into doubt.

First, the nature of the topography, as now revealed – sand islands, mudflats and channels – implies the need for considerable engineering work and could suggest that the armies would have sought initially to cross the Thames elsewhere, where it was easier (Graham 1978, 508–16). Secondly, the pottery assemblages recovered from early features, alongside the well-engineered roads in Southwark appear to belong to the AD 50s rather than the 40s (Sheldon 1978, 24; Tyers 1996, 143–4). These factors have brought back into prominence an earlier held belief, based largely on road alignments, that the early military crossing point of the Thames was 2 km upstream, between Lambeth and Westminster, close to modern Westminster Bridge.

Now it has to be said that such a belief, based essentially on negative evidence from Southwark, together with road alignments, has as yet little firmer evidence to back it. David Bird's article in the *London Archaeologist* (Bird 1994, 268–270) rejects the idea of the military development of the London area during the first decade or so of campaigning. Bird dismisses the controversy, aired in preceding issues of the magazine, about

the location of forts, fortresses, or camps of the invasion period.

Bill Sole has argued for one such fort in Mayfair, east of Park Lane, and taking up much of the Duke of Grosvenor's estate (Sole 1993, 122–6). Nicholas Fuentes has championed a fort south of the river, in the area of St George's Fields, not far from the Elephant and Castle and with access to crossing points both in Lambeth and Southwark (Fuentes 1985, 90–94; Fuentes 1994). There is as yet no convincing evidence for either military establishment, though both ideas should remind us how important it is to ensure that all sites in the relevant areas are adequately examined archaeologically before development.

Evidence to date in north Southwark suggests considerable activities from the early AD 50s onwards. Military equipment points to the role of the army, presumably in both road building and associated engineering projects. The considerable Claudian coinage whose distribution has been compared to that from Sea Mills and other early coastal bases is suggestive of an entrepot concerned presumably with the material needs of an army engaged in conquest, both in distributing the supplies of war, and redistributing the spoils, if not with the more personal needs of administration (Hammerson & Sheldon 1987).

But of course certainty is a scarce commodity in archaeology. In 1990 a site was excavated in Park Street, Southwark, between the Winchester Palace and Courage sites (see below) in an area of the settlement where we have little archaeological information. Running through the site was a deep, early north-south ditch, with an ankle-breaker gully, at the base. This is a type of ditch often associated with military fortifications.

The pottery from the primary levels of the ditch appears to be earlier than any other Roman group yet known from Southwark and Paul Tyers has concluded that it is likely to be earlier than AD 50 (Tyers 1996, 143–144). Whether this discovery represents activity at, say, *c.* AD 50, at the time when the roads apparently are being constructed, whether it suggests that the roads should really be dated earlier, or whether it points to usage of Southwark (and London) earlier in the conquest phase before the construction of the metalled roads, is still unknown. Perhaps what it should do is to remind us that this early Conquest period is likely to be a complex one with changes in military dispositions occurring with rapidity reflecting the necessities dictated by enmities and the oppor-

tunities offered by alliances. The situation may be too complex and fast moving to fit any simple explanation for military activity in Southwark that we can offer on the evidence so far to hand.

SOUTHWARK'S PUBLIC BUILDINGS

We know nothing directly of the status of Roman Southwark, not even whether it was named separately from *Londinium*. Unlike, for example, Trier, where the riverside suburb situated across the Moselle from the walled town was, according to epigraphic evidence, the separate *vicus, Voclannionum* (Wightman 1970), Southwark remains anonymous.

Nick Fuentes has attempted to identify Southwark with the nearest *NOVIO MAGUS* of the Antonine Itinerary, usually thought to be located at Crayford, 12 miles to the east along Watling Street, but it might be preferable to wait until someone pulls up the relevant inscriptions from a well!

Indeed we still know too little of both the spatial outline and temporal development of Roman Southwark. This is partly due to the limited amount that has been excavated and recorded, and partly a problem of the relationships of modern developments to the ancient townscape. Our ability to reconstruct the evolution of the settlement is hampered both by previous destruction and by the nature of the evidence itself and our ability to comprehend it. Yet what has become increasingly clear as the archaeological evidence accumulates from Southwark, is the public nature of its role. This isn't perhaps surprising.

London – and therefore Southwark – is more likely to lie on the boundaries of tribal territories than at the centre. Explanation of London and Southwark's prominence in the Roman period might therefore be sought in the part which they played in the military administration of Britain. We might therefore expect to see buildings concerned with these matters present in Southwark, perhaps the dominant element within its townscape. Two probable public building complexes have been located in Southwark which may illustrate this, one in Southwark Street, the other to the north at Winchester Palace.

The first, at 15–23 Southwark Street (Cowan 1992), lies some 250m from the riverbank, close to the southern edge of Southwark's most northerly island, and more or less midway

between the two Roman roads running south from the bridgehead. (The more northerly of these roads, apparently aligned on an upriver crossing point of the Thames between Lambeth and Westminster, has not yet been located southwest of Southwark cathedral. Not all archaeologists accept the existence of this road for more than a short distance south of London Bridge.)

The building was encountered on a large site, south of Southwark Street, part of a complex constructed early in the Flavian period, succeeding other phases of building on the site. Excavations revealed the stone footings of walls bounding an ambulatory or corridor c.3m wide, opening on to an east-facing courtyard, measuring nearly 20m north-south. Though the footings had largely been robbed, fortunately, probably due to the nature of the terrain, large oak-piles had been sunk beneath the wall foundations. Ian Tyers's dendrochronological dating of the timbers suggests that the construction took place in AD 74. Although Victorian construction had destroyed much of the area immediately west of the corridor, more masonry footings of what appears to be part of the same complex was located about 20m further away. Excavations demonstrated that the complex had a long life and a number of structural alterations were recorded. These included the insertion of an unusual hypocaust with round pilae, inserted into the building during the earlier 2nd century. Later works, probably mainly 3rd century, included the construction of rooms built out into the courtyard. Some had tessellated floors and there are also indications of mosaics. A number of the additional rooms had hypocausts.

More than a dozen burials appear on the site, apparently towards the end of the Roman period. At least one inhumation, a young female, contained mid to late 4th-century pottery and other grave goods. The burials lay close to the walls, in some cases appearing to cut through the demolished wall-lines of the building. This suggests that most of the complex, if not all of it, had gone out of use by the later 4th century. What had the building complex been? One suggestion is a *mansio*.

Facilities for travellers, from pilgrims to stagecoach passengers, from the days of the Tabard Inn to those of the George, are of course a major feature of Southwark's built environment. Perhaps the provision of such services has a longer history. In Roman times the importance of London on the communications highways is

emphasised by its numerous appearances in the Antonine Itinerary and it is likely to have contained at least one *mansio*. Here, facilities would be provided for those travelling on official business: accommodation and baths, changes of horses and carriage, even escorts for important dignitaries arriving from, or proceeding to, the coast. Could that be the function of the buildings encountered near to Southwark Street?

The second complex lies 250m further north, close to both the Roman and the modern riverside, west of London Bridge, within the grounds of the medieval Winchester Palace. Part of the Great Hall of this building, together with its Rose Window, still survives. The inclusion of the site on the Schedule of Ancient Monuments meant that when commercial development was decided upon in the early 1980s resources for investigation were made available by the developers.

In the excavations (Yule 1989) a complicated sequence of Roman structural remains was uncovered, as well as the position of the Roman riverfront in this part of Southwark. I will concentrate on a group of buildings just to the south-east of the Bishop's Hall in Winchester Palace where construction may have begun some time before the middle of the 2nd century and where two remarkable discoveries were made.

In one hypocausted room, within a building with stone external walls, was found a wall painting which, thanks particularly to the efforts of Tony Mackenna, was removed and restored and is now reconstructed in the Roman Gallery of the Museum of London. This had collapsed face downwards into the room. Probably from a lunette, it consisted of a series of columnar structures, hung with garlands and containing a figure of Cupid. The quality of the work, and the imported materials would also suggest foreign craftsmen, employed to decorate a building which was likely to be of some importance.

As excavations continued more hypocausted rooms, probably from part of a large bath house within the same complex, were revealed little more than 10m to the west. Contained within the demolition debris of an external stoking-pit which had serviced the largest room – and had escaped the arched foundation construction of the Bishops' Palace walls – were several fragments of a limestone inscription, which, presumably had been attached to a wall within the building. The dedication, first glimpsed within the pit, contained a list of individual names, apparently

grouped under cohorts. Mark Hassall has suggested that it was erected in honour of the Severan imperial household, perhaps by soldiers based in London, who used the building in which it was found (Hassall & Tomlin). An alternative suggestion is that it recorded the work of a legionary building party engaged in constructing an official building (Yule & Rankov forthcoming).

Brian Yule envisages these two buildings, the one with the wall painting, the other with the inscription, as part of a large complex – perhaps a residence to the east and the baths to the west – with more of the complex lying north of the site, perhaps with a frontage directly on the river bank. Tessellated pavements were located in work beneath the adjoining streets, and walls, found under the now demolished St Marie Overie warehouse, are on a not dissimilar alignment.

Amongst the debris from the large hypocausted room were (two) stamped *Classis Britannica* tiles, usually found at forts and other bases used by the fleet of Britain. It might be unwise to make too much of this find – the numbers are very small compared to the 2000 or so stamped fleet tiles from the bath-house at Beauport Park in the Weald (Cleere 1974). Nevertheless, these buildings do lie on the north-western edge of Roman Southwark, opposite the complex on the north bank close to Cannon Street station, known as the 'Governor's Palace'.

There are suggestions that we should now relocate the Governor's Palace to Southwark (Milne 1995, 84), or even the headquarters of the II legion Augusta (Fuentes 1989, 120–5). This might be going too far but these buildings are likely to be intimately connected with the military administration of the province, or, as they became, provinces of Britain.

ADMINISTRATIVE TRADE AND SHIPPING

Another point I would like to make concerns the Southwark waterfronts and the river. It is well known that the most impressive discoveries made on the north bank, in the spate of archaeological work during the last two decades, has been the series of waterfronts extending progressively through time into the Thames. Sometimes, as at Pudding Lane, near the Roman bridge, these have been found accompanied by warehouses, and riverside installations designed for docking

can now be seen to stretch (not necessarily at one time or in one piece) as far upriver as Southwark Bridge and as far downriver as Custom House (Milne 1985).

These installations have emphasised the role of London as a Thames-side port. The material finds indicate a wide range of goods and commodities, either imported or shipped from elsewhere in Britain; presumably processing and manufacturing took place here, such as metal working in the Middle Walbrook Valley, followed by secondary distribution around the coasts and river ports of Britain.

It is clear that London played a leading role in the commerce, or perhaps more likely in what is now termed the 'administrative trade' of Roman Britain. The supply essentially of the military administration and its armies, the households of the officers of state and the salaried military staff in the Province.

In Southwark, medieval river erosions have bitten deeply into the shore and we are, consequently, never likely to know whether harbour installations, similar to those of the north bank, lay close to the southern foot of the Roman bridge. Nevertheless, there are now some indications from Southwark that it *might* have shared in the activities noted on the north bank, though not necessarily on anything like the same scale.

One such indication comes from Winchester Palace. Here, where the river begins to turn away to the south-west, some indications of early timber revetments on the Thames edge were found. Lying on the river muds in front of the timbers was a complete amphora, as though fallen, though it may have been deliberately deposited while being unloaded. When the amphora was lifted and examined it was found to be full of mackerel remains. Conditions in the river mud had prevented bacteria breaking down the organic contents. What is more they had also preserved the ink writing on the neck of the vessel. This confirmed that this was indeed a fish-based sauce, LIQUAMON, distributed by one Lucius Tettius Africanus from Antipolis in Southern Gaul (Heard *et al* 1990, fig 9). What proportion of the cargo this formed is of course unknown. Perhaps the sauce was intended for the later 1st-century predecessors of the phase of buildings on the Winchester Palace site referred to above.

About 200m further to the south-west than the Winchester Palace site and on low-lying ground, close to the Roman river bank, in a relatively

sheltered upstream position lay a wooden building, probably a warehouse, that might have provided storage for similar imports (Brigham *et al* 1995, 1-72). This remarkable wooden structure had been preserved because of the conditions in which it was buried. The building on the Courage Brewery site measured some 4.75m wide and was at least 11m long (the western end had been destroyed without record in a relatively modern redevelopment). The oak floor, together with joists and some wall timbers as well as a slat, presumably from the roof, were well preserved. A ramp where barrels or amphorae might be rolled down, apparently from a metalled exterior surface, led down to the oak floor.

Dendrochronology suggests that the warehouse was built *c.* AD 152, but it is unlikely to have had a long life as it was filled with silts, presumably due to flooding which may well have occurred later in the century. Whether the building stood in isolation, or was one of a series stretching along the riverfront is as yet unknown. More sites close to the river's edge will need to be investigated before this becomes clear. However, about 500m to the south-east, on the eastern side of the settlement and about 300m south of the modern river, in the grounds to Guy's Hospital, a substantial length of waterfront has been revealed. The series of timberworks included a post and plank revetment, erected in the late 1st century or early 2nd. Dendrochronological analysis suggests that the revetment was repaired in AD 161 with front braces, and that additional structural work, including the provision of front moving posts, took place about 80 years later (Ian Tyers *pers comm*). On the landward site, some 8m from the edge lay a small timber building, perhaps a tank or a store measuring some 3m x 3.5m, with a wooden drain running into the channel which lay east of the waterfront. The successive timber works indicate a long established channel boundary, bordering the eastern side of the settlement. The channel, now known as the 'Guy's Channel' was here some 20m wide and presumably open for the transport of goods or commodities, to and from the Thames.

The presence of the waterfront might help to explain the boat found in 1958 by Peter Marsden about 130m further south and presumably within the channel, near to New Guy's House (Marsden 1965, 118-131). Marsden found the front of a shallow open vessel built of oak perhaps about

16m long, 4m wide and 1m high, buried deeply beneath river silts. He suggested that it was not a sea-going vessel but a river barge designed for use in the shallows of the Thames with a cargo hold amidships. It appears to be designed for side loading, perhaps at quays like the one mentioned above, and for carrying goods up and down the Thames and its tributaries.

The dating evidence has led Marsden to suggest that the boat was abandoned by the end of the 2nd century, though it may well by then have been of some considerable age for there were indications both of structural damage and repair. Such boats may have come right up to the settlement itself. Less than 250m west of Marsden's boat, close to the Roman road running up to the bridgehead, an inlet from the channel met higher ground (175 Borough High Street, Peter Thompson pers comm). Here a collapsed timber jetty, presumably used to load cargo from the bank, was found protruding downwards into the inlet through another revetment.

Sufficient evidence probably now exists to suggest the possibility that Southwark was as intimately connected with the Thames as London. And whatever the fate of the London waterfronts after the construction of the riverside wall in the middle of the 3rd century there is a second ship from the south bank which appears to be later in date. This – found in Lambeth rather than Southwark – is the enigmatic vessel dug up when County Hall was constructed at the beginning of the 20th century (London Museum 1930). According to dendrochronology the boat was built at the end of the 3rd century, though it may not have been very old before it became buried in Thames silts. Whether military or civilian, Marsden suggests that it may have had some official use and was built by craftsmen familiar with Mediterranean shipping construction.

Perhaps it's worth remembering that the boat sank less than 500m north of another (little known) south bank Roman settlement, which is evidenced by late Roman pits and ditches encountered in the grounds of Lambeth Palace, close to the likely crossing point of the Thames between Lambeth and Westminster (Derek Seeley pers comm).

CONCLUSION

Archaeological work during the last two decades in Southwark has been carried out on a scale

hitherto unknown. As a result there is now a clearer indication both of Southwark's natural topography and the 'townscape' created during the Roman period.

Prior to the Roman conquest there appears to be little likelihood of any 'proto-urban' community having existed close to the river where both London and Southwark were to be established. Both are likely to have been implanted into a hitherto rural environment as a single centre to serve the processes of conquest, consolidation and subsequently government of the new province of Britannia.

The military equipment and Claudian coinage from Southwark suggest that, together with the community on the north bank, it was part of an early supply base and strategic communications centre.

Though our understanding of both the spatial and temporary development of Southwark is limited it is slowly improving. One aspect of this expanding knowledge has been the location of substantial building complexes like the ones at 15–23 Southwark Street and Winchester Palace discussed above. The evidence from these suggests that they are of a public nature related to the administration of the province and the same may prove to be true of other structural complexes glimpsed but not yet fully investigated elsewhere in Southwark.

Though the terrain at least would ensure that Southwark was considerably smaller than London, and there is no sign that it was defended, I would conclude that the evidence of the south bank ought more to mirror than to contrast with the evidence from the north. Both in foundation and in function, Southwark, like London, should be seen as a place where the processes of government were established and carried forward in Roman Britain.

POSTSCRIPT

Since this lecture was given in early 1995, major finds have continued to be made in Southwark. A significant discovery, in the context of this paper, has been the later prehistoric landscape encountered between Hopton Street and Holland Street in the Spring of 1997. This extends the evidence for later prehistoric farming close to the Thames upriver of the main Southwark islands.

A report of the Roman buildings south of Southwark Street is contained in LAMAS Transactions vol 43 which was published in 1995 (Cowan 1992, 3–19). A

detailed discussion and reconstruction of the timber warehouse from the Courage site has also been published (Brigham et al 1995, 1–72) as has the early group of pre-Flavian pottery from Park Street (Tyers 1996, 39–146).

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EXCAVATIONS AND OBSERVATIONS AT MINSTER COURT AND MINSTER PAVEMENT, MINCING LANE IN THE CITY OF LONDON

Bruce Watson

SUMMARY

The area of study is now occupied by Minster Court and Minster Pavement in the City of London, EC3 (TQ 3326 8082) (Fig 1). It is bounded on the east by Mark Lane, on the south by Great Tower Street, the west by Mincing Lane and, on the north, by Dunster Court. The aim of this paper is to describe and discuss the various archaeological excavations and investigations which have been carried out here from 1856 until the most recent development in 1988–9. Romano-British discoveries include Hadrianic (c.AD 120–130) fire debris and evidence of in-situ burning, plus a small cold plunge-bath of post-Hadrianic date. Saxo-Norman features consist of two sunken floored buildings and finds of this period include a fragment of an 11th-century gilded decorative mount. Medieval features include a number of cellared buildings, stone-lined wells and cesspits. Medieval finds include a decorated London Ware jug, apparently depicting the expulsion of Adam and Eve from Paradise and a small bone or ivory plaque, depicting a winged animal. The identification of this creature is uncertain, it may be a dragon, a griffin or a lion.

INTRODUCTION

The various archaeological excavations and investigations within the study area (defined in the Summary) are presented here in chronological order (sites 1–6) in the first part of the paper (Figs 1, 2). In the second part (Synthesis) the various sites are discussed period-by-period, with

reference to other London sites. The last remaining archaeological deposits within the study area were removed by redevelopment during 1988–89, providing the final chapter in a history of archaeological work spanning 133 years. This most recent phase of archaeological work has been used as an opportunity to bring together, re-appraise and publish the earlier work within this small area of the City of London.

SITE 1, 40 MINCING LANE AND DUNSTER COURT

Redevelopment during 1856 revealed up to c.7.6m depth of archaeological deposits (Fig 2)

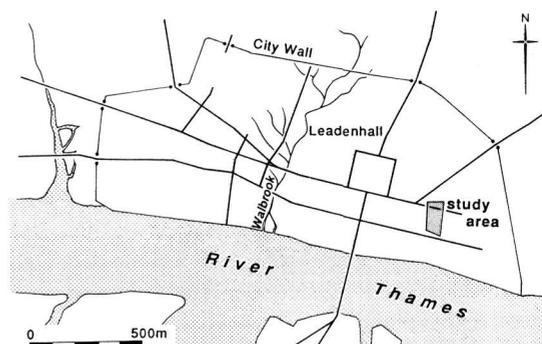


Fig 1. The walled Roman city, showing the location of the study area and road network

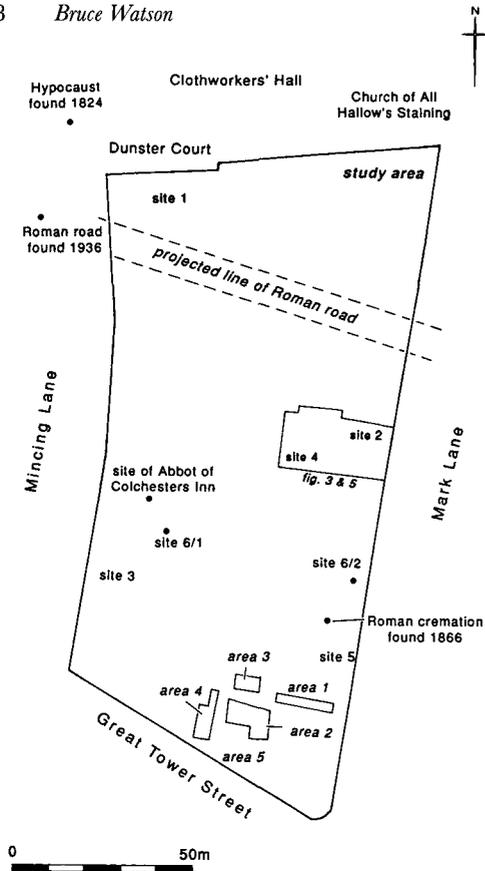


Fig 2. The study area showing sites (1–6) and other buildings and features mentioned in the text. The street frontage is taken from the 1875 OS 1:1056 map

(TQ 3325 8089). At, or near, the base of these deposits were undated chalk, ragstone and ‘cob’ or mudbrick walls or wall foundations. There was also a stone-lined medieval well, containing ‘a small earthen jar ... with green glaze’. These observations suggest that the truncated natural ground surface stood at *c.*9.0m OD. Finds included Roman pottery, human bone and a silver coin of Henry VII.¹

SITE 2, 27 MARK LANE

In 1871, within a yard or garden to the rear of 27 Mark Lane (Fig 2) (TQ 3329 8083), workmen uncovered an area of ‘plain red tessellated Roman pavement’, only 7ft (2.1m) below ground level. The area of the pavement measured 11ft (3.3m) in length by 6ft (1.8m) in width.² It can be estimated that the tessellated pavement stood at *c.*12.5m OD. An engraving, published by the

Illustrated London News,³ shows that the surface of the pavement sloped considerably, possibly due to the partial collapse of the underlying hypocaust pilae – the presence of which was not recorded. Another account of the discovery states that the pavement was found 8ft (2.4m) below ground level and ‘was much broken and pressed out of shape’ and measured about 12ft (3.6m) square.⁴ Associated finds included quern-stones, Romano-British pottery – some of which were sold to visitors – a glass bowl, a glass bead and a bronze key.⁵

SITE 3, 24 MINCING LANE

Rebuilding of the London Commercial Sale Rooms (Fig 2) (TQ 3324 8079) in 1891 revealed at a depth of about 20ft (6.1m) below ground level (estimated level *c.*8.9m OD, a 5ft (1.5m) square, chalk masonry-lined, medieval cesspit, 7ft (2.1m) deep, with a tapered profile, dug into natural sand and gravel.⁶ Finds from the backfill of the cesspit included a wooden bowl, inscribed with the letter J, a dog skull, two eggs (one hen, one duck) and a green glazed, ceramic jug. From the published engraving it appears to be a Surrey whiteware baluster jug of 13th or 14th-century date.⁷

SITE 4, 26–28 MARK LANE AND 28–29 MINCING LANE

During the redevelopment of this site in 1935–36 a watching brief was carried out by Frank Cottrill, Guildhall Museum archaeologist (Cottrill 1936, 255–256). His site records form part of the Museum of London Archaeological Archive (G M.114). The site consisted of a large block fronting onto Mark Lane to the east and Mincing Lane to the west. Most of the recorded archaeological features were within the eastern portion of the site (Fig 2) (TQ 3328 8082), where the existing basement floor stood at 11.9 m OD. Cottrill’s observations were restricted mainly to recording a series of small hand-dug foundation trenches for new stanchion bases, so it is difficult to construct a site-wide stratigraphic sequence from his observations. Instead these discrete observations have been arranged into a series of phases, each made-up of a number of separate, broadly contemporary, events. Truncated

Pleistocene sand and gravel was located at 10.80m OD.

Phase 4/1 dumping of Hadrianic fire debris

In several trenches a 40cm thick layer of dumped red fire debris was found. It consisted of a mass of burnt daub, mud brick (top *c.*11.4m OD), containing fragments of painted wall plaster and tegulae and imbrex roof tiles – some of which were burnt. In one trench under this debris was a layer (over 20cm) thick of white ‘cement debris’, containing roof tile and one large fragment (*c.*30cm long) of plain red tesserae. As the tesserae fragment was found upside down, it could mean the ‘cement debris’ should be interpreted as the dumping of demolition material or fire debris. Alternately if the tesserae had been part of the flooring of the first storey of a building on the site, which had collapsed during the fire, this could explain why it was found upside down. Amongst the Hadrianic fire debris found at Watling Court, one deposit, interpreted as the collapsed superstructure of a building, included an upside down fragment of mosaic (Perring and Roskams 1991, 38), which had presumably fallen from an upper storey.

Dating evidence for this period of activity is limited. The fire debris produced sherds of samian Dragendorff (Dr) forms 27 and 33 (late 1st–early 2nd century) and the cement debris one sherd of Dr form 18 or 31 (late 1st to mid 2nd century). Dunning (1945, 57) attributed this activity to the Hadrianic fire of *c.*AD 120–130, interpreting the debris as the result of the *in-situ* fire destruction of clay and timber buildings.

Phase 4/2 late 2nd-century soil and rubbish dumping

After the dumping of the fire debris, there was a further 50–60cm build-up of dumped soil and domestic rubbish including concentrations of charcoal and oyster shells (top *c.*11.7m OD). Presumably this material was intended to level up the area before buildings were erected. In many cases most of these later deposits had been truncated by the digging of medieval pits (4/4). Dating evidence for this phase of activity included 2nd-century ‘coarse pottery’ (Dunning 1945, 57) and one sherd of samian Dr 38 – a flanged bowl of late 2nd-century date.

Phase 4/3 the Romano-British masonry building and plunge-bath

Cumulative observations by Cottrill revealed truncated masonry foundations of Romano-British date, interpreted as one small portion of a substantial masonry building including a sunken bath (Fig 3). The full plan of this building is unknown, but it is likely that the tessellated pavement found close by in 1871 represents another part of the same building (site 2).

Construction started with the digging of a series of deep wall foundation trenches – cut into natural sand and gravel. Part of the northern arm of these trenches appears to have been either overdug or misaligned, then backfilled with sandy soil, containing cement and brick/tile fragments (Fig 4). The north wall was 1.80m wide and aligned NW-SE. It was constructed of uncoursed ragstone rubble blocks, bonded by yellow mortar containing small pebbles. The upper portion of this masonry appears to have been robbed out in antiquity and a medieval cellar wall foundation (4/4) rested directly on top of this foundation. Built into the south side of the wall – adjoining the sunken bath and at the same level as the cement floor of the bath – was a red and yellow, two-brick-or-tile (probably tegula) thick string course. Each tile was 32mm thick and up to 28cm long.

Built as part of the same phase of construction as the northern wall, was an adjoining, thinner, L-shaped, southern wall. This wall was only 43 to 46cm wide and of uncertain depth. It is interpreted as the western and southern lining walls of the sunken bath (Figs 3, 4). Examination of the southern arm of the lining wall revealed that its southern or sloping external side was trench-built (basal width 38cm), implying that the bath had simply been created by digging a large rectangular hole. This had probably been dug out at the same time as the northern wall foundation trench, lined with masonry, then floored. The masonry of the south wall was constructed of roughly coursed ragstone rubble blocks, plus one yellow fragment of brick or tile, bonded by yellow mortar, containing small pebbles. Built into the northern or internal side of the wall – at the same level as the bath floor – was a red, two-brick-or-tile (probably broken tegula) thick string course. Each tile was 38mm thick and up to 127mm long. Some 20cm above the string course of the south wall was the probable remains of a second string course –

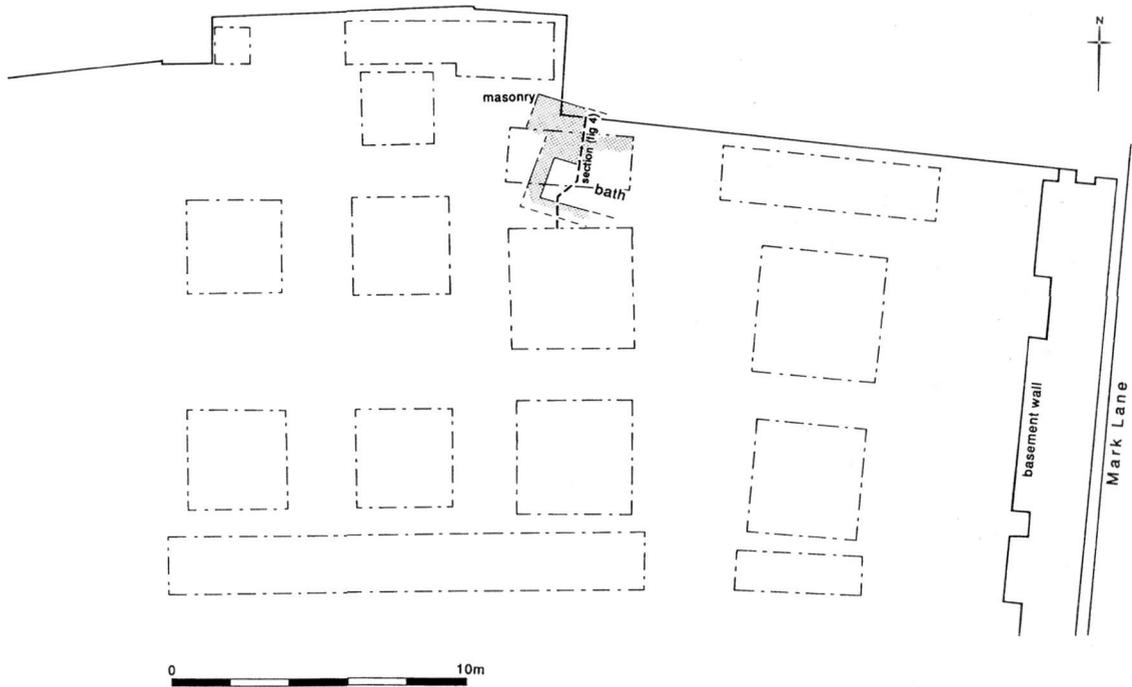


Fig 3. Plan of the Roman walls and plunge-bath found at 26-28 Mark Lane, during 1935-6 (site 4/3), showing the extent of all new foundations and stanchion bases

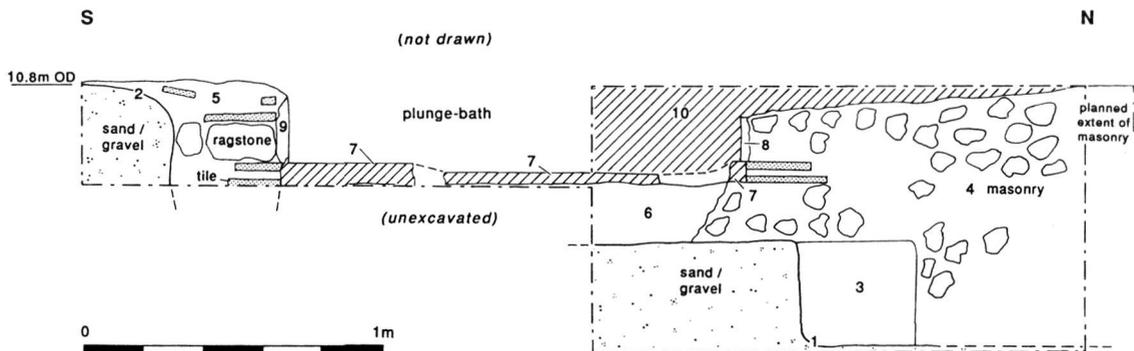


Fig 4. Composite cross-section of the plunge bath at 26-28 Mark Lane (site 4/3). KEY: 1 and 2 construction trench for masonry foundations of bath; 3 sandy soil, containing cement and brick fragments, interpreted as the backfill of an over-dug construction trench; 4 ragstone rubble masonry, bonded by buff-coloured mortar; 5 ragstone rubble masonry, bonded by yellow gritty mortar; 6 unmortared rubble makeup; 7 white cement bath floor; 8 pink plaster (waterproof) lining of bath, with white surface; 9 pink plaster lining of bath, covered by a white plaster skim; 10 undated 'black stony filling' of the bath

consisting of a single brick or tile - 38mm thick and 28cm long.

The rectangular area enclosed by the walls measured 1.52 m N-S and over 1.60m E-W and is interpreted as a sunken bath over 30cm deep. The original depth of the bath is unknown due to the absence of associated floor levels. Below the centre of the bath the natural sand and gravel had been dug out to a depth of c.10.1m

OD, then a 40cm thick layer of unmortared rubble laid down as a foundation for the bath floor. The floor consisted of a layer of white cement, containing brick or tile chips (top surface 10.46m OD) (Fig 4). The thickness of this cement floor varied from 127mm at the south side to only 50mm in the centre and 89mm at the north side. The reduced thickness in the centre may be due to the removal of stone or tile paving

originally set into the upper portion of the cement. To ensure that there was a waterproof joint between the bath floor and the adjoining walls, it had been laid at the same level as the basal string courses of the adjoining walls (described earlier). The sides of the bath were waterproofed by the application of a layer (c.40mm thick) of pink plaster (laid over the edges of the cement floor to make a waterproof joint), finished with a thin skim of fine white plaster (Fig 4). At some unknown date the bath was backfilled with 'black stony soil', possibly this backfilling happened after the robbing out or partial removal of the bath floor and the upper part of the surrounding masonry.

There are no associated finds to date either the construction or the abandonment of the bath and its surrounding masonry. It appears to have been of only a single phase of construction, without any later modifications. However, it is probable that the building was not constructed until after the levelling up of the site during the late 2nd century (4/2), therefore it is tentatively suggested that the building was constructed

during either the late 2nd or 3rd century. The interpretation of the building is discussed in the synthesis below.

Phase 4/4 medieval pits, buildings and a well

Dug into the Romano-British deposits (4/1 and 4/2) were a number of medieval cess or rubbish pits, plus one circular chalk masonry lined well, with an internal diameter of 90cm. The remains of five medieval cellared buildings found at 26–28 Mark Lane, were all of 13th to 16th-century date on stylistic grounds. Structural survival varied from truncated foundations below existing basement level to upstanding masonry preserved by incorporation into later cellar walls (Fig 5).

Medieval building 4/4a consisted of two separate, truncated blocks of mortared chalk rubble masonry containing occasional fragments of ragstone and peg-tile (Fig 5). These two blocks are interpreted as part of the same structure,

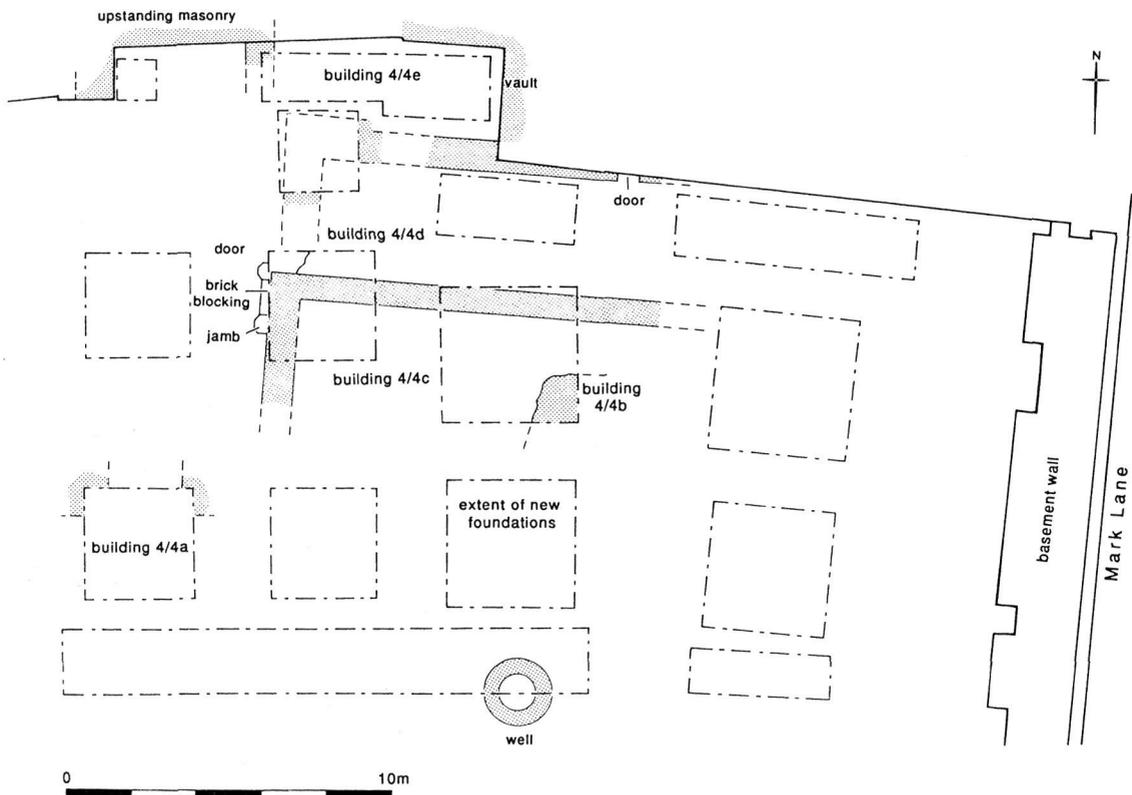


Fig 5. Composite plan of the medieval walls and well found at 26–28 Mark Lane (site 4/3)

possibly they are the truncated remains of a relieving arch for an E-W cellar wall. Nearby were found a number of moulded stones.

Medieval building 4/4b consisted of a massive, block of mortared chalk and ragstone rubble masonry, interpreted as a free-standing pier base (Fig 5).

Medieval building 4/4c consisted of the north and west walls of a large cellared building fronting onto Mark Lane, building 4/4b possibly represents part of an earlier building on this plot. The walls were 76cm wide, constructed of mortared chalk rubble masonry, containing some peg-tile. In the north-east corner of the cellar were the chamfered stone jambs of a doorway, the door was blocked with modern masonry (Fig 5).

Medieval building 4/4d consisted of a large cellar (internal width 3.61m) probably built-up against the adjoining one (4/4c). The walls were constructed of mortared chalk and ragstone rubble masonry, varying in width from 117 to 130cm. In the north wall of this cellar was a door with a four-centred stone arch, probably of 16th-century date (Fig 5). The door jambs had been rebuilt in brick. Adjoining the door were fragments of standing masonry (over 1.6m high, the inward curve of the cellar vault begun 1.30m above the existing basement floor).

Medieval building 4/4e consisted of two areas of upstanding masonry, including the stub of a N-S cellar wall and a section of vaulting, incorporated into the walls of the present basement (Fig 5). It was constructed of squared ragstone facing blocks with a chalk rubble core, bonded by light brown mortar containing chalk flecks. Later additions or repairs were all brickwork.

SITE 5 71-80 GREAT TOWER STREET AND 37-41 MARK LANE

The excavation of five areas in the south-east corner of the study area during 1949-50 (Fig 2) (TQ 3328 8074) was one of the many archaeological investigations directed by the late Professor Grimes on bomb sites within the City of London in advance of redevelopment between 1946-1968. An interim report on the site was included in Grimes's volume on his London work (1968, 123-124). The excavation is referred to as WFG 52 in the Grimes archive, held by the Museum of London. This account of the excavation has been compiled from the original site records.⁸

Due to the depth of the existing basements, archaeological survival – except in Area Three – was restricted to truncated features dug into natural geology. Due to the limited dating evidence (the result of both the partial excavation of some trenches and the loss of some finds), it has been difficult to construct a precise site-wide stratigraphic sequence. Instead the five areas have been arranged into a series of phases, each made up of a number of separate broadly contemporary events. Natural geology consisted of Pleistocene sand and gravel (estimated top c.11.0m OD), sealed by natural brickearth (estimated top c.12.0m OD).⁹ In Area One it is possible that there were traces of a subsoil horizon above the natural brickearth (Fig 6).

Phase 5/1 pre-Hadrianic features

In Area One a large brickearth quarry pit had been dug out and partly backfilled with gravelly soil and domestic rubbish (Fig 6). In Area Four a

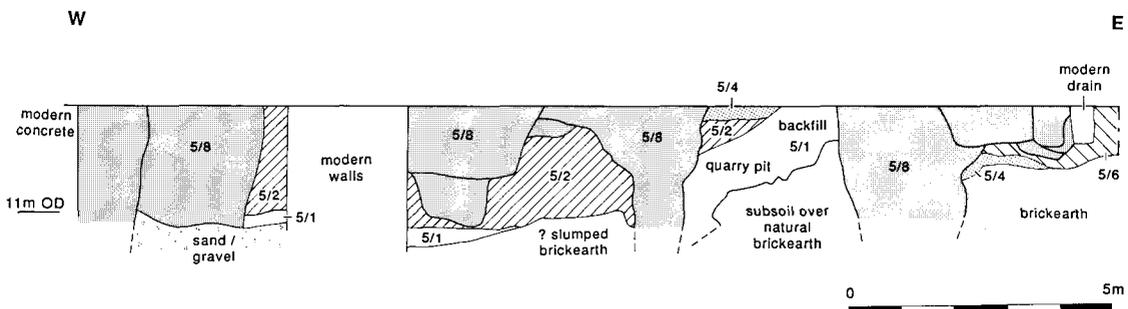


Fig 6. South facing section of Area One (site 5). The numbers refer to the site phasing

flat-bottomed ditch (width 1.22m, depth c.90cm), aligned NW-SE, had been dug. A series of timber slots along its northern side are interpreted as part of an internal revetment. Within the base of the ditch was a posthole. Both these features are considered to pre-date the Hadrianic fire (5/2) on stratigraphic grounds and are probably of late 1st or early 2nd-century date.

Phase 5/2 the Hadrianic fire

In Area Three the natural brickearth had been reddened by *in-situ* burning (implying the existence of buildings) (Fig 7). This burnt horizon was then sealed by a mass of burnt clay or daub, mortar, unburnt and burnt brickearth, possibly a mixture of burnt and collapsed clay and timber buildings and dumped brickearth. Finds from these deposits date to AD 100–120.¹⁰ Grimes suggested that the *in-situ* burning might be part of the Boudiccan fire of AD 60, but the dating confirms that it is part of the Hadrianic fire of c.AD 120–130. The partly infilled quarry pit in Area One was completely backfilled with up to 1.5m depth of ‘red burnt clay ... It should be added that this burnt material was not due to fire on the spot ... it had clearly been re-sorted and redeposited’ (Grimes 1968, 124). The ditch in Area Four was also backfilled with dumped fire debris (5/1).

Phase 5/3 land allotment

After the Hadrianic fire (5/2) a series of linear gullies aligned either NW-SE or N-S were dug across Areas Two, Three and Four (Fig 7). Residual finds from the backfill of these gullies

date to AD 50–100 and 100–120. A number of associated postholes found in Area Two may represent fence lines. These gullies are interpreted as a phase of land allotment, probably marking out potential building plots. The only possible structural evidence was a N-S slot in Area Four, backfilled with brickearth, containing finds dating to AD 100–120. This phase of activity probably dates to c.AD 130–160.

Phase 5/4 soil dumping and external surfaces

In Area Three, the infilled gullies were sealed by dumped brickearth. The brickearth contained finds dating to AD 120–160. The brickearth was in turn later sealed by the dumping of ‘black soil’ mixed with ‘grey stony soil’, containing frequent tile fragments (Fig 7). Finds from these deposits included a Verulamium region white ware mortarium sherd stamped with LUGVDV or LUGUD (AD 70–100). Another unstratified Verulamium region white ware mortarium sherd is stamped with ?MARINUS (AD 70–110). These deposits are interpreted as dumps of domestic rubbish. Grimes (1968, 124) noted that these deposits included ‘a sequence of surfaces with occupation debris which incorporated many amphora fragments as well as broken tiles and stones’. In the absence of any walls these surfaces are interpreted as pathways or yards. In Area Four a series of gravel layers are thought to be either yard surfaces or a trackway.

Phase 5/5 further land allotment

In Area Three two gullies were dug across the external surfaces and dumps of domestic rubbish

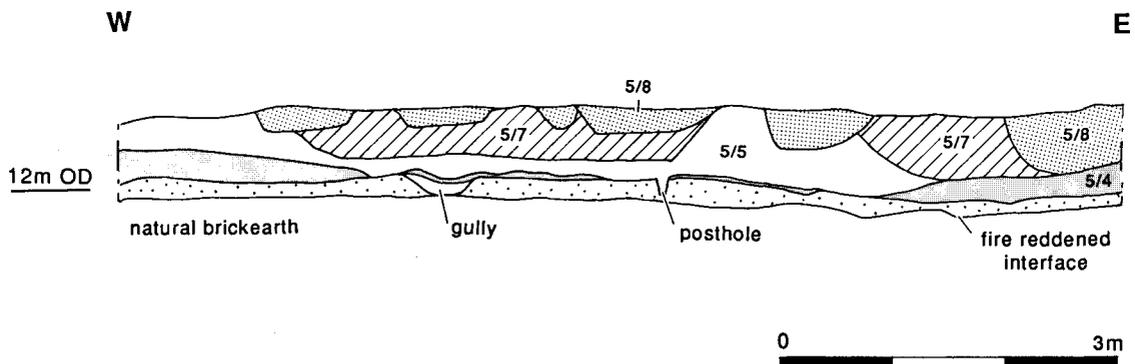


Fig 7. South facing section of Area Three (site 5)

(5/4). One was aligned SW-NE and the other NW-SE – at right angles to one another. A small gap between the two gullies may have been an entrance into a property unit or enclosure. A number of postholes, either within, or, flanking the gullies probably represent fencelines. Three oval features possibly represent postpits. These features are interpreted as a second phase of land allotment, possibly of late 2nd or 3rd-century date. Later these features were sealed by brickearth dumping, containing residual finds dating to AD 100–120. This dumping may have been intended to raise the ground level to create a level building plot, but no trace of any buildings was recorded. One unstratified find from Area Three was a 3rd-century copper alloy Roman coin.

Phase 5/6 late Roman pits

In Areas One, Two, Four and Five a series of rubbish pits were dug during the 3rd or 4th century (Fig 6). The backfill of these pits were ‘sands, clays and gravels which were stained and discoloured by humic matter and often contained much charcoal in the form of tiny flecks’ (Grimes 1968, 123). All the finds from these pits were residual, except one context dating to AD 270–400. The absence of pits from Area Three may be due to the fact that this area was inhabited during the period (5/5).

Phase 5/7 Saxo-Norman sunken floored buildings

In Area Three were portions of two truncated, rectangular parallel features or hollows, 1.20m apart, aligned N-S. The full length of these features was not determined. The western feature had an E-W width of 3.65m, a depth of 46cm, with moderately sloping sides and a flat base (Fig 7). It was backfilled with ‘dark buff (yellow brown) stony loam’ containing ‘clay’ with a basal fill of black organic silt or charcoal. The eastern feature was over 1.50m wide E-W, it was 53cm deep with a moderately sloping western side and flat base. Its basal fill was ‘grey loam’, containing charcoal, overlain by ‘buff loam’, sealed by ‘black soil’. All finds from these two features are residual Romano-British material (AD 70–140). Grimes (1968, 124) interpreted the two features as Romano-British ‘hut-hollows’, they are now reinterpreted as sunken-floored buildings of Saxo-

Norman date (AD 900–1100) for two reasons. Firstly, while no Saxo-Norman pottery was found within their fills, these two features are earlier than the medieval pits (phase 5/8). Secondly, on stylistic grounds, since the features are very similar to a number of Saxo-Norman sunken-floored buildings, excavated in London since the 1970s. Also, the width of the western building (3.65m) matches very closely the width of c.3.4 to 3.7m of a number of excavated Saxo-Norman sunken-floored buildings (Horsman *et al* 1988, 68).

One unstratified find from the 1949–50 excavations is a fragment of copper alloy gilded plate, decorated with concentric lines, to which was attached a fragment of cloth. This object is a fragment of an 11th-century Anglo-Scandinavian decorative mount.¹¹ Originally the mount was probably attached to a piece of furniture or a casket.

Phase 5/8 Medieval pits and other features

Numerous rectangular or oval shaped rubbish or cesspits, probably of 10th to 14th-century date were found in all areas. The backfill of these was of ‘a consistently black, mixed clayey content, which was evidently heavily organic and made up of decayed domestic refuse’ (Grimes 1968, 123). Other medieval features included a barrel lined well or soakaway (diameter 1.19m), a mortared chalk rubble wall foundation or pier base, and a rectangular chalk rubble lined cesspit, with an internal brick dividing wall.

The 1950–53 redevelopment of the entire study area produced a unique 13th-century London ware jug, which unfortunately is unstratified. The jug is decorated with three stylised human figures and two animals, a dog and a serpent.¹² Illustrations of the jug have been published by Dunning (1971, 3) and Cherry (1985, 9). The human and animal figures on the jug were interpreted by Dunning (1971) as a troupe of entertainers and a brothel scene. Reassessment of this jug by Cherry (1985, 8–10) suggests that the scene represents the expulsion of Adam and Eve from Paradise (Genesis Ch 3).

SITE 6 1988–89 REDEVELOPMENT OF DUNSTER HOUSE, COLONIAL HOUSE, MARKET BUILDINGS AND KING’S BEAM HOUSE

During 1988–89 all the buildings within the study area, erected during the 1950s, were

demolished and the entire area redeveloped. The archaeological potential of the site was very limited due to the depth of the existing single and double basements. Archaeological coverage, therefore, was limited to a watching brief to record any features uncovered during underpinning of the perimeter and ground reduction across the entire site. The most significant archaeological features discovered were two medieval wells, dug into natural sand and gravel (Watson 1989, 2–3).

6/1 Medieval well at 21 Mincing Lane

The truncated stone-lined well was circular in shape, with an internal diameter of *c.*1.30m and an external diameter of *c.*2.35m. Only the basal 1.25m survived below the existing basement floor (Fig 2, 8). The lining wall was constructed of coursed chalk rubble masonry, bonded by light brown sandy mortar. The internal face of the lower portion of the lining was vertical, but the upper portion curved inwards, suggesting that the interior was cone shaped. In the centre of

the well base was a mass of compact mortar and crushed chalk fragments, interpreted as construction debris.

The well was infilled with a series of laminated, fibrous, organic silts – derived from decayed cess and organic rubbish – interleaved with dumps of wood ash. Possibly the well was converted into a cesspit as it may not have been deep enough to reach the permanent water-table. Finds from the backfill of the well included a small bone or ivory plaque and sherds of locally made London and Surrey white ware (Kingston-type ware) jugs of late 13th or 14th-century date, plus part of soot encrusted Border ware cooking pot or bowl of 13th or 14th-century date. There were also sherds of several Saintonge ware jugs (1250–1500).¹³ The well was probably constructed during the 12th or early 13th-century and backfilled during the late 13th or 14th century.

The Mincing Lane bone or ivory plaque

The complete, openwork, diamond shaped plaque (Fig 9) is made of either walrus ivory or

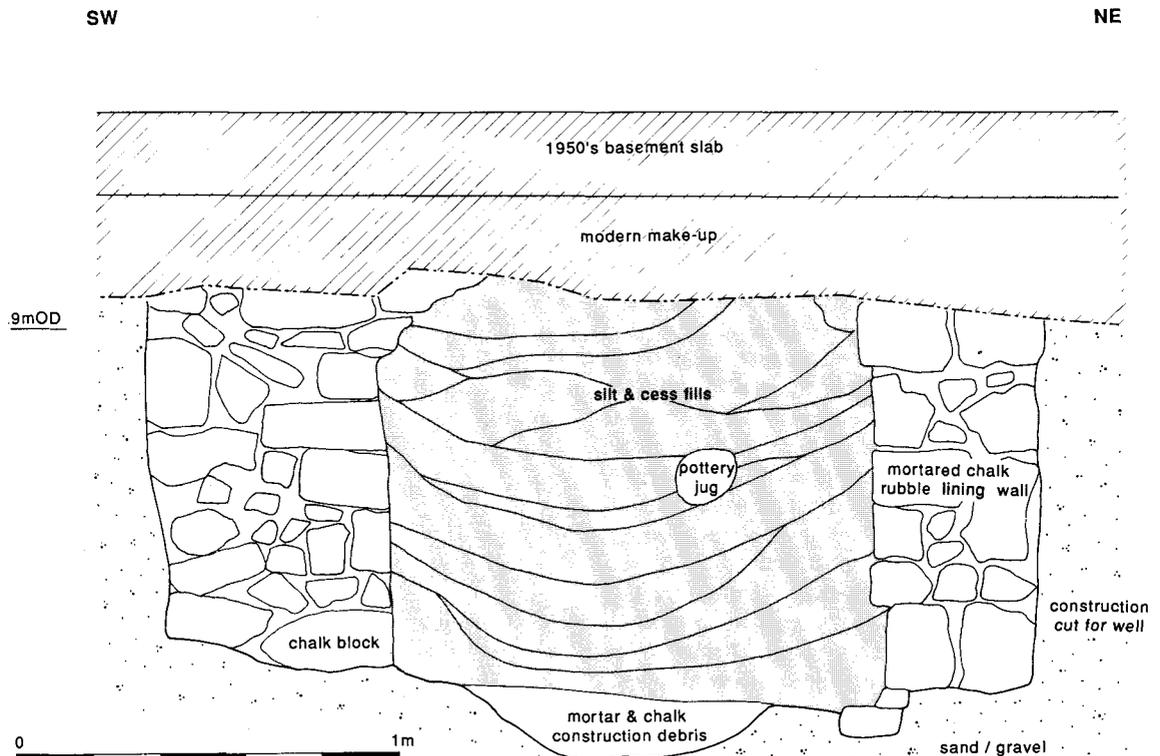


Fig 8. South-east facing section of medieval well (site 6/1)



Fig 9. *The Mincing Lane medieval bone or ivory plaque (scale 1:1)*

Cetacean bone. It depicts a winged animal in an upright pose, with outspread wings; its head is facing forwards and below its feet is a short tail. Some of the spaces between the animal and the frame have been cut away, while others have been retained. In the frame are two small fastening holes. A number of art historians and authorities on medieval ivory carvings have studied the plaque. These are their opinions:

Dr Ian Riddler, Department of Urban Archaeology, Museum of London. The animal is a griffin – a mythical creature with an eagle's head and wings and a lion's body. The size and shape of the plaque suggests that it was originally set on a manuscript cover. It is of 12th or 13th-century date (31/1/89).

Mr Paul Williamson, Department of Sculpture, Victoria and Albert Museum, London. The animal is a winged lion, not a griffin as it has a mane and no beak. The winged lion is the emblem of St Mark one of the four evangelists. The fastening holes suggest that originally the plaque was mounted on a larger object such as a manuscript cover. It is of 13th or 14th-century date (5/2/91).

Professor Else Roesdahl, Moesgard, Institut for Middelalder Arkaeologi, Højbjerg, Denmark. She knows of no parallels for the Mincing Lane ivory plaque. It is probably made from Cetacean bone, as it is too large to be carved from a walrus tusk (29/9/93).

Dr Martin Blindheim, Oslo, Norway. The animal appears to be a winged lion and is probably of 14th-century date (6/12/93).

Dr Lennart Karlsson, Statens Historiska Museum, Stockholm, Sweden. The animal is probably a dragon – because of the type of wings. The plaque is probably of 14th-century date and the style of the work suggests that it was probably not produced in Scandinavia, but in southern Europe (6/12/93).

Dr Erla Bergendahl Hohler, Department of Archaeology, Numismatics and History of Art, University of Oslo. The animal is not a lion, as it seems to have no front legs. It looks more like a dragon (4/8/94).

There is no consensus amongst the experts about the type of winged animal depicted on the plaque, it could be a dragon, a griffin or a lion. Alternately it could be one of the many mythical creatures which occur in English Romanesque sculpture (Zarnecki *et al* 1984, 149–192). One reason why the plaque may not depict the emblem of St Mark is that, in medieval art, his symbol normally has feathered, rather than bat or dragon wings. However, there is general agreement that the plaque is of 13th or 14th-century date, which fits with the date of the associated pottery. Where the plaque was produced is uncertain. Documentary evidence suggests that during the 13th and 14th centuries London did not have a large ivory carving industry, whereas Paris was a more important centre for the ivory trade at this period (Stratford 1987, 108–109). As there was a very cosmopolitan population in medieval London it is possible that the plaque was brought to London from Europe.

6/2 Medieval well at King's Beam House, 30–41 Mark Lane

This truncated stone-lined well was circular in shape, it had an internal diameter of 1.00m and an external diameter of c.1.55m, at least 1.70m of depth survived below the existing basement floor (Fig 2). The lining wall was constructed of close-jointed, coursed chalk blocks bonded by light brown sandy mortar. On stylistic grounds

the well is of 13th to 16th-century date. It was backfilled during the 17th or 18th century with ash and clinker, which included many coal fragments.

SYNTHESIS

Topography and geology

The natural ground surface of the study area slopes slightly from west to east, away from the natural plateau of the Leadenhall area on the east side of the Walbrook stream (Fig 1). Pleistocene sand and gravel was located at 10.80m OD (Site 4) and c.11.0 m OD, the top of the overlying brickearth is estimated to have been c. 12.0m OD (Site 5).

Pre-Hadrianic activity

The earliest Romano-British features within the study area were a length of ditch and a brickearth quarry pit (5/1). These are of late 1st or very early 2nd-century date, as both were backfilled with debris from the Hadrianic fire (4/1, 5/2). The scarcity of pre-Hadrianic features within the study area is probably due to the limited nature of the various archaeological investigations. For instance, excavations to the south-west of the study area at 1–4 Great Tower Street in 1989 revealed late 1st-century clay and timber buildings (Spence and Grew 1989, 18). The discovery in 1866 of an early Roman urn-cremation burial at 36 Mark Lane (within the study area) (RCHM 1928, 155), suggests that this area was on the eastern limits of late 1st-century Roman London (Fig 2). However, the scarcity of evidence and the single cremation burial have been interpreted as implying that the eastern limit of 1st-century Roman London probably lay somewhere between Mark and Mincing Lane (Merrifield 1983, 51; Perring 1991, 15). Excavations at 86 Fenchurch Street (to the east of the study area) in 1981 revealed a succession of open areas and buildings dating from between AD 60 and 80 (Upson, 1981), which confirms that at least some sites east of the study area were already settled by the late 1st century.

The Hadrianic fire

Evidence from a large number of sites in the City show that London was devastated by a

major conflagration during the Hadrianic period (c.AD 120–130) (Dunning 1945). Dunning (1945, 57) interpreted the fire debris found at 26–28 Mark Lane (4/1) as *in-situ* destruction of clay and timber buildings. However, reassessment of the site records suggests that most of this material was probably dumped here. What is not certain is if this dumped fire debris was derived from buildings on site or was brought here for disposal. Grimes's excavations located dumped fire debris and, in one instance (Area Three), *in-situ* burning (5/2), sealed by fire debris and dated to AD 100–120. In 1936 on the west side of Mincing Lane (nos 4–8), the remains of a cement-floored, clay and timber building were found, which was apparently destroyed during the Hadrianic fire (Dunning 1945, 57).

In a reassessment of the evidence for the Hadrianic fire it was considered probable that the fire debris found at 4–8 Mincing Lane and at 26–28 Mark Lane (4/1), were both the result of *in-situ* fire destruction (Roskams and Watson 1981, 63). The discovery of *in-situ* burning at only one location between Mark and Mincing Lane (5/2) suggests that there were few buildings in this area at the time of the fire and during the post-fire reconstruction, burnt debris was carted here for disposal from the area of denser settlement further west.

It should be noted that the dating evidence for this fire was largely derived from the samian found within the fire debris at Regis House during 1929–31 (Dunning 1945, 53). Now this site has been excavated by the Museum of London Archaeology Service (MoLAS) the dating evidence for the fire is going to be re-assessed. Archaeomagnetic dating by MoLAS's Clark Laboratory of two burnt mud brick walls at Regis House produced dates of AD 110–130 and 130–180 (Brigham and Watson 1996, 64).

Second and third-century land allotment and occupation

Soon after the Hadrianic fire, a series of linear gullies (5/3) were dug across the southern part of the study area. Most of these were either aligned at right-angles or were parallel to the projected line of the Roman road which ran E-W across the northern part of the study area (Fig 1, 2). Gravel road metalling was located at 4–8 Mincing Lane in 1936 (Merrifield 1965,

292), but the road has never been located either within the study area or further east.¹⁴

The linear gullies or small ditches are interpreted as a period of land allotment, probably marking out potential building plots. At Leadenhall Court, on the site of the second Roman basilica, a series of linear gullies of mid 1st-century date, represent enclosures and property boundaries (Milne and Wardle 1993, 29–30). At Austin Friars, during the late 2nd century, before buildings were constructed on the site, a series of linear gullies interpreted as property boundaries were dug (Watson, 1994, 18).

The only possible structural evidence associated with the gullies was one linear slot, which may have marked the wall-line of a cob or clay-lump walled building (5/3). The gullies were sealed by brickearth dumping and external surfaces, probably yards or trackways (5/4) of late 2nd-century date. During the 2nd or 3rd century there was another phase of gully-digging followed by further brickearth dumping (5/5).

The Romano-British masonry building

At some time after the Hadrianic fire, possibly during the late 2nd or 3rd century, on the south side of the projected road, a masonry building was constructed (Fig 2, 3). Both the date and plan of this building are uncertain as only two elements of it have been located. First, an area of plain tessellated pavement (site 2), with possibly an unrecorded hypocaust below, was found, but there were no associated masonry walls. Secondly, there was a small sunken, stone-lined, cement floored, cold plunge-bath (internal width 1.52m, length over 1.60m, depth over 30cm) (4/3). The wide masonry foundation on the north side of the bath may have supported either a water-tank (to supply the bath) or an external wall.¹⁵ It is probable that the plunge-bath formed part of the cold room (*frigidarium*) within a bath suite, which would have also included warm (*tepidarium*) and hot (*caldarium*) rooms. Such a bath suite would presumably have been private and been part of a substantial town house. The presence nearby of a tessellated pavement supports this interpretation. If there was a hypocaust under the tessellated pavement then it could have served part of the bath suite, possibly the *tepidarium*. There is no evidence that the bath suite was rebuilt or altered so perhaps it was only in use for a short period. Many bath

suites had a complex history of alteration. For instance, at Lullingstone Villa, Kent, the cold plunge-bath was reconstructed twice and refloored three times during a period of c.200 years (Meates 1979, 93–94). The discovery of a hypocaust in Mincing Lane, outside the Clothworkers' Hall in 1824 suggests the existence nearby of another masonry town house on the north side of the projected road (RCHM 1928, 134) (Fig 2).

In 1866 a portion of a decorated, ceramic, hypocaust flue-tile with mortar adhering to it, was found in Mark Lane.¹⁶ Its style of stamped decoration was described by Lowther (1948, 12) as an example of 'florid' design, on account of the ornate mass of tendrils and buds, in his corpus of decorated flue-tiles (group 3, die 8). This stamped decoration is also classified as 'die 8' in a new corpus of Romano-British tile stamps and examples of this die are also known from the *mansio* baths (dating to AD 130–150) at Chelmsford, Essex (Betts *et al* 1997, 76). It is possible that this tile was discovered on or near the site of the masonry building, if the tile was found at 36 Mark Lane which was being redeveloped in 1866, but as the find spot is unknown this suggestion cannot be confirmed.

The Mark Lane plunge-bath is one of three examples of small square, rectangular or quadrilateral baths known within the Roman city of London. The small size of the four examples suggests that each formed part of modest, private bath suites.¹⁷ In 1895 a square plunge-bath was found at 63 Threadneedle Street (internal dimensions 1.72 by 1.72m). It was lined with ragstone rubble masonry 'mixed with many broken flanged roof tiles'. One lining wall was founded on a string course of tegulae.¹⁸ Internally the bath was lined with 'plaster' and floored with *opus signinum*. In one corner of the bath was a set of semi-circular steps (Norman and Reader 1906, 218–219). In 1905 a quadrilateral plunge-bath (internal dimensions 1.90 by 3.20m) was discovered at Cannon Street. It had brick or tile-built lining walls and was both lined and floored internally with *opus signinum*. In one corner of the bath was a set of steps (Norman and Reader 1906, 215).

Merrifield (1983, 84–85) suggested that the Cannon Street and Mark Lane plunge-baths were both large enough to have been part of public bath-houses. However, the relatively small size of these plunge-baths does suggest that they were part of private, rather than public, facilities.

It has been suggested that the small semi-circular, 2nd-century, Pudding Lane, plunge-bath (length *c.*2.70m, width *c.*1.40m) might have been part of a bath suite attached to a waterfront inn (Milne 1985, 139–140). Within Roman London there are a number of examples of bath suites with larger plunge-baths than the above examples (Rowsome forthcoming). For instance, the Lime Street plunge-bath measures 2.54 by 3.50m internally (Marsden 1987, 132), while the plunge-baths at Cheapside measure 2.3 by 4.3m internally (Marsden 1976, 32–34). The Cheapside baths were originally interpreted as a public facility, but it has been suggested recently that they might have been part of a large private facility (Perring 1991, 73). The internal dimensions of the late 2nd-century plunge-bath at Lullingstone Villa, Kent are 2.44 by 3.20m (Meates 1979, 93). At the time (*c.*AD 180) when the bath suite was added to the villa it already possessed 12 rooms. It is worth considering that the number of small bath suites within Roman London could have been due to the absence of a large-scale public facility within the city, after the demolition (during the mid to late 2nd century) of the of the huge bath house at Huggin Hill (Rowsome forthcoming).

Late Roman pits

The last phase of Romano-British activity in the study area was the digging of a number of rubbish pits (5/6). The backfill of one of these pits dated to AD 270–400. It is probable that during this period the masonry building (4/3) was abandoned and the plunge-bath infilled.

The Saxo-Norman buildings, streets and finds

The walled Roman city was reoccupied and refortified during the late 9th or early 10th century (Dyson 1990). During the 10th and 11th centuries a series of new roads aligned N-S were laid out to link the re-established harbour with the city centre (Steedman *et al* 1992, 123–128). It is probable that both Mark and Mincing Lane formed part of this Saxo-Norman (AD 900–1100) street grid. Mark or 'Marthe' (Martha's) Lane is first documented in *c.*1200 and Mincing Lane (the lane of the nuns), is first documented in 1189 (Ekwall 1954, 120; 129). Stow suggested

that the nuns of St Helen's Bishopsgate (founded 1212) held property here and gave the street its name (Wheatley 1956, 121). However, as the street is documented earlier than St Helen's, the existence of an undocumented community of nuns or recluses in the area is implied (Ekwall 1954, 120). The exact date when the study area was reoccupied is not known, but it is likely to be later than the main focus of initial resettlement in the Queenhithe, Billingsgate and East Cheap area which was reoccupied *c.*AD 900–950 (Horsman *et al* 1988, 112; Ayre *et al* 1996, 19–20). Excavations at Leadenhall Court (to the west of the study area) confirm that this site was not reoccupied until *c.*AD 950–1000 (Milne 1992, 37).

Saxo-Norman occupation is represented by two sunken floored buildings (5/7) and a number of (undated) medieval rubbish or cesspits (4/4, 5/8). Other Saxo-Norman sunken floored buildings have been discovered within the City. The plans of most of these are fragmentary, but nine examples are square or rectangular; all were lined internally with post and plank walls. The majority of these buildings were between 3.0 and 5.0m wide, compared with one of the Mark Lane examples at 3.65m. The length of the buildings varied from *c.*4.5 to *c.*13.4m, and the original depth varied from 41cm to 2.3m (Horsman *et al* 1988, 68).

One unstratified find from the 1949–50 excavations was a fragment of an 11th-century Anglo-Scandinavian gilded decorative mount (5/7), only the third example known from London, the other two coming from Smithfield (Webster 1984, 103).

The medieval cellared buildings and other features

Fragments of five medieval cellared buildings were found, fronting on to Mark Lane (4/4) (Fig 5). On stylistic grounds all the cellars are of 13th to 16th-century date. However, some cellars obviously remained in use during the post-medieval period since fragments were found incorporated into the standing buildings on site. The ground storey of the associated medieval buildings may also have been stone-built, but the upper storeys would have been timber-framed. In *c.*1957 a complete cellar or undercroft, probably of late 13th or 14th-century date, was found at 50 Mark Lane (on the east side of the street). Its walls were *c.*75cm thick, with internal

facings of squared chalk blocks and chalk and flint rubble cores (Harris 1958).

To the north of the study area stood the church of All Hallows Staining (Fig 2) which was documented by 1170–97 (Carlin and Belcher 1989, 64). The medieval church, apart from its tower, was demolished during the 19th century. A survey of the tower in 1993 by Richard Lea of English Heritage has established that the earliest standing fabric is probably of early 14th-century date (Schofield 1994, 89).

Broadly contemporary with the medieval cellared buildings were four stone-lined wells (1, 4/4, 6/1, 6/2), one barrel-lined well or soakaway (5/8), two stone-lined cesspits (3, 5/8), plus a number of rubbish or cesspits (4/4, 5/8). Many of the pits were closely spaced or intercut each other (Fig 6). The density of pits was greatest within the areas some distance back from the medieval street frontage, suggesting that the centre portion of the study area was probably an open-space for most of the medieval period. On the Agas map of London (c.1562) all the street frontage around the study area is shown as built-up, although quite large areas of the interior were still open (Fisher 1981, plate 10). One of the wells was later used as a cesspit during the late 13th or 14th century (6/1) and contained the bone or ivory plaque, depicting a winged animal, variously interpreted as a dragon, a griffin or a lion (Fig 9). This well stood on the approximate site of the Abbot of Colchester's Inn or town house in Mincing Lane (Carlin and Belcher 1989, 69) which the abbot acquired in c.1230 (Kingsford 1916, 93).

CONCLUSIONS

The six sites discussed here were all relatively small-scale pieces of work; only Site 5 consisted of a series of excavated trenches. Three of the sites are antiquarian observations between 1856–91, reflecting the fact that much of the City's archaeology was destroyed during this period by the digging of deep basements. It should also be noted that the accounts of the antiquarian work given here are a re-interpretation of many of the discoveries and not just a gazetteer. For instance, the medieval stone-lined cesspit found on Site 3 was originally published as a 'square pot hole' of Romano-British date (RCHM 1928, 134).

Antiquarian finds from the study area are also

worth re-appraisal, the decorated flue-tile from Mark Lane, for instance, can now be dated and placed within a national corpus, thanks to the work of Ian Betts. These two examples illustrate the scope for re-examining antiquarian observations and finds from the City on a systematic basis to see what they have to contribute to current work.

The more recent archaeological investigations within the study area (sites 4, 5 and 6) were also relatively small-scale, yet each produced significant new information, and two produced medieval finds – the gilded mount and the ivory plaque – both of which are objects of national interest.

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Some of the preliminary post-excavation work on Grimes's site WFG 52 was funded by English Heritage as part of the Grimes archive publication programme. The Roman pottery spot-dating was undertaken by Jo Groves of MoLAS.

The 1988–89 work (MCT88) was undertaken by the Department of Urban Archaeology of the Museum of London. The site was negotiated by Marie Nally, DUA Excavations Officer and funded by Prudential Portfolio Managers Ltd. Dick Bluer and Dave Lawrence recorded the two wells; Julie Edwards spotted the medieval pottery, and the plaque was found by James Mathews, one of the site engineers.

The author is also grateful to Dr Martin Blindheim, Dr Erla Bergendahl Hohler, Dr Lennart Karlsson, Dr Ian Riddler, Prof Else Roesdahl and Mr Paul Williamson for their comments on the Mincing Lane plaque.

Figs 1 to 8 were drawn by Kikar Singh of the MoLAS drawing office, and Fig 9 was drawn by Nigel Harris of the DUA.

NOTES

¹ *Archaeol Journal* 1856, 13, p274. Procs at the meeting of Archaeol Institute, 4 April 1856.

² *The Illustrated London News* 13 May 1871, p470.

³ *ibid.*

⁴ *Journal of British Archaeol Assoc* 1871, 27, p387. Procs of the Assoc, 26 April 1871.

⁵ *Journal of British Archaeol Assoc* 1871, 27, p514. Procs of the Assoc, 24 May 1871.

⁶ *Daily Graphic* 21 October 1891, p12.

⁷ *ibid.*

⁸ The excavations at WFG 52 occupied four trenches or areas, plus one small separate area: 'G cutting' an area of intercutting pits in the south-west corner of the site, this is described here as Area Five. As the exact position of Area Five was never plotted on the trench location plan its extent is not shown on Fig 2.

⁹ The OD levels of natural geology are estimated from local observations, as it has not proved possible to determine the precise level of all the pre-War basements covering the area – from which all depth measurements were made during the 1949–50 excavation. During 1988–89 (site 6) truncated sand and gravel was located at 8.82m OD along the Mark Lane frontage and at 9.09m OD along the Mincing Lane frontage.

¹⁰ All the Romano-British dating evidence for WFG 52 cited is taken from the 1992–93 pottery spot-dating by Jo Groves, see site archive for details.

¹¹ MoL, Acc No. 92.87/1.

¹² The jug is now on loan to the MoL, Acc No. L152.

¹³ The medieval pottery from the well was spot-dated by Julie Edwards of the DUA finds section in 1989.

¹⁴ The lack of evidence for the continuation of the road eastwards within the study area is probably due quite simply to the absence of any archaeological investigation within the area of 36–38 Mincing Lane and 17–21 Mark Lane.

¹⁵ At Lullingstone villa, Kent, the thickness of the masonry walls around the late 2nd-century plunge-bath varied from 45 to 81cm. The increased wall thickness was thought to be due to less stable geology on one side (Meates 1979, 93). Adjoining the external wall of the 4th-century baths suite at Northchurch villa, Hertfordshire, were two large rectangular blocks of masonry interpreted as water-tank bases (Neal 1976, 15).

¹⁶ In the original publication of this flue tile (Price 1870, 216), it is stated that it was found in Fenchurch Street during the 1860s. However, in the 1908 *Catalogue of London Antiquities in the Guildhall Museum*, page 73, it is stated that the tile was found in Mark Lane during 1866.

¹⁷ A small plunge-bath is defined here as one with an internal floor area of less than seven square metres. The Mark Lane example is included in this category due to its width of less than 2m.

¹⁸ *Archaeol Journal* 1895, 52, p198–199. Procs of meeting of Royal Archaeol Inst, 3 April 1895.

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EDWARD IV'S BULWARK: EXCAVATIONS AT TOWER HILL, LONDON, 1985

Michael Hutchinson

SUMMARY

Excavations within a drainage trench traversing Tower Hill uncovered remains of an 11th or 12th-century structure and the Tower Bulwark, an outwork or barbican to the Lion Tower begun by Edward IV in 1480. Defensive walls, the northern bastion and a building attached to the inside of the Bulwark walls were all recorded. Evidence of bone-working and smithing was discovered in the cellar of the building, while a large group of distillation vessels was found nearby. Encroachments against the Bulwark were pulled down during the Great Fire of 1666 to help create a fire break. Demolition of the Bulwark itself began in 1668 as part of a scheme to strengthen the western entrance to the Tower. During the early 18th century its visible remains were concealed by the landscaping of Tower Hill.

INTRODUCTION

Between November 1985 and January 1986 the Museum of London's Department of Greater London Archaeology undertook an archaeological excavation at Tower Hill (TQ 3346 8063; see Figs 1 and 2, and Pl 1) prior to relandscaping and repaving. Most of the work was confined to a drainage trench 120m long and 2m wide which extended from the foot of Tower Hill northwards to the junction with Byward Street.

Practical limitations and restrictions on the excavation

Excavation could not take place below the designated level of the drainage pipe (hereafter

called the 'invert level'), which varied in depth between 1.5m and 2.0m below modern ground level. As a consequence the full archaeological sequence could not be examined in most areas. The unusual shape and limited area of the excavation (see Fig 2), in addition to the relandscaping, hindered the analysis of stratigraphic relationships. In some areas modern relandscaping had truncated all archaeological deposits down to the surface of the terrace sands and gravels.

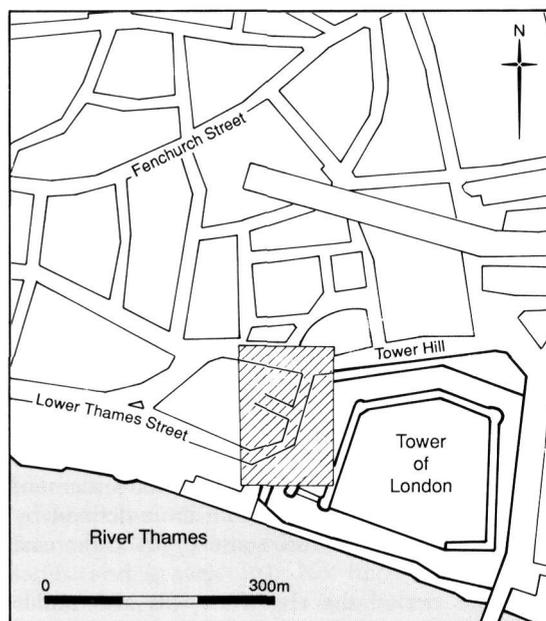


Fig 1. Location plan of site



Plate 1. The Tower of London looking east with excavation trench in the foreground

Previous archaeological and documentary evidence for the occupation of Tower Hill

Tower Hill has developed continuously since the medieval period, and excavation has indicated earlier activity. Evidence of prehistoric land-use came to light in 1976 when excavations along the southern side of the Tower of London located a pit containing possible Iron Age pottery and cut in turn by a shallow inhumation burial (Parnell 1977, 97). No other pre-Roman occupation has been identified in the immediate area.

A mid to late 1st-century burial, found near the church of All Hallows (Page 1909, fig 1), suggests the presence of an early Roman cemetery just north of the excavation (Merrifield 1983, 112). The cemetery may have been abandoned in the late 1st century when the settlement boundary was extended to the limit defined by the City wall of c.AD 200, some 175m to the east of Tower Hill.

At this period the riverfront was also under development: two Roman quays were revealed during excavations at the Custom House

immediately west of Tower Hill (Tatton-Brown 1974, 117–219). First-century building was also taking place along the Thames c.200m to the east (Parnell 1977, 97; 1981, 71; 1982, 88) and on the near side of the 'Lorteburn' valley east of Seething Lane (Bentley 1984, 13–16).

A mosaic pavement and ragstone walls found below All Hallows Barking indicate that high-quality Roman buildings superseded the redundant cemetery to the north of Tower Hill at about the time the City wall was built. There is little further evidence of activity in the south-east corner of the Roman city until the 4th century when the river wall was added to the City's defences. This has been excavated at the Custom House site (Tatton-Brown 1974, 122) and along the south side of the Tower of London (Parnell 1977, 97; 1982, 133). Its projected alignment suggests that it ran just beyond the southern limit of the Tower Hill 1985 excavation.

Evidence of later Roman activity was found north of Lower Thames Street where a possible 5th-century house or hostel has been excavated (Marsden 1980, 152–5). The site also revealed 5th-century Saxon activity and later 7th or

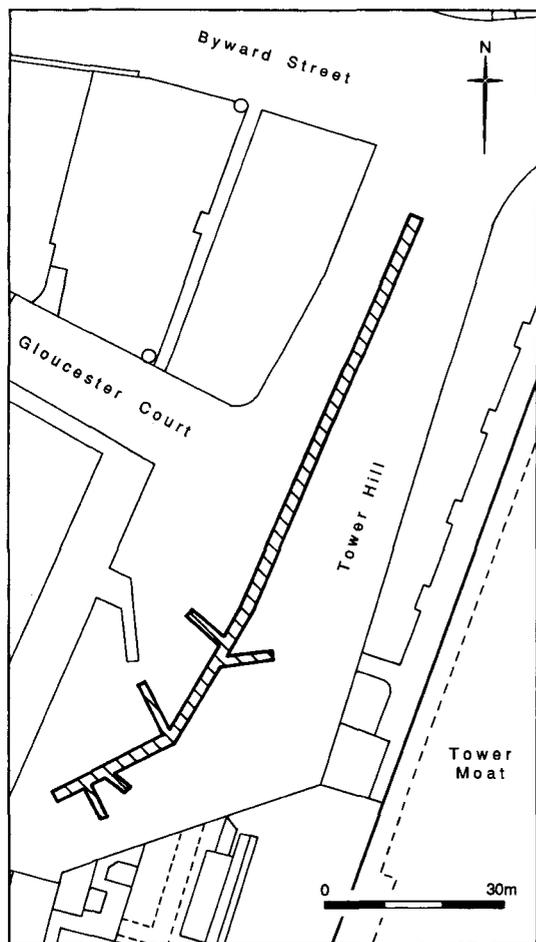


Fig 2. Location plan of drainage trench

8th-century robbing for building material, possibly for use at All Hallows Barking.

After the abandonment of the Lower Thames Street house, no subsequent activity is recorded until the 12th century when a rammed gravel surface was laid down which Merrifield (1983, 255) suggests was a road. This break in activity was also recognised on the Custom House site and was marked by a series of sandy gravels, possibly deposited during a phase of marine transgression (Tatton-Brown 1974, 120).

From the earliest stages of the Norman Conquest defensive structures were built within the City walls. One such may have been located within the south-east corner of the City walls of c.AD 200. Later, from c. 1078, the White Tower was erected, and beginning in 1184 the castle was enlarged by extending the bailey to the west and encircling it with a moat. More defensive

structures were added between 1275 and 1285, when a new curtain wall and moat were provided, and the main entrance was moved from the middle of the western curtain wall to the south-west corner. In the two centuries that followed, only repairs are recorded to the western entrance. There is no evidence of substantial modification until Edward IV's construction of the Bulwark or outwork to the Lion Tower in 1480, which proved to be the principal feature of the present excavation.

Topography and geology (contexts [1]–[3])

Tower Hill is formed by a spur extending southwards from the northern edge of the lowest river terrace. The excavation trench ran north-south down the southern scarp from just below the summit and terminated c.20m north of the pre-Roman bank of the Thames.

Owing to the restrictions imposed by the invert level, natural river terrace deposits were recorded in only two areas; one opposite Gloucester Court, and the other a further 20m to the south. The river terrace deposits [1] consisted of bands of pale yellow and pale orange fluvial sandy gravels with occasional bands of darker stained gravel.

Ordnance datum heights taken from these areas show that deposits slope downwards from +8.46m OD in the north to +6.65m OD in the south. Although this represents a drop of 1.80m over a distance of 38m (an inclination of about 1 in 20), it need not represent the natural slope, which may have been altered by relandscaping. As previous excavations in the area located a thin layer of brickearth overlying the river terrace gravels (Tower Hill underground station, Parnell 1982, 125; Wakefield Gardens, Whipp 1980, 49), its absence at Tower Hill would suggest that the slope had been artificially modified.

The fluvial sands and gravels were overlaid by a series of clean silty sands [2], which were recorded in the excavation trench just north of Gloucester Court. The deposit was 0.25m thick and may have been formed by accumulating hillwash material. The layer sloped downwards towards the eastern limit of excavation and formed a depression which was filled with 'clean' sands and gravels [3]. No finds or traces of charcoal were retrieved from these deposits, confirming that they probably evolved before the occupation of Tower Hill.

THE SITE**Roman** (contexts [4]–[6])

Although a possible Iron Age inhumation was found on the southern side of the Tower (Parnell 1977, 97), the earliest material on the Tower Hill site was dated to the Roman period. A south-west to north-east orientated linear feature [4], between 2.40m and 4.40m wide, was observed over a distance of 5m opposite Gloucester Court and may have been formed by natural erosion. Although it was cut into the fluvial sands and gravels, its relationship with the early hillwash had been destroyed by modern truncation, and its full profile is unknown since only the bottom 0.30m survived. The base was flat in cross-section and sloped downwards towards the south. It was filled with fine sand containing rare shell fragments and charcoal flecks. One sherd of 1st-century pottery was found in the northern fill [5], while the southern half produced a small amount of pottery which dated to after AD 120. A 17th-century clay pipe stem found in the feature is thought to be a modern intrusion. No other Roman features were observed during the excavation.

Another early feature [6] which cut hillwash deposits [2] was located 10m to the north of feature [4]. Owing to depth restrictions imposed on the excavation, it was not completely excavated and no finds were recovered. Its eastern side formed an arc which extended westwards beyond the limit of excavation. Although the date and function are unknown, the early status of the feature is confirmed stratigraphically as it cut 'clean' hillwash material [2] and was sealed by later deposits [7].

Post-Roman (context [7])

The area may have been abandoned after the Roman period when a 0.30m deep layer of sterile, clean sandy clay and clayey silt [7] accumulated. The deposit was located just north of Gloucester Court and probably represents hillwash or natural soil, or both.

Early medieval*Development of soils* (contexts [8]–[12])

Further hillwash material [8] accumulated over layer [7] and formed a thick deposit of sandy clayey silt up to 1.0m deep.

Lower down the slope the deposit was represented by layers of sandy silt and clay [9]–[12]. Unlike the earlier hillwash, this material contained charcoal, mortar flecks, fragments of animal bone and oyster shell whose presence suggests that this area of Tower Hill was once again occupied. The thickness of these layers indicates that they may not have derived exclusively from hillwash, but may also represent agricultural activity or upcast dumped on the site during levelling prior to building. Several 12th-century sherds were retrieved from these deposits, including fragments from cooking pots in Early Surrey ware and chalk-tempered ware (Fig 16, No. 2). Early 12th-century masonry foundations were located c.90m north of the excavation (Tucker 1988), and an 11th or 12th-century structure was located just south of Gloucester Court (see below).

Further to the south these deposits were truncated during the construction of the Bulwark, while, to the north, depth restrictions precluded investigation.

11th/12th-century building (contexts [13]–[15])
(Figs 3, 4)

An ill-defined building was recorded just south of Gloucester Court, but was observed in the western section of the site where controlled excavation was not possible; the following interpretations must therefore be seen as tentative.

The deposits consisted of floor make-up and levelling material [13] derived from redeposited natural, overlaid by a floor [14] composed of brickearth make-up over which a surface of crushed chalk was laid. Demolition material [15] was composed of pale brown mortar, chalk and ragstone cobbles, and was dumped over the crushed chalk surface. Fifty-five sherds of pottery were recovered from this material and dated the demolition to the 12th century, including Fig 16, No. 3. The relationship between the structure and the hillwash was destroyed by later intrusions.

Area of rubbish pits (contexts [16]–[27])

A number of pits concentrated in an area c.40m north of the structural remains were excavated, but the associated ground surface was truncated by modern road make-up. Twelve pits were excavated in all, three of them dated by pottery

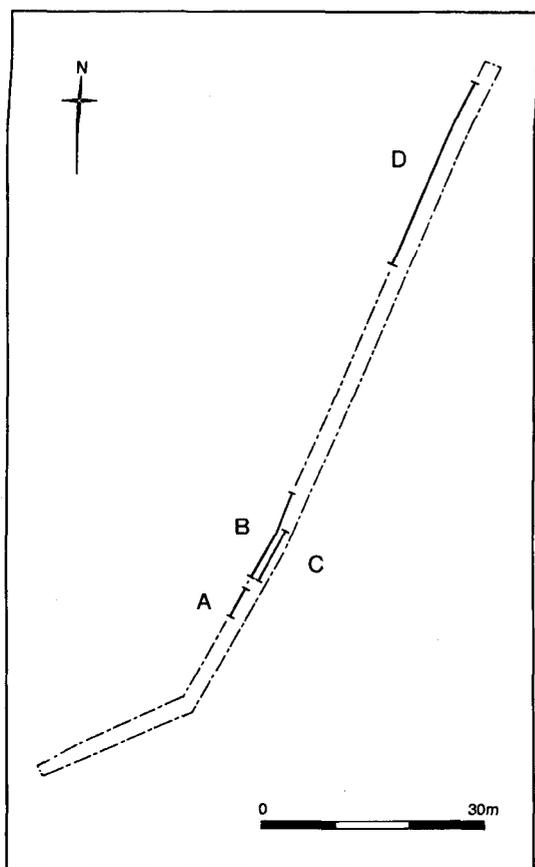


Fig 3. Location of sections

to the 12th century. Several residual Roman tile fragments, two *tesserae* and an irregular copy of a coin dated to the reign of Tetricus I (governor of the Gallic Empire, AD 270–73) or soon after, were also found within the fills of these pits (see Coin Report, below). As all but two of the fills were similar, and contained similar inclusions, the whole group has been analysed together.

In one part of the concentration a sequence of four pits was excavated. The entire sequence is dated by pottery to the 12th century, and it is suggested that this part of Tower Hill was used as an 'open' refuse area.

All the pits extended beyond the limit of excavation, obscuring their interpretation. They were divided by shape into two groups; those which appeared to be circular, and those which were square. Their surviving lengths ranged from 0.80m to 2.60m. Nearly all were filled with dark clayey silts which contained fragments of animal bone, residual Roman tile, oyster shell, charcoal

and cobbles of greensand and chalk. Pit [16] was filled with sands and sandy clays with tip lines of almost pure charcoal, and a mixture of charcoal and sandy clay. The fill also contained inclusions similar to those in the other pits, as well as fragments of mortar. Pit [17] contained an upper fill similar to that in the other pits but was lined with packed chalk fragments and flint pebbles. The lining was 0.10m thick at the sides of the pit and 0.25m on the bottom.

All the pits, with the exception of [17], have been interpreted as rubbish pits. Pit [17] may have had an industrial usage, *eg* tanning or fulling.

Medieval (contexts [28]–[34])

A layer of sandy silt [28] accumulated over the demolition rubble of the 12th-century building, suggesting further neglect and accumulation of hillwash. The 0.25m thick deposit contained many pebbles, tile and mortar fragments, and agriculture or dumping may also have contributed to its formation.

A similar combination of events may have been responsible for the deposition of a widespread deposit of sandy silt with clay lenses [29]–[32], which were excavated *c.*50m further up the hillside. Clay lenses, however, do not seem characteristic of hillwash and may indicate that the material was dumped in the wake of relandscaping, and the presence of clay would suggest that it originated from further down the slope. It formed a 0.75m thick layer before continuing beyond invert level. Several sherds of pottery were recovered from the layer, which indicate that it was deposited in the mid-13th century (Fig 16, Nos 4–6).

Cut into the dumped material was a large feature [33] whose shape and function were obscured by subsequent intrusions. Several sherds of residual Roman pottery were recovered from the fill [34], but the feature was dated to the 13th century by sherds of London ware and South Hertfordshire ware. The 13th-century deposits lower down Tower Hill were truncated during the construction of the Bulwark in *c.*1480.

Late medieval (contexts [35], [36])

Prior to the construction of the Bulwark, the lower part of Tower Hill was levelled by dumping clays [35] and [36] over the hillwash. The dumps

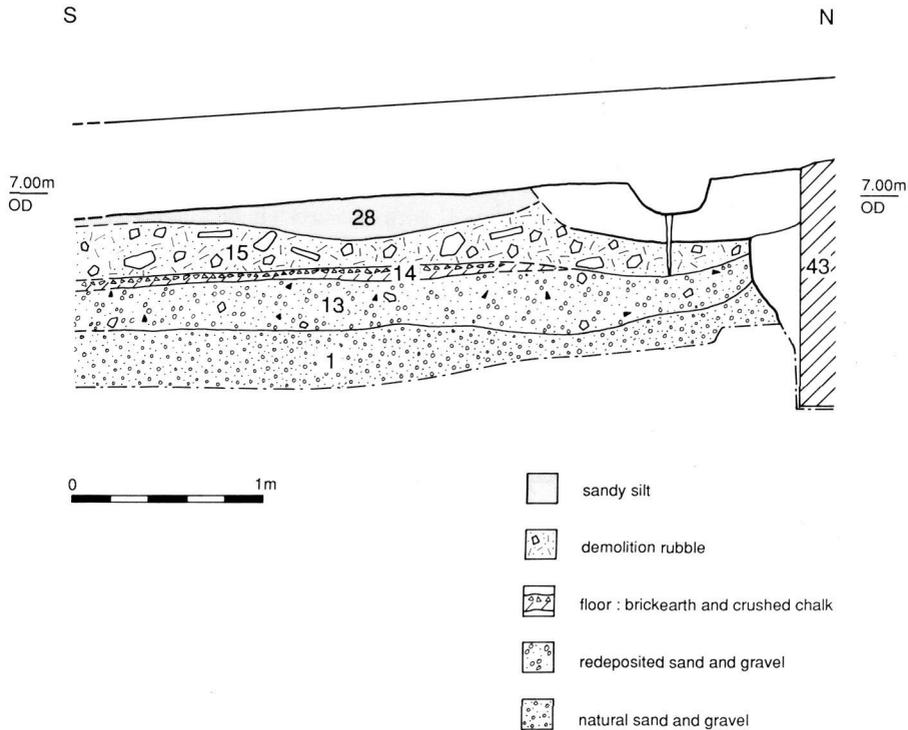


Fig 4. Section A

contained lenses of sandy gravel, pebbles and flint nodules, and were at least 1.0m thick above invert level. They are not considered to represent flood deposits since they extended c.2.5m above the medieval highest astronomical tides (Milne & Milne 1982, 60), to heights of +6.25m OD and +4.23m OD respectively.

Construction of the Bulwark (contexts [37]–[48])

The foundations of the brick Bulwark were cut into the hillwash and clay deposits at the bottom of Tower Hill (see Fig 8). The outer defensive walls were built first, and were encountered at the southern end of the trench, where the Bulwark defences seem to have comprised two parallel walls set on trench built foundations: an outer wall [37], and an inner wall [38]. The space between the walls was 1.20m wide, and each wall was 1.20m thick and survived to a height of 2.30m. In between were three small cross-walls [39], [40] and [41] whose function is unknown but which probably provided strengthening and support for a parapet walkway. No deliberate infilling of the space that could be

considered structural was observed during the excavation.

Further north, opposite Gloucester Court, the initial Bulwark defences were represented by walls [42], [43] and [44], which formed three sides of a square and suggested a hollow bastion (see Fig 9). Walls [42] and [43] were c.1.0m thick and survived to a height of 1.5m, while wall [44] extended beyond the limit of excavation. All the walls were bonded to each other and represented a single phase of building. Wall [45] was bonded with the side of wall [42] and extended northwards from it, curving slightly towards the east. It may have represented a rounded bastion associated with the Bulwark gate and designed to accommodate artillery intended to cover Great Tower Street (Colvin 1963, 1.452–3; Ross 1975, 272).

A large cut feature [46] was excavated just outside the northern end of the Bulwark. It extended at least 8.0m northwards from the bastion foundation of wall [45] before being truncated by a later cut feature [88]. Its eastern and western sides extended beyond the limits of excavation, making interpretation difficult, but it may represent an external ditch associated with

the defence of the Bulwark. Primary fills [47] and [48] accumulated over the foundation of wall [45] and were composed of waterlaid silts and clays.

The salient feature of this period, and of the whole excavation, was the location of the northern part of the Bulwark or outwork constructed outside the Lion Tower by Edward IV in 1480. It will be useful to consider first the documentary background to this late addition to the Tower's defences.

The documentary evidence for the Bulwark

Geoffrey Parnell

The vast and expensive works carried out by Edward I at the Tower, mainly between the years 1275 and 1285, marked the ultimate expansion of the castle. Apart from a few modifications and additions, the concentric pattern of the defences established at the end of the 13th century is essentially the plan that survives to this day.¹

Edward I's scheme involved the excavation of the outer moat and the resiting of the main western entrance from a position along the projected line of Great Tower Street (*ie* the site of the present Beauchamp Tower) to the south-west corner of the defences. The new arrangement comprised an inner and outer gatehouse (Byward and Middle Towers) with a great half-moon shaped barbican beyond. This imposing structure, known as the Lion Tower because of its long association with the king's beasts, was approached by a causeway to the north, itself controlled by another small gate labelled the 'Lyons Gate' on the 1597 survey (Fig 5). All this seems to have been completed by the summer of 1281 when the new approach was in use. It might also be mentioned that the slope of Tower Hill at this time was terraced and planted with vines and fruit trees by the king's gardener.²

During the next two hundred years repairs to the western entrance are recorded, but there is no evidence for any remodelling of the established layout. According to John Stow it was Edward IV who ordered the approach to be further strengthened by the addition of the brick outwork known as the Bulwark,³ a statement supported by an entry in a draft Tellers' Roll of c.1480 for £16 towards 'making the bulwark at the Tower of London.'⁴

On 9 March 1484, a certain Thomas Redhede

was appointed 'porter of the Tower of London and Keeper of *le bulwerk* without the west gate of the same and 6d daily for his wages ... and a mansion within the bulwark aforesaid.'⁵ The following year the post was granted to Robert Jay, 'the houses on Tower Wharf and the gardens on Tower Hill' also being included within his custody.⁶ In 1495, when an inventory of ordnance at the Tower was prepared, three guns are listed as being 'in the Bulwark'.⁷

References to the Bulwark in surviving 16th-century accounts are often brief and provide little evidence for the appearance and condition of the structure. Some recommendations made in a report on the state of the Tower and its Liberties while Sir Francis Jobson was Lieutenant of the Tower, and therefore dated some time between 1564 and 1570, may, however, be cited:

Also we present that any p[er]sons keeping Shoppes or Sheddys within the Bullwarke shall not lye within the same a night, except they be English men ...

Also we present all the Inhabitants within the sayd Bullwark or else within the libertys of the sayd Tower, for casting their Rubbish into the Tower dytch, or on Tower hyll ...

Also we present the Smyths shedds adjoyning to the said Bullwark on the backsyde of James Jacob's howse, unmeete to stand there for that it is hurtfull to the sayd Bullwark.⁸

At about this time the first cartographic evidence for the Bulwark begins to appear. Wyngaerde's view of c.1550 shows the enclosure with a large entrance on the north-east corner and a bastion on the north-west corner. To the rear of the latter stands a building, to the south a gatehouse controls the narrow passage from the wharf.⁹ A similar representation is shown on the Agas map of c.1560, with an additional building depicted against the inside of the west wall.¹⁰ An elevation of the northern defences is featured in a herald's sketch of Queen Elizabeth's coronation procession leaving the Tower in January 1559 (Fig 6), while more detail can be found on the Haiward and Gascoyne bird's-eye survey of the Tower in 1597 (Fig 5). By then the west wall of the Bulwark, the area about the Tower Hill entrance and the edge of the moat immediately to the north, are seen to be crowded with buildings. These and other encroachments evidently formed the subject of a letter from the Lieutenant of the Tower, Sir William Waad, and two chief officers of the Works in 1606, part of which reads:

Moreover, where there is one chiefe Bullwark on the west syde of the hyll, to which all the Tower hyll is subject, the same is quite within few yeres made no use by

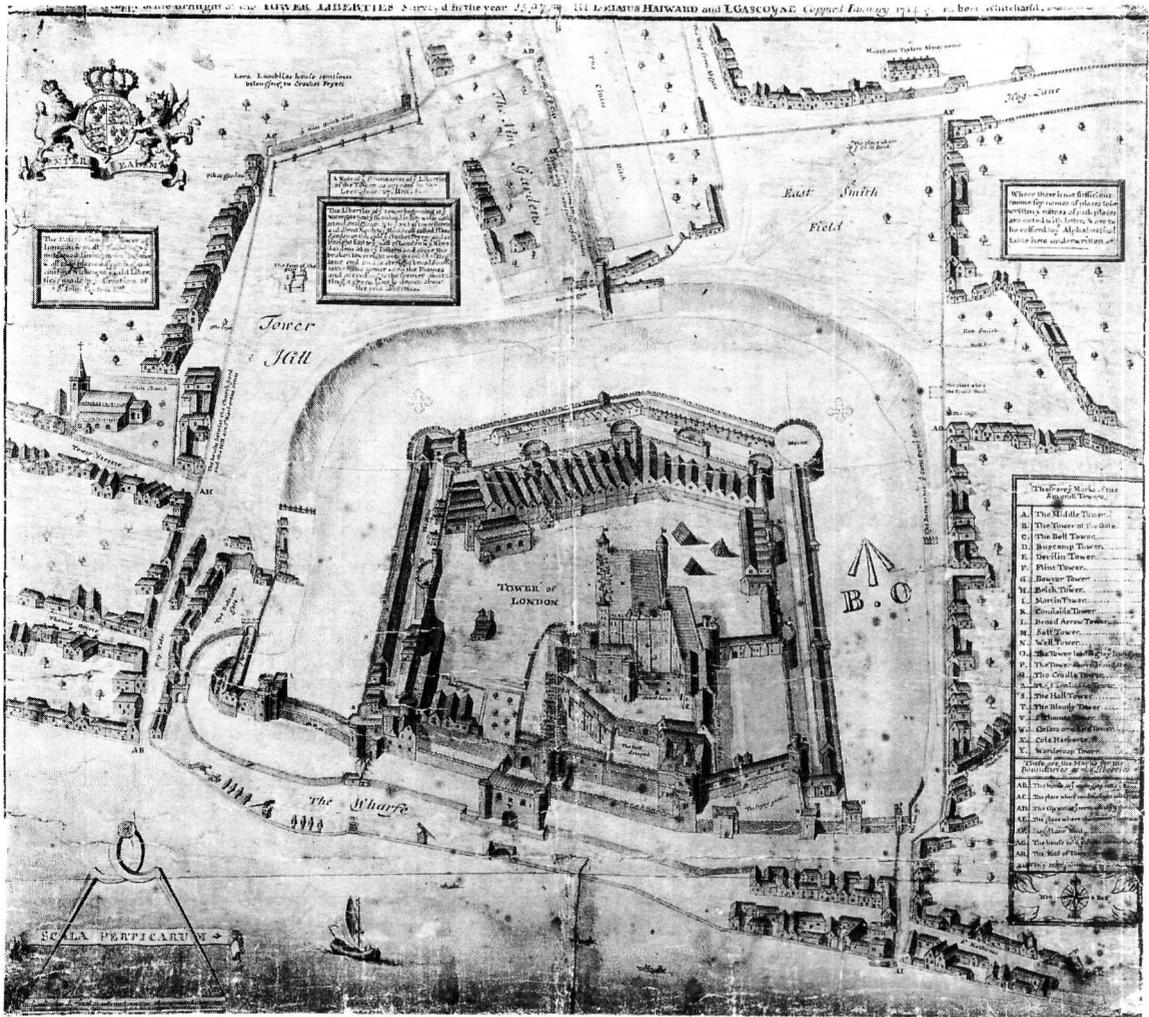


Fig 5. Detail of the Bulwark and the Western Entrance from Haiward & Gascoyne's survey of the Tower in 1597 (by permission of the Museum of London)

buildings from the one end to the other, that have been erected by leave of the Gentlemen Porters.¹¹

The letter was accompanied by a very rudimentary plan of the Tower which emphasises the encroachments but provides no further information about the defences.¹² The extent of the encroachments provoked one of a number of complaints made by six members of the Privy Council who considered the condition of the Tower in 1620.¹³ They called for a detailed survey which, when supplied in December 1623, referred to some 220 houses, sheds, timber yards, wheelers' yards and such like which encumbered the margins of the moat and the western entrance.¹⁴ The description of the Bulwark in the 1623 report is of considerable interest:

The first gate called the Bullwarke (proportioned with 2 halfe Rounds the one is 16 foot over, and the other 2 Rods with a straight wall of 2 Rods between them and soe from the greater round to the Wharfe gate a strong wall of 11 Rods and 8 foote long) hath formerly been enclosed round with a Moate where of some parte is now called the Tower dock, the rest is filled up This Bullwarke with his walls and two gates are planted with howses, both within and without, where formerly Ordnance have been placed as appeareth by the great loopeholes over arched yett to be seene within their houses: To proportion this bullworke to its former intended service and use the charge of the perticulers there of is to be calculated but by gesse, except the howses were pulled downe that the defects might appeare and is therefore left to your Lordships consideration.¹⁵

The significance of this account, in terms of the architecture of the Bulwark, is discussed

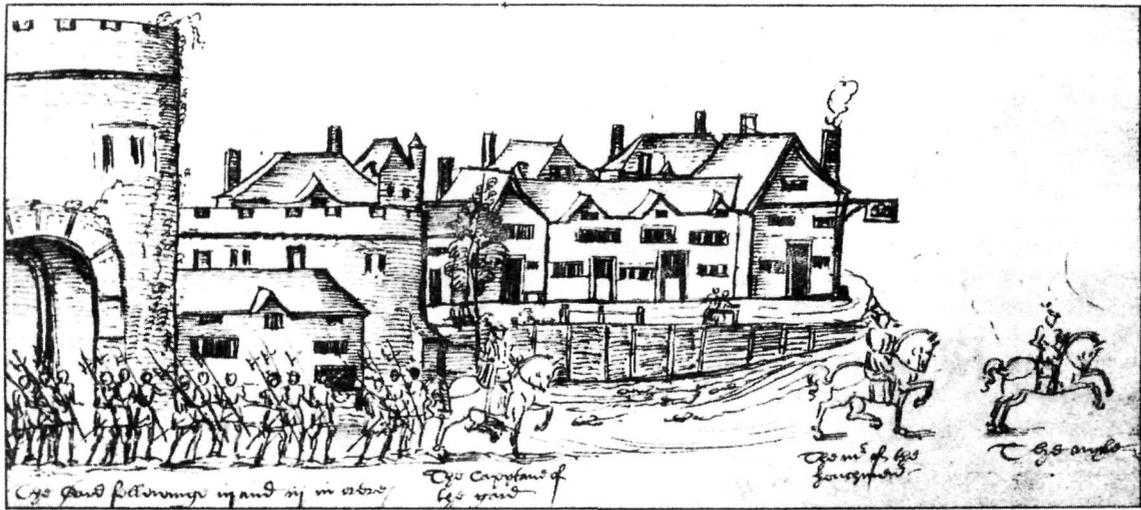


Fig 6. Part of Elizabeth I's coronation procession leaving the Bulwark in 1559. The north-east bastion, incorporating the entrance gate, occupies the foreground, while the larger north-west bastion can be seen to the rear (By permission of the British Library)

below. As regards the proposed reparations, however, no work is revealed in the accounts at this time nor in any of those associated with the flurry of activity to improve the Tower's defences before the outbreak of the Civil War.¹⁶

The long-standing problem of encroachments about the moat and the western entrance was finally resolved in a dramatic manner during September 1666 when the offending structures were summarily demolished to prevent the flames of the Great Fire reaching the fortress.¹⁷ The Gentleman Porter was eventually compensated £135 by the Office of Ordnance in 1675 for the loss of his rents.¹⁸

In the wake of the City's destruction the Ordnance reconsidered the effectiveness of the Tower's defences, and in November 1666, their Chief Engineer, Sir Bernard de Gomme, produced a draft design for refortification which included the replacement of much of the existing western entrance with a great ravelin and moat.¹⁹ This, the most radical of his proposals, was not implemented, but demolition of much of the Bulwark was to proceed and on 4 July 1669 the Lieutenant of the Tower, Sir John Robinson, requested to see a warrant that was being drawn up by the Ordnance Commissioners in respect of the Bulwark and other matters.²⁰ Orders must have been issued almost immediately for on 11 August the Privy Council advised the Commissioners and the Lieutenant of the need

for an estimate of the cost of works already under way which included the 'planeing & Levelling the Place called the Bulwarke'.²¹ Demolition of the Bulwark had in fact begun in November 1668²² and during the following year hundreds of thousands of bricks and a mass of rubbish were removed from the site.²³ Between 21 November and 22 December 1670 the Office bricklayer was engaged in 'taking down the outward great gate into the Bulwarke',²⁴ presumably the principal entrance on the north-east corner of the enclosure previously referred to.

During 1670 a new wall and gate was constructed on an east-west alignment to the north of the Lion Tower²⁵ which linked up with a wall about the Lion Tower and evidently the vestiges of the Bulwark near the Wharf.²⁶ For reasons which are not apparent, substantial remains of the Bulwark were left standing to the north of the new enclosure (see cover picture) and in October 1675 the Ordnance Board authorised 'stoppinge up the Gapp of the wall of that parte of the old Bulworke goinge into Thames Streete' and the 'Repaire [of] the Wall in several places with out the Gate'.²⁷ Five years later the Board ordered some 35 yards of the remaining Bulwark by the Wharf Gate to be taken down after they were advised that the brickwork was ready to collapse.²⁸

Vestiges of the west wall of the Bulwark and the north-west bastion seem to have stood until

at least the start of the 18th century.²⁹ Further losses probably occurred in 1706 when modifications were made to the inlet known as Tower Dock, whose origins seems to have been associated with a defensive ditch about the Bulwark. On 7 March the Board ordered the breast wall of the dock to be repaired and the northern extent, 'between the End of Thames Street and Tower Hill', to be filled in with rubbish from the locality.³⁰ Contracts with the builders were drawn up in May and June³¹ and the principal accounts with the mason and carpenter were settled in September 1708.³² Twenty years later, surveys of the Tower suggest that all visible trace of the Bulwark had effectively disappeared.

Notes for Documentary Evidence for the Bulwark

¹ Colvin 1963, ii.715–23.

² Maclean 1981, 70.

³ Kingsford, 1908, i.48.

⁴ Colvin 1963, ii.729.

⁵ *Cal Pat R, 1476–85*, p 380; cf also *Cal Close R, 1476–85*, no 1294 (payment of arrears of salary dated 26 November 1484). The mansion was the first in a long line of lodgings assigned to the Porter at the western entrance, the last, attached to the south side of the Middle Tower, was demolished in 1845 (Parnell 1993, 94; pl 10).

⁶ *Cal Pat R, 1485–94*, p 14 (21 September 1485).

⁷ PRO E36/8/203.

⁸ BL Add MS 14,044, f 40.

⁹ Colvin 1963, pl 44.

¹⁰ Fisher 1981, 13.

¹¹ Hatfield House, Cecil Papers 119, f 160.

¹² Parnell 1985b, 66–9.

¹³ *Cal SP Dom 1619–23*, 160; BL Harley MS 1326.

¹⁴ Doubtless many of the traders and artisans had established themselves in the area to avoid the restrictions placed on commercial life within the City by the Livery Companies.

¹⁵ BL Harley MSS 1326, f 108; 5913, f 15.

¹⁶ *Cal SP Dom 1640–41*, 158, 186–7; PRO WO 49/72, ff 64–6.

¹⁷ PRO PC 6/19, pp 103–4. For payments to the Lieutenant of the Tower and others, *Cal TreasBills 1667*, 161, 643; *Cal SP Dom 1666–67*, 582; WO 51/7, ff 158, 169; PRO 30 37/16. See PRO PC2/60, ff 84, 97 for petitions of inhabitants.

¹⁸ WO 51/18, f 90.

¹⁹ Parnell 1985b, 69–72 & figs 5–6.

²⁰ *Cal SP Dom 1668–69*, 395.

²¹ WO 55/426, entry 129.

²² WO 48/9, p 488.

²³ *Ibid*, p 477; WO 51/10, f 114; WO 51/18, f 98.

²⁴ WO 51/12, f 158.

²⁵ WO 48/9, p 519; WO 48/11, p 21; WO 51/12, ff 52 & 61.

²⁶ Parnell 1985b, fig 9.

²⁷ WO 47/19B, f 93.

²⁸ WO 47/9, f 33.

²⁹ Parnell, 1985b fig 11; this undated drawing was assumed to be late 17th century as it is a copy of a plan in the possession of English Heritage bearing the date 1692. Subsequent research, however, has shown that the drawings include Ordnance lodgings erected in 1699–1701 and it may be supposed, therefore, that the date of 1692 was entered at a later date and is incorrect.

³⁰ WO 47/23, p 186.

³¹ *Ibid*, pp 311 & 389–90.

³² WO 51/74, f 71; WO 51/75, f 37.

The construction and function of the Bulwark

Geoffrey Parnell

The word 'Bulwark' seems to have come into use during the 15th century to describe a kind of outwork or barbican specially designed for artillery. Structures of this kind were devised by engineers in response to the development of heavier and more accurate guns which, by the end of the century, had rendered many earlier forms of medieval military architecture obsolete.

Some of the most advanced examples of 15th-century English artillery works were associated with the Calais pocket and were intended to resist a French assault. Bulwarks of brick and stone were added to the town defences between 1448 and 1454, while the castle at Guines was strengthened with two masonry bulwarks furnished with gunports all round between 1462 and 1474 (Colvin 1963, i.488–9, 453). There are also references to repairs in the castle to three stone vaults in an earthen bank 'for guns to shoot out of'. These emplacements, called 'murderers' (similar devices are mentioned at Calais in 1468–9), presumably represent early casemates. Perhaps one of the oldest surviving casemates in the country can now be found in the glacis beyond the moat on the east side of Castle Rushen, Isle of Man. Both the sloping glacis, which was added to mask the curtain wall from gunfire, and the casemate, probably form part of the innovative works carried out by the 3rd earl of Derby in c.1536–40 (O'Neil 1951, 14–5, 25–6).

It is against the backdrop of these early developments in artillery fortifications that the Bulwark at the Tower may be seen. The plan of the enclosure was highly irregular and determined by the need to surround the western entrance from the river in the south to the moat about the outer *enceinte* to the east. As far as the surviving historic views are concerned, the shape of the two towers or bastions on the north side of the enclosure appears to vary from circular to horseshoe. The excavated footings suggest that the north-west bastion was circular, and the north-east horseshoe, but their precise plans can only be determined by further investigation. In outline, however, the excavated remains seem to conform with the dimensions recorded in the 1623 survey (see above). This gives the circumferences of the north-east bastion as 16ft and the north-west as 33ft (*ie* 2 rods), with a 33ft stretch of wall between the two. The length of wall from the larger bastion to the gatehouse by the Wharf was 189ft 6in (*ie* 11 rods and 8ft). The description of the bastions as 'halfe Rounds' supports the cartographic evidence that they were hollow.

Apart from allowing some flanking fire to be brought to bear along the faces of the adjoining walls, the bastions must to some extent have covered the approaches from Great Tower Street to the west and Tower Hill to the north. In addition, as may be appreciated from the 1597 survey, the principal entrance into the enclosure was incorporated in the east elevation of the north-east bastion (Fig 5). The gateway can also be seen in this position on the Elizabethan sketch of 1559, together with a building against the external face of the enclosure between the two bastions (Fig 6). Brick footings revealed by excavation in this area possibly belong to the same structure, and might amount to one of the encroachments referred to in the 1623 report.

The same report complained about encroachments concealing the 'great loopholes over arched' in the walls of the Bulwark, where formerly ordnance had been planted. This is a particularly interesting observation, for it indicates that the enclosure had once been armed with heavy artillery. It is regrettable that the document does not indicate the level at which the apertures were located. At Dartmouth Castle in Devon (begun in 1481), which is noteworthy for representing the earliest surviving castle in England to be designed to have guns as its main armament, the heavy ordnance was placed on

the lowest floor. The gunports have large rectangular openings with internal splays to allow a degree traverse (O'Neil 1935, 138, 140-1).

Recent restoration work at Kingswear Castle, built in 1501-2 on the opposite side of the Dart estuary, has resulted in the gunports on the ground floor being fully exposed. These are of identical size to the Dartmouth Castle examples, but have suffered little alteration and exhibit the remains of large timber baulks set in the cills of the openings, which are flush with the floor. It is clear that the wooden beds which supported the guns were pivoted into these timbers. Evidence from the floor above indicates that smaller, hand held, ordnance was mounted in a similar manner, but in openings formed at a level above the floor, while the top floor and the roof parapet are pierced with loops for handguns. What is now clear is that the pattern of armament replicates the earlier arrangement at Dartmouth (Parnell, forthcoming).

The only surviving evidence for early gun emplacements at the Tower is found in the Byward Barbican, immediately to the east of the Byward Tower and overlooking the Wharf. The wedge-shaped addition to the south face of the building, generally attributed to the reign of Henry VIII but unrecorded and possibly earlier, is pierced at ground floor level with two small gunports, one in the east face the other in the salient. These were clearly intended for small pieces of ordnance mounted on beds, rather than wheeled carriages. Of further interest are loops with double key-holes for handguns at mezzanine level overhead.

If the large gunports mentioned at the Bulwark were located at ground level, the artillery could have been accommodated in casemates formed in the thickness of the curtain wall. This was c.3.20m wide and of unusual construction, being composed of two brick walls c.1.20m wide, tied together at intervals with cross walls and presumably containing an infill to cushion the impact of cannon shot, though in the area examined the core was disturbed by later activity. The height of the walls is difficult to gauge from the available views, but there is no reason to suppose that they were not reasonably high, as the two bastions appear in the 1559 view (Fig 6), and are therefore rooted in the medieval tradition.

The only other evidence for the nature of the fortifications, as revealed in the 1623 report, is a

reference to a moat or ditch which had formerly surrounded the enclosure. The report identifies the inlet known as Tower Dock as the southern extent of this feature and the only part by then still visible. There is some archaeological evidence for the continuation of a cutting to the north, but apart from Tower Dock nothing can be seen on any of the views dating from the middle of the 16th century, and as a defensive feature the ditch must have had a relatively short life.

Post medieval (Figs. 7, 8, 9)

Internal development of the Bulwark (contexts [49],[50])

Sometime after the completion of the Bulwark defences, buildings were added to the interior. In 1606 the Lieutenant of the Tower and two principal officers of the works complained that the 'chief Bulwark on the west syde of the hill, to which all the Tower is subject ... is quite within a few years made of no use by buildings from one end to the other'. One of these buildings, represented by wall [49], was located at the southern end of the trench while the remainder of the building presumably extended beyond the limits of excavation. A brick wall, observed during a watching brief *c.*6m to the south of wall [49], could have formed the southern extent of the building. Wall [38] may have represented the western side of the building, but the relationship between walls [38] and [49] was truncated by a later feature.

To the north of the trench, an internal wall [50] was built against bastion wall [43]. The wall was observed in the eastern section only and may have formed part of a further internal building for which there is no other evidence.

Lean-to added to the exterior of the Bulwark (contexts [51]–[60])

The large cut feature [46], which may have been an external ditch of the Bulwark, contained sand and gravel [51] and [52] with which it had apparently been backfilled deliberately in view of the lack of waterlaid material in the upper part of the fill. This action may have been taken to level the ground prior to the construction of an external bulwark building represented by wall [53].

Wall [53] may form the northern wall of a

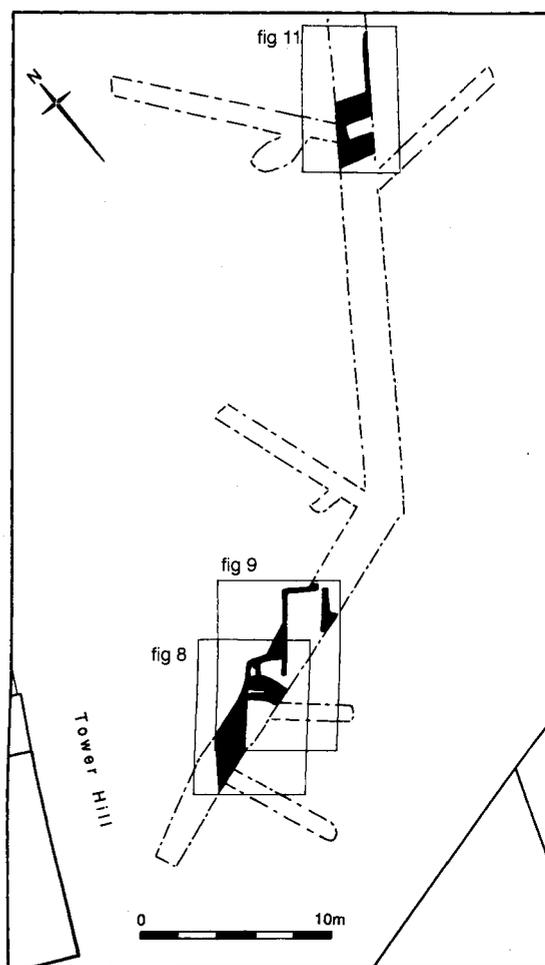


Fig 7. Location plan for Figs 8, 9, and 11

lean-to structure occupying an external corner of the Bulwark created by walls [42] and [45]. It was built of brick and was 0.50m wide, surviving to a height of 0.70m. Inside the building a mortar spread [54], interpreted as a floor, was laid over the backfill of ditch [46] and against wall [53]. A hearth [55] was sunk into the corner of the building against walls [42] and [45]. It was composed of bricks set within a clay base [56]. Occupation debris and hearth rake-out [57] accumulated against the front of the hearth and over the mortar surface. Iron smithing slag was found within the hearth rake-out, suggesting that the building was used as a smithy. Forty-one sherds of pottery were recovered from the floor and hearth rake-out, and have been dated to *c.*1480–1550 (Fig 16, Nos 7, 8). A pinner's bone

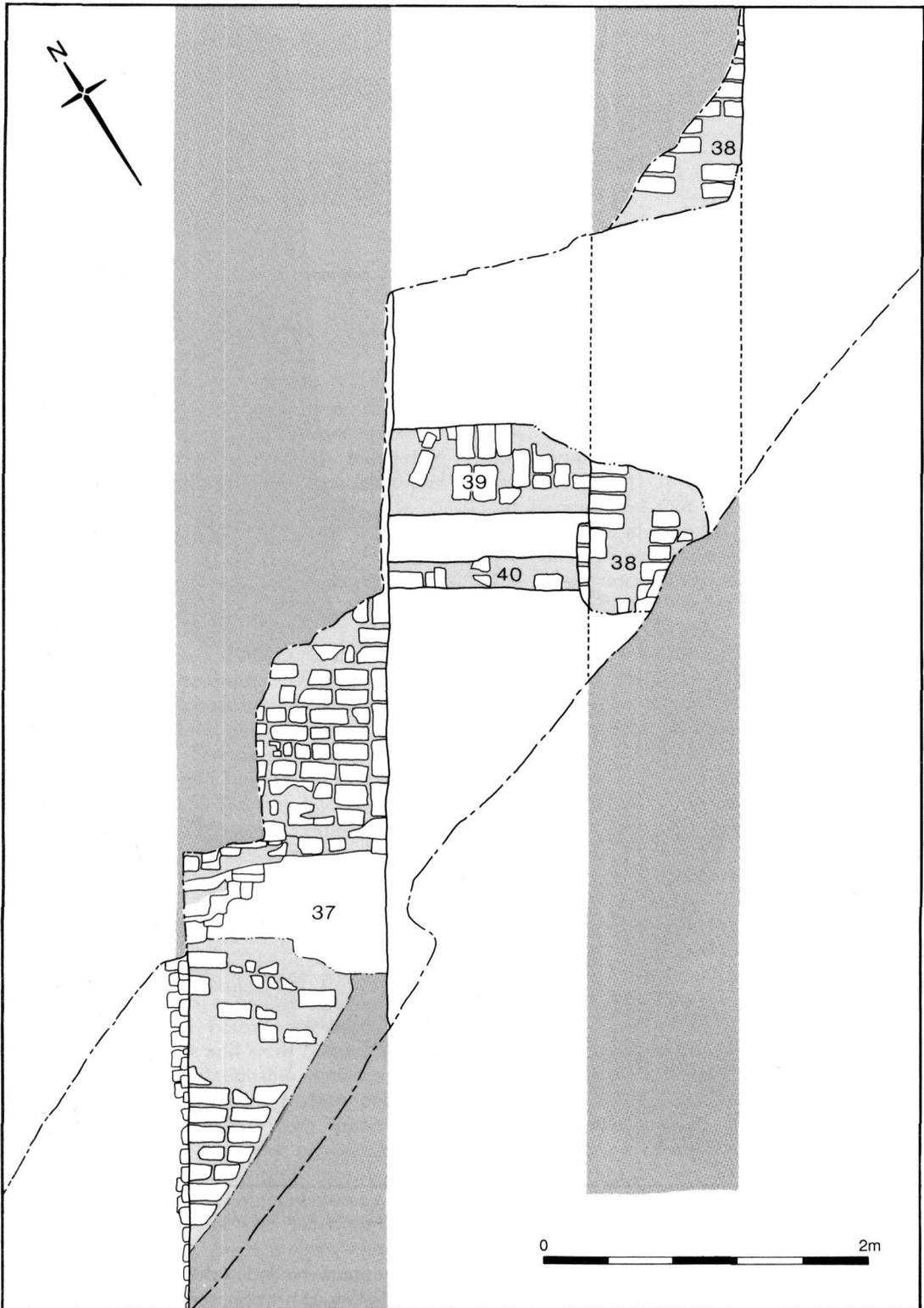


Fig 8. Bulwark walls at south end of trench. Dark tone shows projected walls and light tone shows mortar

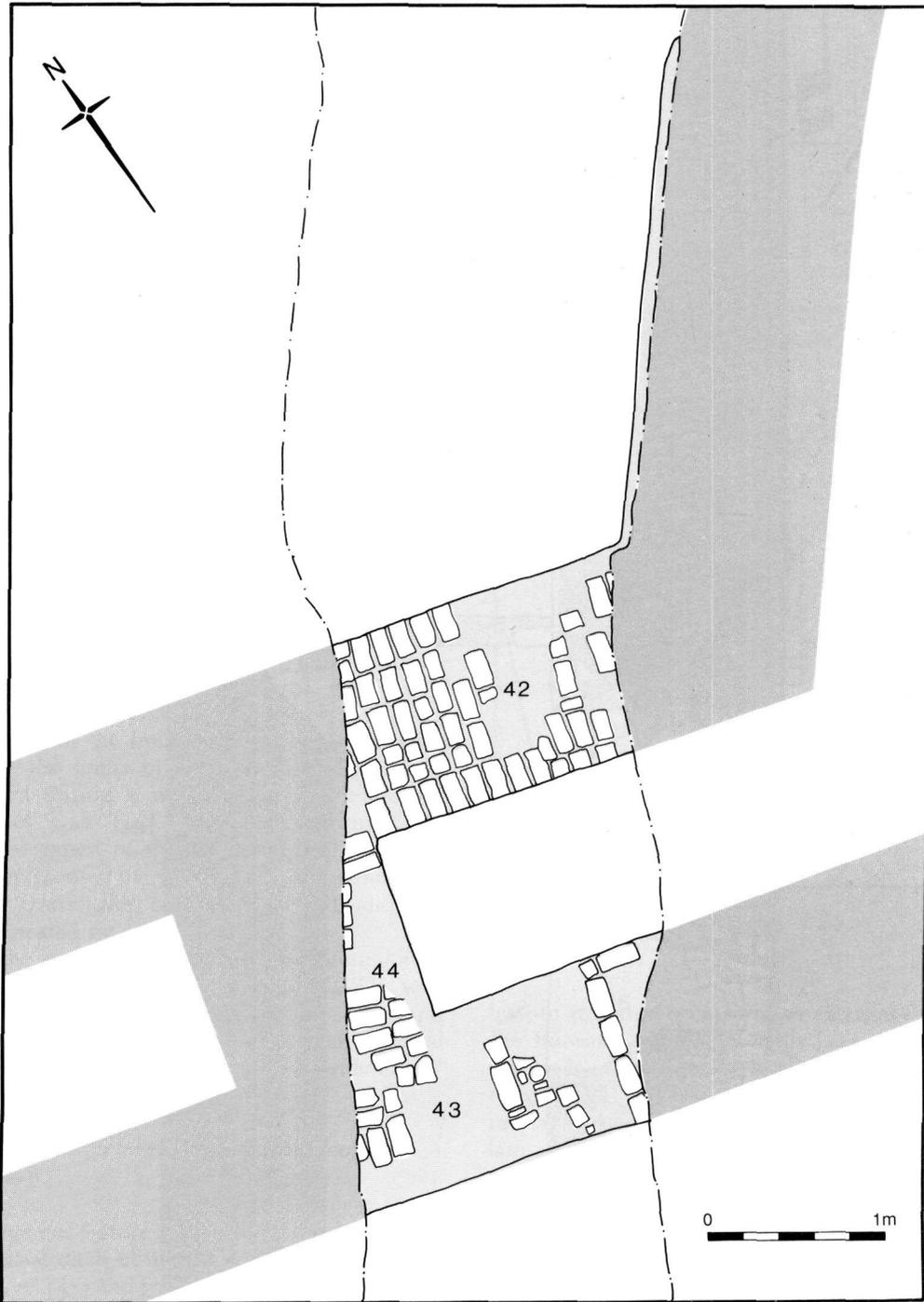


Fig 9. Bulwark walls at north end of trench. Dark tone shows projected walls and light tone shows mortar

(Fig 21, No. 24) and fragments of iron were also found within the building.

Two stake holes [58] and [59] were seen to

cut the southern end of the hearth [55], fracturing the bricks and possibly serving as foundations for a superstructure, perhaps a brazier. Hearth [55]

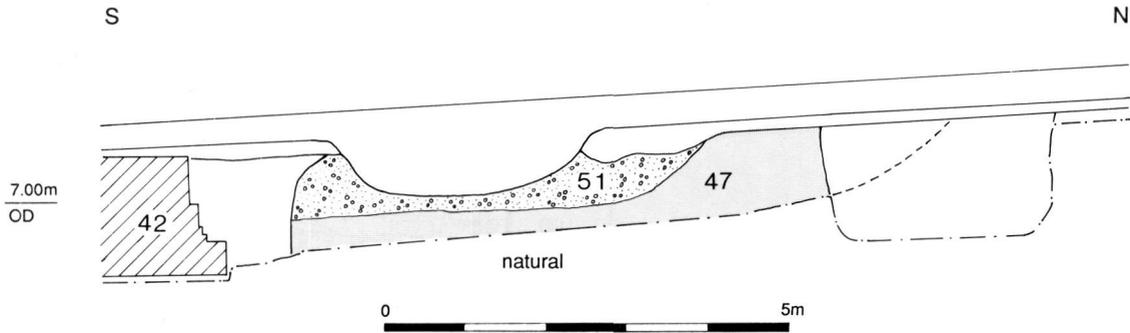


Fig 10. Section B

continued in use and a layer of burnt material [60] containing iron smithing slag accumulated over it and stake holes [58] and [59], indicating that the hearth remained in use even after the superstructure was dismantled.

Addition of a cellar to the internal building (contexts [61]–[70])

A half cellar was added to the building erected against the inside of the Bulwark and represented by wall [49]. The construction required the lowering of the floor level and the dismantling of a section of wall [38]. The alteration exposed the foundations to walls [38], [39] and [41], and also the construction backfill for the outer defensive Bulwark wall [37]. The newly exposed foundations were refaced with a single thickness of bricks; wall [38] was refaced with facing [61], walls [38] and [39] with [62], wall [41] with [63] and the construction backfill for wall [37] with [64].

Away from the Bulwark defensive walls, two new walls [65] and [66] were added to form the northern and eastern boundaries respectively. Both were trench built and were bonded to one another, though the relationship between walls [65] and [49] was destroyed by a later cut [91]. Wall [65] contained a niche with timber [67] placed at the bottom, its upper surface 200mm above floor [68]. Located centrally on this upper surface was a shallow circular depression *c.* 140mm in diameter, which could have acted as a base plate for a door pivot. Such a pivot may have been related to two holes located on the inner face of wall [49] which were 100mm × 80mm and 170mm × 120mm in size and may have

received timbers belonging to a stairway leading down into the cellar. The cellar was then given brick floors [68] and [69] which respected the refacing.

It is presumed that the area to the south of wall [40] was also given a cellar at about this time, for its floor [70] was at a similar OD height to that of floors [68] and [69], though not certainly part of the cellar represented by them. Little more is known about this cellared area as it extended beyond the limit of excavation. Many bone-working fragments were found on floor [70] and within demolition rubble [78], suggesting that the area was used as a bone workshop. The fragments included waste material and partly finished combs and knife handles, the latter dated to the 17th century.

Alterations to the cellar (contexts [71], [72])

A small internal wall [71], 240mm wide (one brick length), was added to the south end of wall [38], cutting the refacing [61] and [63] (see Fig 11). It partly filled the gap cut earlier in wall [38] but stopped *c.* 0.70m short of the southern side, creating an entrance to the area defined by walls [71], [64], [39] and [41]. The relationship between wall [71] and floor [68] was destroyed. Wall [71] had a small niche [72] cut into its western face, *ie* facing the interior of the small area (see Fig 13). The niche was positioned in the centre of wall [71], 0.65m above floor level, and is presumed to have held a candle or lamp, as soot was found on its ceiling. The use of the area defined by walls [71], [64], [39], and [41] is unknown but a large quantity of slag was found on floor [68]. The slag had collected on



Fig 11. Plan showing walls and floors of the building attached to the inside of the Bulwark wall. Dark tone shows mortar in the walls and light tone shows mortar in the floor. The stippled area shows the earlier phase of the Bulwark defensive walls

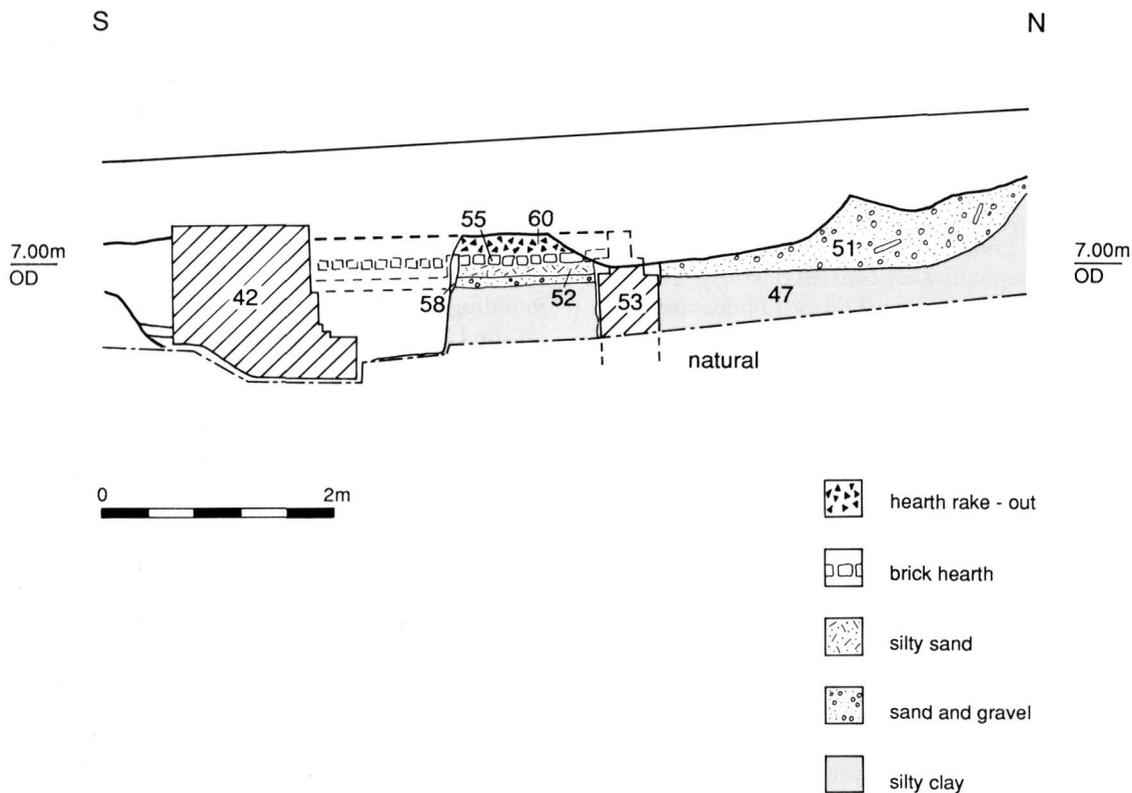


Fig 12. Section C

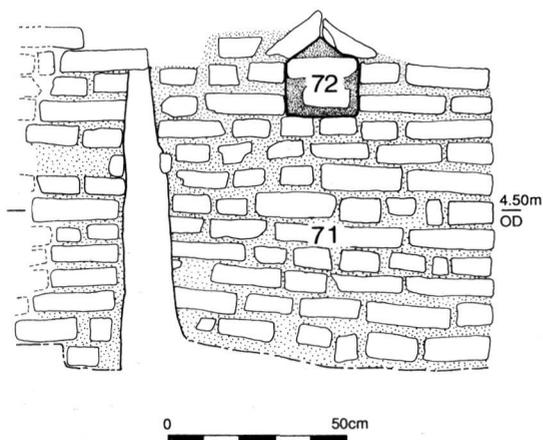


Fig 13. Wall 71 containing niche 72

the bottom of a hearth and suggests smithing. It may be that the space between the parallel defensive walls and cross-walls provided a makeshift chimney, in which case the parapet walkway

(if it had ever existed) was no longer in use. The presence of the iron slag and the nature of the ivory waste within the cellar suggest that complete knives were being produced.

The remains of a return, indicated by a single brick, ran eastwards from the southern end of the eastern face of wall [71].

Cellar repaired after damage by fire (contexts [73]–[75])

The cellar may have been damaged by fire after the construction of wall [71], which exhibited signs of scorching on its eastern face. A burnt layer [73] on cellar floor [69] was directly overlaid by floor [74]. Floor [74] was interrupted by an east-west linear feature [75], c.0.10m wide and c.0.10m deep, which ran the whole length of the floor. It was interpreted as a sill beam for a light internal partition (see Fig 11).

Great Fire demolition (contexts [77], [78])

The building at the south end of the trench was demolished and collapsed into its cellar. The demolition took place from within the Bulwark leaving the defensive walls still standing. There is ample evidence that the demolition took place in 1666 to create a 'fire break' protecting the Tower of London (PRO WO51/7 ff 158, 169; WO55/322p 46; *Cal Treas Bills 1667p* 161; *Cal SP Dom 1666-7p* 582). The demolition material, [77] and [78], consisted of building rubble, loosely compacted and containing bricks, mortar and tile fragments and one fragment of diamond paned window glass set in lead was found within the rubble. Also present in this dump was a quantity of ivory waste, both offcuts and unfinished artefacts (Fig 20, Nos 1-12; Fig 21, Nos 17-20, 23; Fig 25, No. 26).

Although areas of burnt material were found, their localised nature suggests that the building was pulled down rather than destroyed by fire. No demolition material was found in the area of the Bulwark gate and although the internal wall [50] was dismantled or robbed, it is not known if this formed part of the demolition process. The demolition layers produced a total of 72 sherds dating mainly to the second half of the 17th century, which accords with the documentary evidence.

Post-Fire reorganisation of Tower Hill

North of the Bulwark there is an apparent three or four hundred year break in the archaeological sequence between the 13th-century hillwash and

the late 17th-century cut feature [79] (see Fig 14). This discontinuity probably results from site clearance or relandscaping after the Great Fire of 1666, as is borne out by cartographic and documentary evidence. In contrast with Faithorne and Newcourt's map of 1658, which shows buildings clustered around the northern Bulwark gate and Tower moat, Hollar's engraving of Leake's map of London after the Fire (1667) shows the same area to have been cleared of buildings. After the Great Fire a royal warrant to the Ordnance Office referred to 'planeing and levelling the Place called the Bulwark' (WO55/426 entry 129), which, as excavation revealed, included the stripping of 14th, 15th and 16th-century deposits in the area. To the south of the Bulwark, however, buildings remained standing but in a state of disrepair. The scene is vividly illustrated in Johannas Spilberg's painting of 1689 (see cover picture), housed today in the Queen's House at the Tower.

After Tower Hill was refashioned, a large feature [79] was cut into the new ground surface (see Fig 14). Its eastern and western sides extended beyond the limit of excavation. The width from north to south was 7.0m, and the northern and southern sides were near vertical but slightly concave. The feature was excavated to a depth of 1.0m as far as invert level, and was filled with silts and clays and silty sands containing many fragments of tile, brick, charcoal, mortar, oyster shell and animal bone. The lower fill may represent *in situ* silting but the upper fills appear to have been dumped. Clay pipes retrieved from the fills date to between 1660 and 1680, and 16th and 17th-century sherds retrieved from fills [80] and [81] included fragments of a

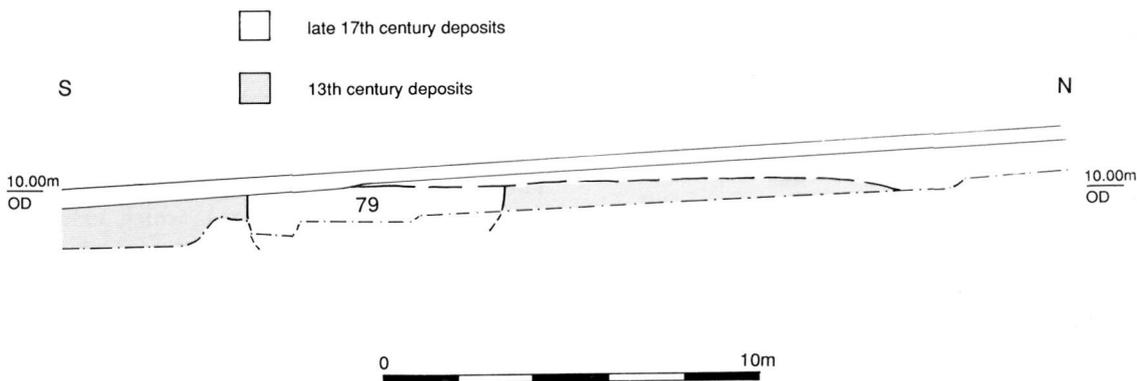


Fig 14. Section D

North Italian marbled slipware bowl and a rare Frechen stoneware chamber pot.

Although feature [79] post-dated the re-landscaping, it may represent an initial attempt to dispose of debris from the demolition of buildings surrounding the Tower moat, if not to create a fire break during the Fire then as part of the subsequent reconstruction. The latter hypothesis seems more likely as Hollar's version of John Leake's map of post-Fire London shows the buildings surrounding the landward sides of the Tower moat to have been removed.

A series of building rubble layers composed of brick, tile, stone and mortar fragments in a matrix of sandy clay [82]–[87] was dumped over the new ground surface. Some of the deposits also contained oyster shells, burnt daub and fragments of charcoal and coal. The dumping was 0.75m deep before being truncated from above by modern road make-up. A cobbled surface [82] may represent part of the original construction, but the limited extent of the feature made interpretation difficult. Overlying the cobbles was a layer of ash [83] and cinders [84], but the extent of this material was so limited that interpretation is again difficult. The general lack of burnt material within these building rubble layers, however, suggests that they were deposited later than the Fire.

Pottery and clay pipes dating to the 17th century were recovered from the rubble dumps, including two sherds of Chinese porcelain and a fragment of a chafing dish from Saintonge; a few fragments of ivory waste were also found (Fig 20, Nos 9, 13).

Modern road make-up truncated all 18th and 19th-century deposits which would have overlain the post 'Great Fire' rubble dumps and neglected Bulwark walls, including the ground surface from which several pits were cut into the underlying deposits. All the pits contained brick rubble and are interpreted as rubbish pits. Many sherds belonging to distillation vessels were found in rubbish pit [88], which may indicate the close proximity of industrial activity (Fig 17, No. 18). Two ivory combs (Fig 21, Nos 21, 22) and fragments of tin-glazed tile (Fig 18, Nos 1, 5–7, 9, 10) were also found in the pit.

Opposite Gloucester Court a late brick vault [89] of unknown function was trench-built into the underlying natural sands and gravels. Further south, pit [90] was cut through the hearth rake-out on the floor of the lean-to represented by wall [53]. Its southern and eastern sides were

formed by walls [42] and [45] respectively, and it cut part of the foundation to wall [42]. Three straight sides were observed before the cut passed beyond the western limit of excavation. The pit measured 1.0m wide and 2.0m long with near vertical sides terminating abruptly in a flat bottom lined with cobbles. The remains of two timbers were set into the cobbles; one, a plank, lay within a gap in the cobbles, and the other, a stake, was set vertically through them. The cut was filled with thick clay which may have acted as a 'plug' over which rubble was dumped. The function of the feature is unknown. The finds include a few fragments of distillation vessel.

The watching brief

A watching brief was maintained during the excavation by the contractor of several small feeder drains which extended eastward and westward from the main drainage trench.

As little time was available for this work, the drain cuts were planned and photographed. Owing to the shallowness of the cuts (between 0.30m and 0.50m below modern ground surface) little further archaeological evidence was obtained apart from the plotting of the extent of the brickwork in plan. It is possible that these excavations did not always penetrate as deep as the Bulwark, but the watching brief nevertheless contributed to its hypothetical reconstruction (see below).

Conjectural reconstruction of the Bulwark (Fig 15)

Information from the excavation, combined with documentary evidence, enables a tentative plan of the Bulwark to be made.

This can be done by relating the excavated Bulwark walls to surviving features such as the Middle Tower and the eastern side of the Lion Gate Causeway. The western Bulwark wall aligns with the western side of the access way to the Tower Pier, which is thought to have occupied the area of the quay or inlet at the western end of Tower Quay and formed the western limit of the c.1480 Bulwark. Documentary evidence provides a rough outline of the Bulwark which can then be compared with the archaeological and extant remains.

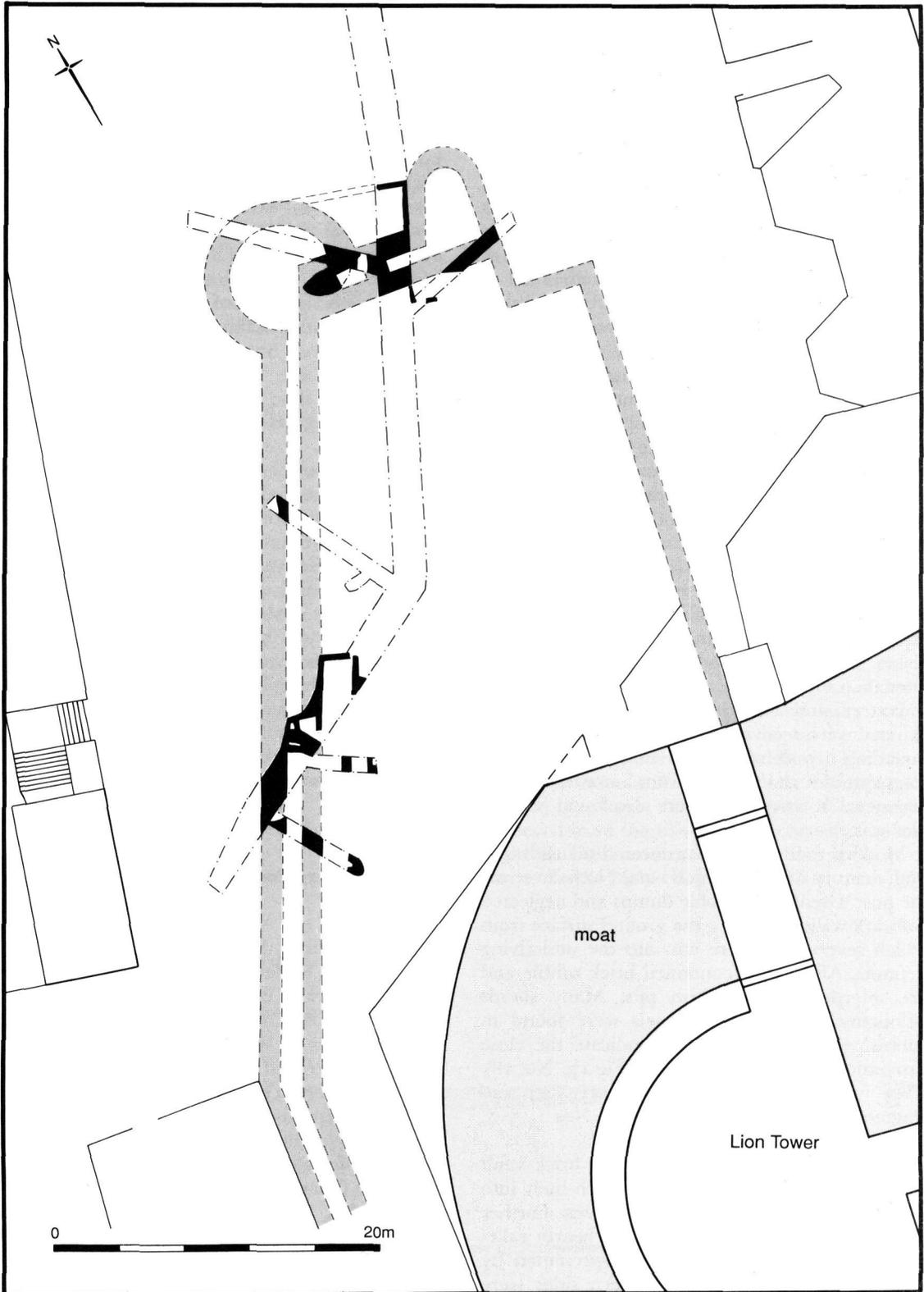


Fig 15. Reconstruction of the Bulwark with the dark tone showing the projected walls

As can be seen from the reconstruction plan (Fig 15), the archaeological evidence suggests a double defensive wall. Only the western side of the Bulwark is thought to have been built in this way however, for though the eastern side was not located by the excavation trench a double defensive wall in that position would probably have restricted access to the Lion Gate.

To the north of the Bulwark, in the area of the gate, it is possible that there were two bastions, as documentary evidence would indicate. Part of what is thought to be the eastern bastion was located by the excavation (wall [45]), while part of the western one may have been revealed during the watching brief. The disposition of the walls suggests that the western bastion was circular, and the eastern horseshoe-shaped. At a later date the northern extremities of the bastions were joined by a small brick wall [53]. This is supported by a late 17th-century plan embodying proposals for the refortification of the Tower (Parnell 1985b, 79).

No attempt has been made to reconstruct the internal Bulwark building since none of the walls attributed to this feature was sufficiently detailed.

THE FINDS REPORTS

The Roman pottery

Helen Rees

The 83 sherds of Roman pottery (2.193kg) were recorded by fabric, form and context on pottery record sheets, using the standard pottery fabric codes current in 1987. This data, together with an analysis of the material according to the original excavation trenches, forms the pottery archive, which is held, together with the finds, by the Museum of London. The distribution of the different wares in each phase is presented in Table 1, while the total sherds/weights in the different stratigraphic groups is shown in Table 2. This small scatter of Roman material is in keeping with the location of the site, which is peripheral to zones of more intensive occupation within the City and in the area now occupied by the Tower of London (Parnell 1985a, 7–22). The assemblage is thus best considered in the wider context of general Roman settlement in this particular part of the City of London. This small sample includes most of the types common in London from the 1st to the 4th centuries (see *eg*

Cameron 1985, 55–60; Green 1980; Marsh & Tyers 1978; Richardson 1986), but contains no material positively diagnostic of the 1st, rather than the 2nd, century.

Phase 2. Roman features

Two small assemblages (14 sherds, 651g) were recovered from a truncated pit [4] cut into the natural subsoil and sealed by the modern road surface, which contained material not earlier than *c.*AD 120; the small size of the sample, however, means there is insufficient evidence for certainty in dating. This group also includes a single sherd of uncertain but probably earlier Roman date (Fig 16, No. 1). This is from a jar with slight shoulder and long neck, the zone below the shoulder bearing a row of crudely impressed dots and rilling, the neck being burnished. The ware is handmade but hard-fired, rough in fracture and to the touch, with greyish brown surfaces and grey core and margins. Visible in fresh fracture are moderately frequent elongated voids of all sizes up to *c.*4mm, some with calcareous(?) traces adhering to their edges. The fabric is slightly sandy in texture, but few individual quartz grains are visible; it has a porridgy appearance, suggesting the presence of clay pellets. It is moderately micaceous. This type has not yet been recognised elsewhere in the City of London (B. Richardson, pers comm) but the fabric, form and surface treatment (burnished and rilled with stabbed decoration) is reminiscent of earlier Roman material from Canterbury (L. Blackmore pers comm; see *eg* Frere and Stow 1983, 199 No. 48).

Residual Roman pottery

Redeposited material, including pottery of both earlier and later Roman date, was confined to the northern part of the site; the absence of Roman material in the southern part of the site, however, may reflect post-Roman truncation. The distribution of sherds is shown in Table 1.

The medieval and later pottery

Lyn Blackmore

The post-Roman pottery was recorded as described above; the distribution of the stratified

Table 1. Summary of Roman pottery fabrics by sherd count and weight in grammes. For references to individual fabrics see eg Cameron 1985; Green 1980; Marsh & Tyers 1978 and Richardson 1986

Code	Fabric	Roman contexts		Residual	
		Sherds	Weight	Sherds	Weight
AHSU	Alice Holt Surrey	—	—	1	20
AMPH	Misc. amphorae	—	—	4	128
BB2	Black Burnished 2	2	48	3	63
C306	Camulodunum type 306	—	—	1	14
DR20	Dressel 20 amphorae	3	304	5	566
HWC	Highgate Wood	—	—	3	29
KOAN	Dressel 2–4 amphora	—	—	1	89
LOMI	Local mica-dusted	1	18	—	—
NVCC	Nene Valley colour-coated	—	—	3	16
OXID	Misc. oxidised	1	58	6	27
OXMO	Oxfordshire white mortarium	—	—	2	119
OXPA	Oxfordshire parchment	—	—	1	27
OXRC	Oxfordshire red-slipped	—	—	1	3
PE47	Pelichet 47 amphorae	2	157	2	34
RWS	Red and white slipped wares	—	—	2	20
SAM	Samian	1	1	10	81
SAND	Misc. sandy wares	4	65	17	210
SHEL	Shell-tempered	—	—	2	57
TSK	Thames-side Kentish greyware	—	—	1	2
VRW	Verulamium Region white	—	—	4	37
Totals		14	651	69	1,542

material (266 sherds, 16.71kg) is illustrated in Table 2, which includes the total sherd weights per stratigraphic unit. The assemblage mainly dates to the 17th/18th century, with a smaller group of 12th/13th-century date. The dating of the post-medieval pottery suggests that re-landscaping started, and was completed, shortly after the demolition of the Bulwark and associated structures. The nearest excavated assemblages are those from within the Tower itself (11th-century onwards), the Custom House (Thorn 1975: mainly 13th- to 15th-century), St Mary Graces/the Royal Mint (14th-century and later) and the Tower Postern (mainly 15th- to 17th-century); for a general survey see Blackmore 1994.

Early medieval

Development of soils ([8]–[12]: Fig 16, No. 2)

Most of the pottery was found in layer [8], which in addition to residual Roman material, produced a substantial fragment of an 11th/12th-century Early Surrey ware cooking pot (ESUR; base diameter c.300mm) and a rimsherd of Early Medieval Chalk-tempered ware (EMCH; No. 2). The latter (source unknown) has been found within the City, but is rare on sites outside the

walls, although a few sherds of chalk-tempered ware were found during excavations in 1974–75 at the Tower of London (Redknap 1983, 121). Layer [8] contained one small rim-sherd of Shelly-Sandy ware (SSW), which dates these deposits to c.1150–1200.

11th/12th-century building and rubbish pits ([13]–[27]: Fig 16, No. 3)

The pottery from this phase comprises mainly Roman material, but the demolition deposit [15] produced 55 sherds from an early medieval shell-tempered cooking pot (EMSH No. 3), while four pits [16, 17, 18, 19] together produced 18 sherds of 12th-century date. These include one small sherd in a fine buff fabric with a thin line of red paint and a splashed yellow glaze, possibly imported Andenne-type ware. A small sherd of Andenne ware (ANDE) was also found during the excavations of 1955–77 in the Inmost Ward Tower of London in the Phase X robber trench of the first Roman riverside wall, the infilling of which is dated by documentary evidence to c.1190–1220 and 1225–35 (Nelson 1985, 76). A further sherd of uncertain, but possibly early medieval, date was found in pit [20].

Table 2. Tower Hill. Distribution of the pottery in post-Roman deposits (by sherd count and weight)

Code	Fabric	Contexts									
		8-12	13-27	28-34	37-48	51-60	77-78	80	82-87	88-90	Total
LSS	Late Saxon shelly									1	1
SSW	Shelly-sandy ware	2		8							10
EMS	Early med. sandy	3	4	2					1	10	
ESUR	Early Surrey	13		1						14	
EMCH	Early med. chalky	1	4	1						6	
EMSH	Early med. shelly	55=1	2				1			4	
EMSS	Early med. sand + shell		8	1	2				1	12	
EMFL	Early med. flinty			1						1	
SHER	South Herts			18					2	20	
LOND	London-type ware			13		2				15	
MG	Mill Green fine								1	1	
KING	Kingston-type		2					2		4	
CBW	Coarse Border ware				4			2	1	7	
CHEA	Cheam white ware							2		2	
TUDG	Tudor Green								2	2	
TUDB	Tudor Brown					27		4	1	4	
CHEAR	Cheam Red			1						1	
GUYS	Guys ware					3		1	3	7	
PMR	Post-med. redware						35	6	1	20	
PMFR	Post-med. fine redware									14	
PMBL	Post-med. black-ware								1	2	
BORD	Fine border ware						18	8	26=2	20	
RBOR	Red Border ware									7	
TGW	Tin-glazed ware						7	11	1	46	
METS	Metropolitan slip-ware									3	
PMSL	Post-med. slipped ware									1	
STBU	Staff. butterpot						5			11	
LONS	London stoneware									2	
ANDE	Andenne ware		1							1	
LANG	Langerwehe					2		1		3	
RAER	Raeren					3			1	4	
SNTG	South Netherlands maiolica					2				2	
VALE	Valencian lustreware					5				5	
MEDM	Mediterranean maiolica									1	
DUTR	Dutch red-ware									1	
DUTSL	Dutch slip-ware					1				1	
FREC	Frechen stoneware						7	2	3	8	
NIMS	North Italian marbled							1		1	
NISG	North Italian sgraffito									1	
SPAN	?Spanish coarse ware							2=1		1	
SPOA	Spanish Amphora									1	
SAIN	Saintonge								1	1	
WEST	Westerwald								1	2	
CHPO	Chinese porcelain								1	1	
Total	MPOT/PPOT	20	19	47	7	45	72	43	13	157	266
sherds	RPOT	11	15	35				2		6	69
Weight	M/PPOT	1,427	321	1,174	132	1,319	3,359	1,111	487	7,376	16,706
in	RPOT	587	375	509				41		30	1,542
grammes	All	2,014	696	1,683	132	1,319	3,359	1,152	487	7,406	18,248

Medieval features

Hillwash and pits ([28]–[34]: Fig 16, Nos 4–6)

The dumped deposits [30] and [32] produced 50 sherds (1,252g), of which 43 derive from layer

[30]. Much of the material is residual, of Roman or early medieval date (No. 4), but the dump is dated to the mid 13th century by sherds in London-type ware (LOND; No. 5) and from Kingston (KING; No. 6, fine sandy pinkish buff fabric). The former possibly derives from the

pedestal base of a chafing dish with applied anthropomorphic or zoomorphic decoration; this is green-glazed both inside and out, with the glaze being chipped and worn around the base angle. This form is rare in the medieval period, although examples are known from London (Pearce & Jenner 1985, Fig 73) and Bergen, Norway (Blackmore & Vince 1994, 66–7; Fig 27, No. 72). No. 6 is probably from a baluster jug in the highly decorated/North French style, with a clear glaze and applied rouletted strips in green (Pearce & Vince 1988, Figs 50, 52). The South Herts wares (SHER) include sherds of cooking pot and a jug rim with oval-sectioned handle, possibly from Pinner.

Residual sherds include an unusual vessel in Shelly-Sandy ware with a raised footring (SSW: Fig 16, No. 4, ?cooking pot or curfew), and a thumbled rim sherd from an Early Surrey ware cooking pot similar to others found during excavations at the Jewel House within the Tower of London (Redknap 1983, Fig 21, Nos 29–32).

The fill of pit 33 contained mainly Roman pottery, but also a few sherds of 12th/13th-century date.

Late medieval

Construction of the Bulwark ([51]–[60])

Only seven sherds were recovered from the backfill of the construction trenches of the Bulwark; these include part of a horizontal handle in what appears to be Cheam redware (CHEAR), with traces of slip under a patchy clear glaze with a greenish tinge. If this identification is correct, the close dating of the context to c.1480 is of some interest, as it coincides exactly with the date proposed for the beginning of early post-medieval red-ware production at Cheam (Orton 1982, 76; 82–3) and elsewhere (Nelson 1981, 101). Wall-sided dishes would appear to have been an established form by the late 15th century, and may have been introduced at a slightly earlier date (Orton 1982, Fig 24). The fabric of the Tower Hill West sherd, which contains occasional flint grits, is slightly coarser than the usual Cheam red-ware, and perhaps represents the contemporary Tudor Brown ware, if it is not a Dutch import.

Post-medieval

Lean-to outside the Bulwark ([51]–[60]: Fig 16, Nos 7–8)

The pottery from layers associated with the construction and floor of the lean-to dates mainly to the period 1480–1550, with little residual material. Joining sherds were found in layers [52] and [54]. The main fabric is Tudor Brown (TUDB), including part of a bung-hole pitcher; imports include Langerwehe (LANG) and Raeren stoneware (RAER), Spanish lustre-ware from Valencia (VALE); the lustre now almost totally invisible (No. 7), and part of a South Netherlands maiolica flower vase (SNTG; No.8). Layer [60], which sealed the hearth, contained four sherds (48g), including one of a Low Countries cooking pot with slip decoration (DUTSL; cf Hurst *et al* 1986, fig 60, no. 191). These wares are somewhat unexpected in what would appear to have been a smithy, and their significance is uncertain. The lean-to structure, however, is only a short distance from the waterfront, where foreign ships were landing at the Custom House, Wool Key, and at Galley Key (Tatton-Brown 1974; 1975, 107–110; *ibid* 1975, 110–13). A range of imports of similar source and date has been found on sites in the Tower Hill area, some of which must represent *ad hoc* waste disposal by visiting merchants (Blackmore 1994; in preparation).

Great Fire demolition ([77]–[78]: Fig 16, Nos 9, 10)

The pottery from the demolition dumps comprises a typical range of late 16th and 17th-century wares: post-medieval red-wares (PMR, RBOR), including part of a bung-hole pitcher and a jug (No. 9); sherds from two Border ware pipkins (BORD); sherds from an oval Staffordshire butter-pot (STBU); tin-glazed wares, including (TGW; No. 10) and Frechen stoneware (FREC).

Post-Fire reorganisation ([80]–[90]: Fig 16, Nos 11, 12)

The pottery in this group contains a number of residual Roman and medieval sherds. Later sherds of interest include part of a North Italian marbled slipware bowl (NIMS), a handle, probably from a costrel, also possibly from Spain (SPAN; No. 11), and part of a Frechen stoneware

chamber pot (No. 12). No. 11 is in a hard fine fabric with frequent fine white flint grits up to 1mm. The firing varies from pink to grey, with a pale creamy slipped outer surface; an olive glaze covers the upper part of the handle. No. 12 is a rare form, even in the Rhineland, and although a few other examples have been found in London, they are very unusual; a complete example has been found at Linacre Gardens in the Cathedral precincts at Canterbury (Canterbury Archaeological Trust: unpublished). Tin-glazed wares include both blue and white and polychrome designs. Layer [81] also contained two sherds of distillation vessel (see below) and two crucible fragments.

Rubble layers ([82]–[87])

The pottery from these deposits is very similar to that from the re-landscaping deposits, but includes no residual material. Imports include one sherd of Westerwald stoneware (WEST), and one from a bichrome (yellow and green) chafing dish from the Saintonge (SAIN). Examples of the latter have been found in the vicinity of this site, at the Tower of London (Nelson 1983, Fig 7, No. 1), at the Tower Postern (Blackmore in preparation) and at the Royal Mint site (Blackmore in preparation). Two sherds of post-medieval blackware (PMBL) and two of Chinese porcelain (CHPO) were also found, the latter dating this group to after 1650.

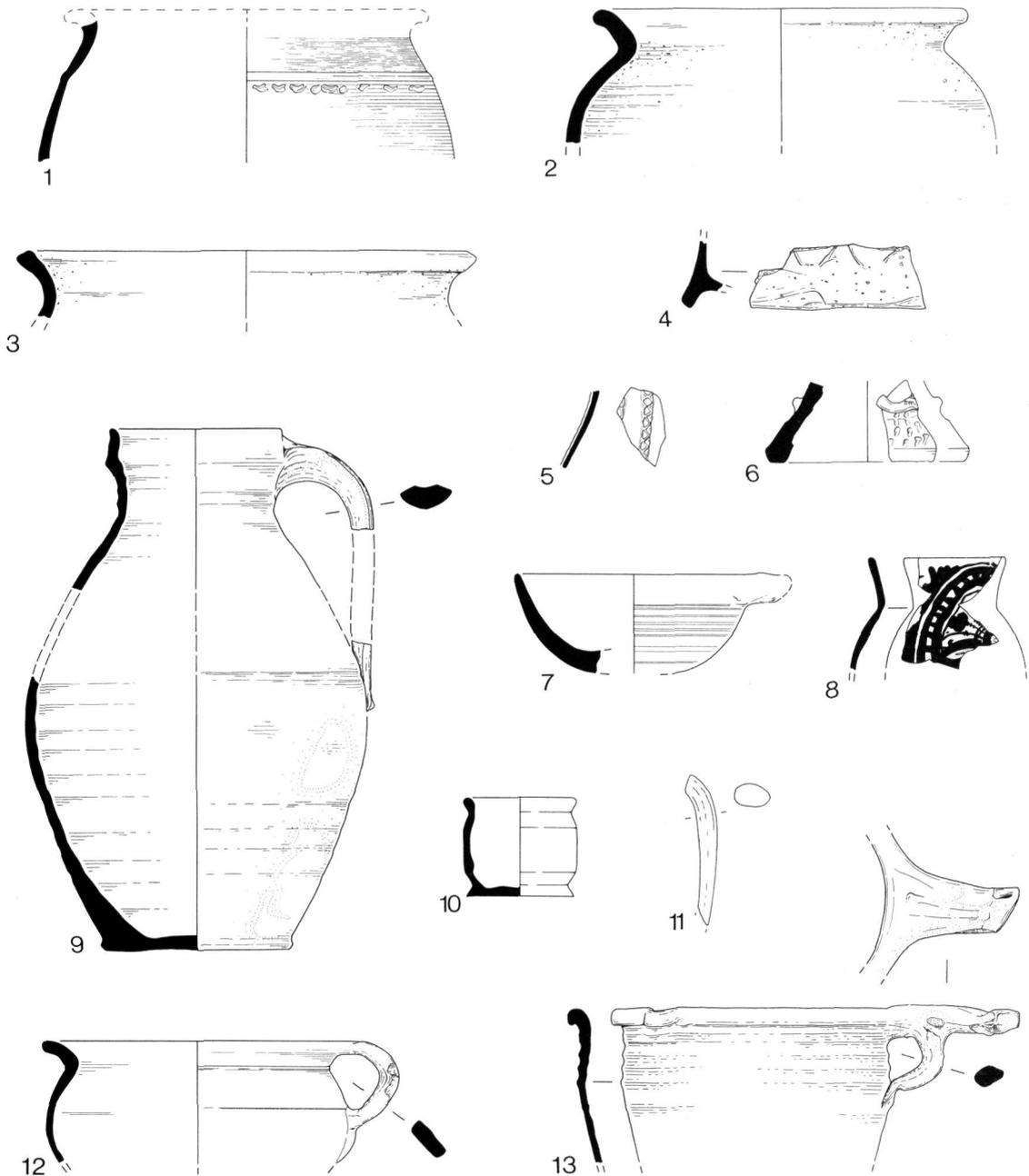
Activity outside the Bulwark ([88]–[90]: Fig 16, No. 13; Fig 17, Nos 14–18)

The pottery from the remaining contexts is discussed as one group by fabric/period, dated to after 1666. The largest amount of pottery in one context was found in pit 88, which contained an extensive dump of bottle-shaped distillation vessels (cucurbits: see below) together with PMR, BORD, TGW and FREC. The dating and origin of the distillation vessels is problematic, but they would appear to be of late 16th or 17th-century date (pre-1666). If they represent earlier activity in the area of the Bulwark, then this is most likely to have been in the external lean-to, where evidence of smithing was found, and where a few fragments from distillation vessels were found.

However, scientific analysis shows that the vessels were probably used in the parting of precious metals, and it is equally possible that the vessels were used in the mint within the Tower and discarded in the mid 17th century when new metal-working techniques were introduced, or during later refurbishments (Dyer 1988); similar vessels are known from Legges Mount, which lies at the north-west corner of the Tower, on the other side of the moat from pit [88]. The Hayward and Gascoigne map of 1597 (Fig 5) shows that this pit was probably located on the nearest available open land outside the 17th-century gateway into the area enclosed by the Bulwark. The metalworking ceramics from Tower Hill and elsewhere in London will be considered more fully elsewhere (Blackmore & Pearce in preparation).

Local pottery mainly comprises fine red-wares and white 'Border' wares. The former include part of a large 'Guy's' ware bowl (from layer [93]), and possibly part of a plant-holder. The Border wares include a saucepan with an unusual handle (No. 13), dated to 1650–1700 (Pearce 1992, 21). Tin-glazed wares include probable London dishes with Wan Li-style borders copying Chinese porcelain (Fig 17, Nos 15–17) dated to c.1650–1700. Of the imported wares, the polychrome dish No. 14, in a creamy-pink fabric with a footring, is most unusual, the geometric pattern in black, green and yellow apparently copying a Montelupo design. This is almost certainly an import, but it is difficult to assign a precise source, and the vessel is therefore classified with the group TGW in Table 2.

Other Mediterranean wares include two small 17th-century rimsherds from Pisa, North Italy. The first is from a marbled slip-ware bowl, the second one from a 'Graffita tarda' dish in a hard red fabric with a decoration of concentric rings incised through a white slip (NISG; Hurst *et al* 31). Other wares include part of a Mediterranean Maiolica jar from Italy or Spain (MEDM), glazed both internally and externally, and a strap handle from a Spanish amphora with patchy yellow glaze (SPOA). Finally, there are a few sherds of German stoneware and a late 15th or 16th-century dripping dish from the Low Countries, with typical pulled and folded straight handle and pinched feet (DUTR; cf Hurst *et al* 1986, 136; fig 61, no. 201). All these add to the picture of continuing mercantile activity along the waterfront in the post-medieval period.



0 100mm

Fig 16. The Pottery. No. 1: Roman; Nos 2-6: Medieval; Nos 7-14: Post-Medieval. Scale 1/4



Fig 17. The Pottery. Nos 14-17: Post-medieval; No. 18: Distillation vessel (composite profile). Scale 1/4

Catalogue of the illustrated medieval and later pottery

No.	Fabric	Context	Sherd	Comments/parallels
Fig 16				
1.	OXID?	4	1	Rilled, stabbed, ?Kentish <i>cf</i> Frere & Stow 1983, 199, No. 48
2.	EMCH	8	1	
3.	EMSH	81	55=1	
4.	SSW?	30	1	
5.	LOND	32	1	Green glaze, worn around base
6.	KING	32	2=1	<i>cf</i> Pearce <i>et al</i> (1988) Fig 50
7.	VALE	52	4=1	<i>cf</i> Hurst <i>et al</i> (1986) Fig 22
8.	SNTG	52	2=1	<i>cf</i> Hurst <i>et al</i> (1986) Fig 54, 1
9.	PMR	76	71=1	
10.	TGW	77	5=1	White glaze, drug jar
11.	SPAN	80	2=1	Olive glaze, jug or costrel
12.	FREC	80	1	Chamber pot
13.	BORD	90	6=1	Saucepan, clear/yellow glaze <i>(cf</i> Pearce 1992, Fig 9; Fig 30, No. 185)
Fig 17				
14.	TGW	88	5=1	?Italian or Spanish
15.	TGW	90	1	Anglo-Dutch
16.	TGW	88	4=1	London
17.	TGW	90	3=1	London
18.	RBOR	88		Distillation vessel

The distillation vessels*Richard Sewart*

The distillation vessels, which comprise by far the largest group of vessels in a single fabric, consist entirely of bottle-shaped vessels (cucurbits); no alembics or other associated forms such as dishes or crucibles were found, except for a single bone ash cupel (unstratified). The great majority were found, together with a small amount of other pottery (see above), in a single rubbish pit postdating the Bulwark phase of the site ([88], phase 7). The total rim and base EVEs (Orton) counts are 31.92 and 26.63 respectively, calculated from a total of 75 rim and 183 base sherds. A mean estimate of 30 whole vessels is therefore suggested for this sample, which weighs *c.*38 kg.

Approximately one-third of the feature was excavated, the remainder lying beyond the limit of the excavations. Assuming that it was fairly regular in plan, the quantity of pottery retrieved may approximate to a similar proportion of the total originally present. This means a possible dump of *c.*100 vessels, with a total weight of 115kg, which must represent a workshop of some size. A few sherds were also found in another rubbish pit and in a cesspit, both of which

postdate the Bulwark ([90] and [94]). A smaller group of similar vessels and associated forms is known from Legges Mount, in the Tower of London (Bayley 1992, 7; Fig 9).

Throughout the group from pit [88] the vessel forms were found to be fairly standard so that, although it was not possible to reconstruct a profile from adjoining sherds, a composite profile has been produced, using average rim and base diameters and 'overlapping' sherds from different vessels (Fig 17, No. 18). The height of the profile is therefore less reliable than the diameters. At 330mm it is slightly shorter than a similar whole 'bottle' of 360mm. The range of rim diameters is 52–58mm, giving an average of 55mm; the range of base diameters is 140–160mm, giving an average of 150mm. These figures were obtained using samples of 1,000% rim and base EVEs (10 of the 17 complete rims were irregular in shape, largely due to the knife-trimming of the underside and base angle). For this reason, no sherd of less than 20% EVEs was used in estimating the base diameter. Unlike the Legges Mount finds, which are larger and of composite manufacture with the neck luted on to the body (Bayley 1992, fig 9), the bulwark finds are made in one piece. They have obvious wheelmarks inside and ridges and grooves on the outside, presumably the result of twisting under heavy

pressure during throwing; the surfaces of the body are generally smoothed. The bases of some of the vessels show signs of blister action during use, probably the result of exposure to heat or chemical action, or both, during use. The estimated capacity of a typical vessel, based upon the hypothetical profile, is 3.8 litres.

The fabric, identified as Red Border ware, can be divided into two categories, poorly defined by superficial examination. Approximately two thirds of the sherds are in a hard, slightly soapy, buff-coloured fabric, while one third are in a harder, more highly fired, rough fabric which is either orange or grey in colour. Most of the sherds in the latter fabric have a grey core, orange margins, and grey or orange surfaces, reduced and oxidised colour combination varying within and between vessels. Both fabrics contain a moderate-to-abundant frequency of very fine mica, and sparse, ill-sorted, medium-to-coarse sub-round ironstone inclusions. Occasional voids in the fabric are due to poor preparation of the clay, to inclusion-loss during or after firing, or to heat exposure and chemical action during the industrial process. The inconsistent colouration of the harder fabric may also be due to conditions of use.

In addition to the Tower Hill finds, a cluster of sites with similar industrial and assaying ceramics is known in the Cheapside area, while scattered finds have been reported from other sites in London (Moorhouse 1972). The significance of the Tower Hill finds is briefly considered in the pottery report and below, and will be discussed more fully elsewhere (Blackmore in preparation).

Analysis of the distillation vessels

Michael Heyworth

The deposits on the insides of the distillation vessels were analysed by X-ray fluorescence, and iron and calcium were the main elements detected. The dark red deposit is likely, therefore, to be haematite, an iron sesquioxide. One vessel base fragment had a yellow deposit on the broken edge which was found to be sulphur.

These results indicate that the vessels were probably used for the distillation of ferrous sulphate to give sulphuric acid, as haematite is a by-product of this process. The technique is mentioned in documents written by medieval

alchemists who described ferrous sulphate as 'green vitriol' (Greenaway 1972, 79–81; 84–6). Sulphuric acid had no direct uses, so it was usually distilled with sodium or potassium nitrate to give nitric acid. This acid was used for the parting of precious metals, as it had the effect of dissolving silver but not gold. In the 16th century nitric acid was produced on an almost industrial scale. The fragments of distillation vessels found at Tower Hill therefore suggest the production of sulphuric, and probably nitric, acid for use in the parting of precious metals.

The distillation process was undertaken using two vessels; the ferrous sulphate was heated in a lower vessel, which was known as the cucurbit, and the sulphuric acid vapour was condensed in an upper vessel called an alembic which had a domed head and a spout. The alembics were often made of glass which would not have survived as well as the ceramic cucurbits (Greenaway 1972, 81–4; Moorhouse 1972).

The building material

Susan Degnan

Three main periods and types of material are represented: Roman material (residual), 15th-century bricks and 17th-century tile.

Roman

The Roman tile comprised broken and abraded fragments of *tegula*, *imbrex* and brick in the common London red sandy fabric (MoLAS type 2815).

Only one fragment of *imbrex* was in a stratified context [4]. A single piece of box flue tile (fabric 2815) was also found, on which a comb had been used to score a diagonal cross. Five residual Roman *tesserae* were found in three Phase 4 deposits; these vary in size from approximately 20mm × 20mm to 30mm × 22mm square, and from 15mm to 20mm thick.

Medieval brick and tile

The brick samples retained from the 1480 Bulwark vary in size slightly (c. 8½" (220mm) long × 4¼–4½" (103–112mm) wide × 2¼" (53mm) thick). They are in reddish-orange, soft, sandy

fabric, typical of the local brickearth. This is consistent with their late 15th-century date.

Section B produced a couple of fragments of flanged medieval roof tile (in fabric 2273).

17th century (Fig 18)

The 17th-century material consists mainly of pegtile and pantile; the latter (not used in London before the Great Fire), was present in pit [88], wall [39] and in pit [79] (fill [80]). A small Flemish brick measuring 165mm × 85mm × 38mm was found in the upper fill of pit [88]. Two fragments of plain glazed floor tile were found, a green one from the lower fill of [88] and a yellow one from pit [90]. In addition there were several fragments of polychrome and Delftware tile.

The polychrome tiles comprise four fragments. One has a floral design showing a rose and rose hips (No.1, [88], upper fill). Another has a medallion design with a central motif of a man, possibly on horseback (No.2; unstratified). Tiles of this type are known to have been produced both in Holland (van Lemmen 1986, 10) and in Southwark in the early 17th century. Although no precise parallel for No. 2 is known, similar tiles are held in the Museum of London collections (Britton 1987, 1723); further examples

have been found in excavations at Rectory Grove, Lambeth (see also Noël-Hume 1977, 55). The closest parallel for the fleur-de-lis corner motif on Nos 3, 4 (layer [76], the fill of the cut for sillbeam [75]; unstratified) is also on a Dutch tile dated to c.1640, although this is in blue and white, not polychrome (van Lemmen 1986, 10).

The Delftware tiles comprise 30 fragments, mainly from layers [76] (phase 5) and the lower fill of pit [88] (phase 7); these cover a date range from the early 17th-century polychrome floor tiles, to 18th-century thin wall tiles. Some were probably locally made; others may have been imported, since the only known parallels for these designs are Dutch. The two tiles depicting soldiers with pikes (Nos 5, 6, lower fill of [88]) for example, have their closest parallels in tiles from Holland (van Lemmen 1986, 7, dated to c.1625; de Jonge 1971, 43; 75, dated to 1600–1700).

A blue and white tile (No. 7, [88], lower fill) is of interest in that the interlacing design is one more commonly found on the earlier polychrome tiles, examples of which were found at the Pickleherring kiln site in Southwark (Noël-Hume 1977, 19); others are held in the Museum of London collections (Britton 1987, 175, Fig 196). This suggests that certain polychrome designs maintained their popularity even when poly-

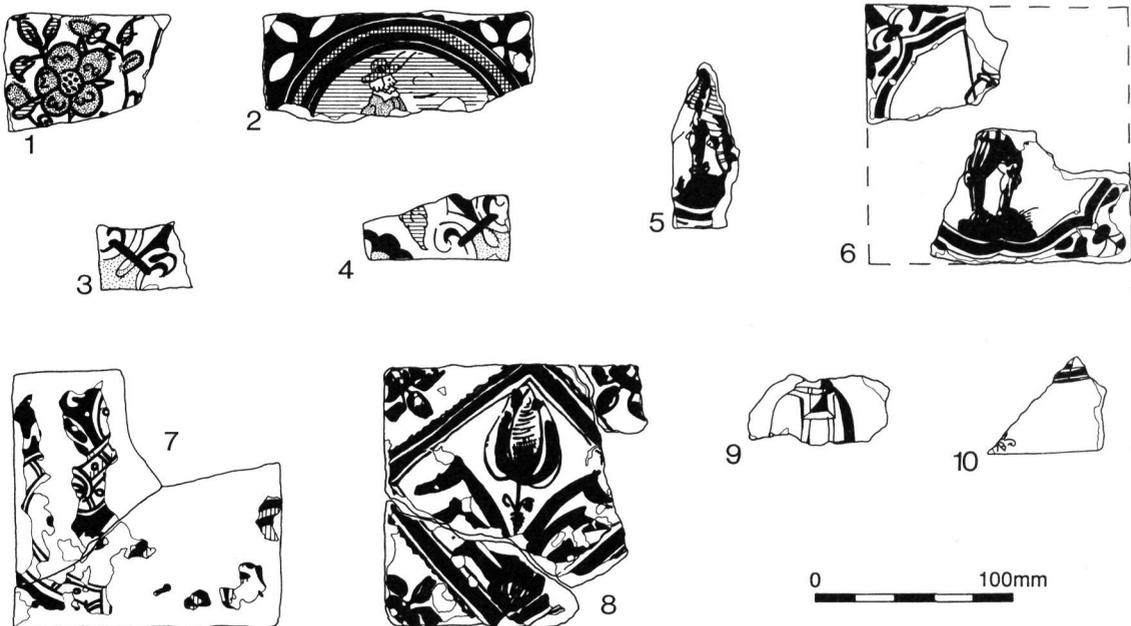


Fig 18. The tin-glazed tiles. Scale 1/4

chrome as such had gone out of fashion and blue and white tiles were in vogue. A second, more worn, example of this motif was found in pit [79] (Phase 6).

The blue and white tulip design (No. 8) is also most closely paralleled by Dutch polychrome tiles (de Jonge 1971, 38, dated to c.1600–1650). At least six examples of this design were found, all in [9]; on all but one the glaze was badly worn.

The later tiles comprise two small fragments of wall tile both from pit [88] (lower fill). One depicts a bishop (No. 9). The other (No. 10) has half a spider head corner motif known to be used on London delftware tiles of the late 17th century and 18th century (Horne 1989, 18). It shows part of a tiled floor, a common setting for indoor scenes on later tiles.

The range of forms represented is surprisingly limited, and would seem to indicate a fairly limited date range of c.1660–1670 for all the post-medieval contexts. Most pipes are of Type 15 or Type 18 in the Atkinson and Oswald (1969) typology, which is still acceptable for London. Some of the Type 18 pipes are slightly more bulbous and may merge into Type 13, but the date range is the same (1660–80). It is significant that in the largest group there are no Type 19 pipes, which would be expected in a later 17th-century assemblage. Only the smaller bowls from dump [84] and pit [96] show any tendency to an early 17th-century date, while the single Type 25 in the Phase 5 demolition layer [77] may be intrusive.

Catalogue of the illustrated building material, glass and clay pipe

No.	Context	Frag	Thickness	Comments/parallels
<i>Fig 18</i>				
1.	88 (Upper)	1	18mm	Rose and hips
2.	U/S	1	18mm	Medallion, man on horse
3.	U/S	1	15mm	Fleur-de-lis
4.	76	1	15mm	Fleur-de-lis
5.	88 (Lower)	1	11mm	Soldier with pike
6.	88 (Lower)	1	11mm	Soldier with pike
7.	88 (Lower)	1	12mm	Interlace
8.	76	1	14mm	Tulip
9.	88 (Lower)	1	9mm	Bishop
10.	88 (Lower)	1	10mm	?Indoor scene
<i>Fig 19</i>				
11.	76	1	14mm	Clay pipe with letter 'B' on bowl
12.	76	1		Glass pharmaceutical bottle

The clay pipes

Stephen Nelson

Clay pipe fragments were recovered in varying quantities from some 19 contexts. Most contexts contained only two or three fragments, the largest groups being found in the fills of pit [88] (72 pipe bowls). The condition of the pipes varies in that many are burnt or stained by cement or iron rust deposits, but most are un battered and do not appear to have been lying about for long before deposition.

The initialled pipe-bowls

Stephen Nelson and David Higgins

For some time it has been recognised that various types of marking, other than the usual stamped or moulded marks, were occasionally added to pipes. For example scratched initials have been noted on 17th-century pipes from London and Surrey (Le Cheminant 1981, 128; Higgins 1981, 280), and there is a crude burnished star on the base of another pipe from London in the Elkins collection.

The use of written ink marks, however, is very unusual. There are pipes in the Museum of London collections which have gained later written inscriptions and some late 19th-century and early 20th-century makers did use indelible ink stamps; but a contemporary owner's initial on earlier pipes is extremely rare, and until the Tower Hill West discovery only one marked fragment had been recognised amongst the thousands of clay pipes recovered from excavations in London. This is from a heel pipe dating to c.1660–80, and was found on the Billingsgate site (BIG82, 537, SF571). The marks, in red ink, comprise five short strokes on the left side of the stem, possibly intended to form the letter 'E', and the initials FA on the heel. The latter are more carefully formed, serifs having been added to the letters.

The discovery of at least three marked pipes in the Tower Hill West collection is thus of great interest and importance (Fig 19, No. 11). These are all Type 18 pipe bowls from [88], which bear the letter 'B' inscribed in a red pigment upside down on the back of the bowl (facing the smoker). These bowls differ slightly from the other Type 18 pipes only in that they show a bevelled rim (but with no milling), and would appear to have been lightly burnished all-over. There is an indication of a further 'B' on one of the Type 15 pipes, but the bowl is broken and this is very uncertain.

Although the condition of these pipes is varied, the mark, a reasonably well-formed 'B' in a flowing script, is quite distinct on at least one bowl, and would appear to be contemporary with the date of the pipe (second half of the 17th century), although clearly added after firing. It is most unlikely that a pipe-maker would employ this method of marking when marks could be quickly and neatly impressed in the traditional manner, and it seems probable that the pipes were marked by their owner. The burnishing may be significant, indicating slightly more up-market pipes that the owner wished to identify

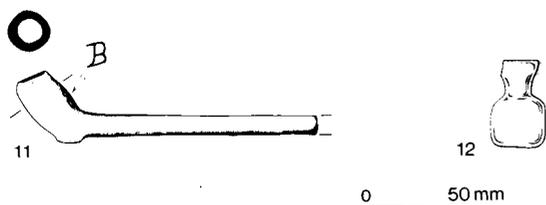


Fig 19. *The clay pipe and glass. Scale 1/2*

as his own. The fact that these are all heel pipes rather than spur pipes, moreover, suggests that they were all acquired and marked at the same time.

The worked bone and ivory

A large dump of sawn ivory fragments was found in layer [77] on the floor [70] of the cellar to the south of the Bulwark wall [40]; further fragments were found in the demolition rubble [76] over layer [77], and in rubbish pits [88] and [94], which post-date the Bulwark. A number of pieces were also collected from modern contexts. Since the dump in layer [77] continued beyond the limit of excavation, the bone assemblage must be regarded as a sample.

The assemblage falls into two groups: waste fragments, and partly finished artefacts, mainly combs and knife handles.

The waste material

Richard Sewart

The structural nature of ivory, availability of the raw material, and the problems associated with working it have been discussed by MacGregor (1985, 14–19; 38–40; 65–66), and are not repeated here.

A statistical analysis was attempted on 18kg of the 24kg of waste material collected, in order to determine what artefacts were being produced and the stage(s) in the process of manufacture represented. The remaining 6kg, comprising broken or laminated pieces which could not be assigned to any of the relevant categories, was disregarded for statistical purposes.

The great majority of the 1,152 fragments analysed have an outer (dentine) tusk surface (981 fragments, 85%). These include 13 section fragments from the root end of the tusk, and eight complete sections measuring 55mm–165mm in length and 54mm–123mm in diameter; three of the latter have holes bored through them (see Fig 20, No. 1). Totalling circumference percentages, measured on a pottery rim diameter chart, an estimated equivalent of approximately 12 whole tusks is represented. Six tusk tips are also present. The remaining 15% of the collection (171 fragments) comprises internal pieces. Both groups include pieces sawn longitudinally as well as laterally. These were grouped into cross-

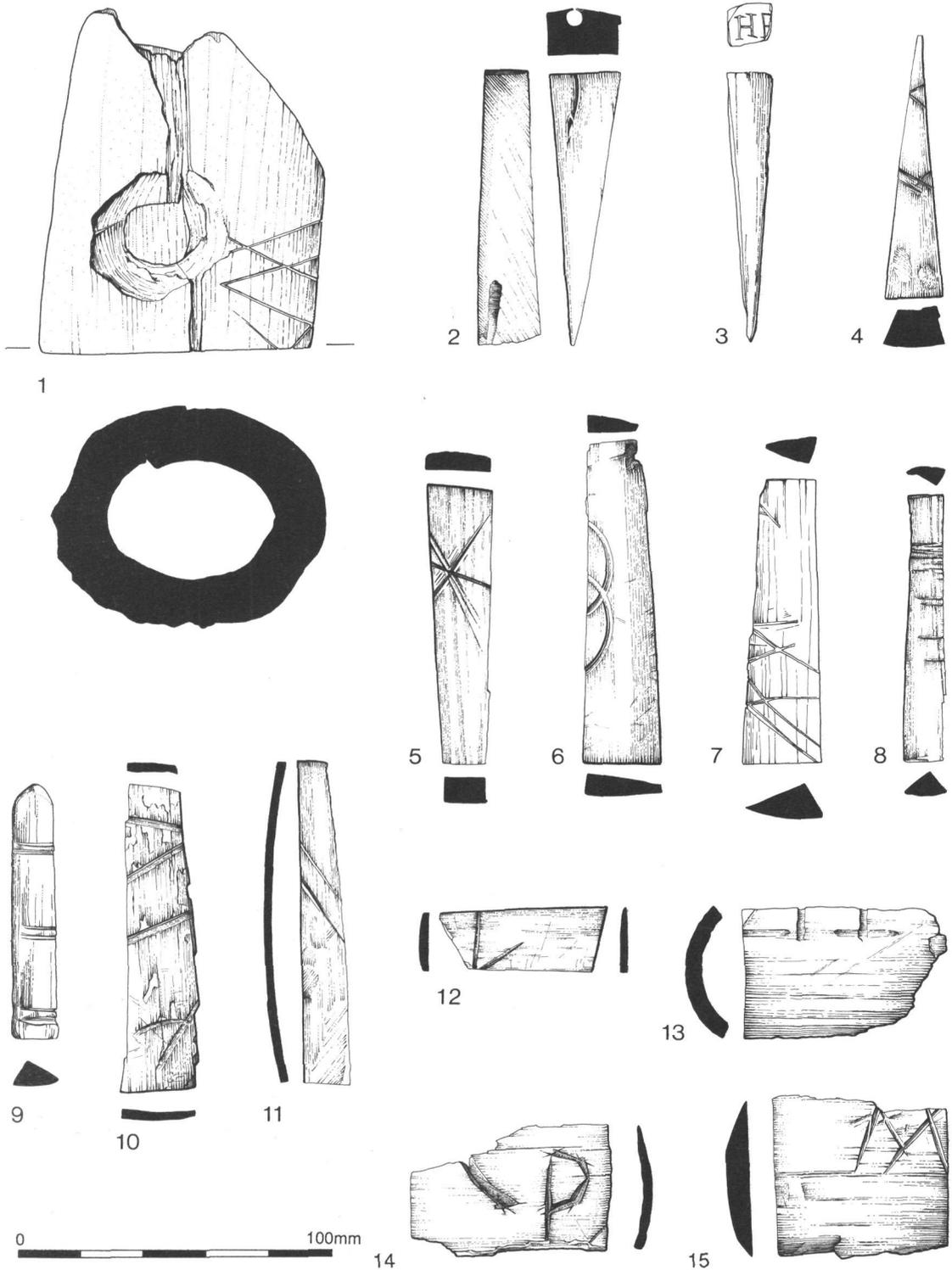


Fig 20. The ivory off-cuts and worked bone. Nos 1-15. Scale 1/3

sectional shape categories, and graded by length at 10mm intervals (see Table 3).

The off-cuts with an outer tusk surface fall neatly into one of three cross-sectional shape categories: roughly triangular, quadrilateral, and tangential. The close co-variance in length, and compatibility of form of the two categories suggests that they are the product of the longitudinal slicing of the same set of tusk sections (see Fig 22a). The 'wedges' of quadrilateral (Fig 20, Nos 2-6) and triangular cross-section (Fig 20, Nos 7-9), which taper to a point, show a similar pattern, despite the fact that they must be shorter than the sections from which they were cut. The completely different range of lengths of the tangential pieces suggests that these were cut from a different set of tusk sections (See Figs 22; 20, Nos 13-15; Fig 21, No. 16). There are no tangential wedges.

The internal pieces were grouped according to the presence or absence of the pulp cavity, and

also according to whether their maximum widths were greater or less than 30mm (the maximum width of a triangular/quadrilateral piece). The aim of this was to correlate the internal and external groups. The results (see Table 3) suggest that the group of pieces narrower than 30mm has a similar range of lengths to that of the triangular/quadrilateral group, and so is likely to have been cut from the same set of tusk sections (see Fig 22a). The 'wedges' again show a similar pattern. Those wider than 30mm however, correspond more in length to the range of the tangential group (see Fig 22b). Included in this very small group are a couple of pieces less than 5mm thick.

A sample of 94 pieces, selected from the fragments with a larger percentage of the circumference present, was taken from both the tangential group and from the triangular/quadrilateral groups. The maximum lengths of these pieces were recorded to the nearest 1mm,

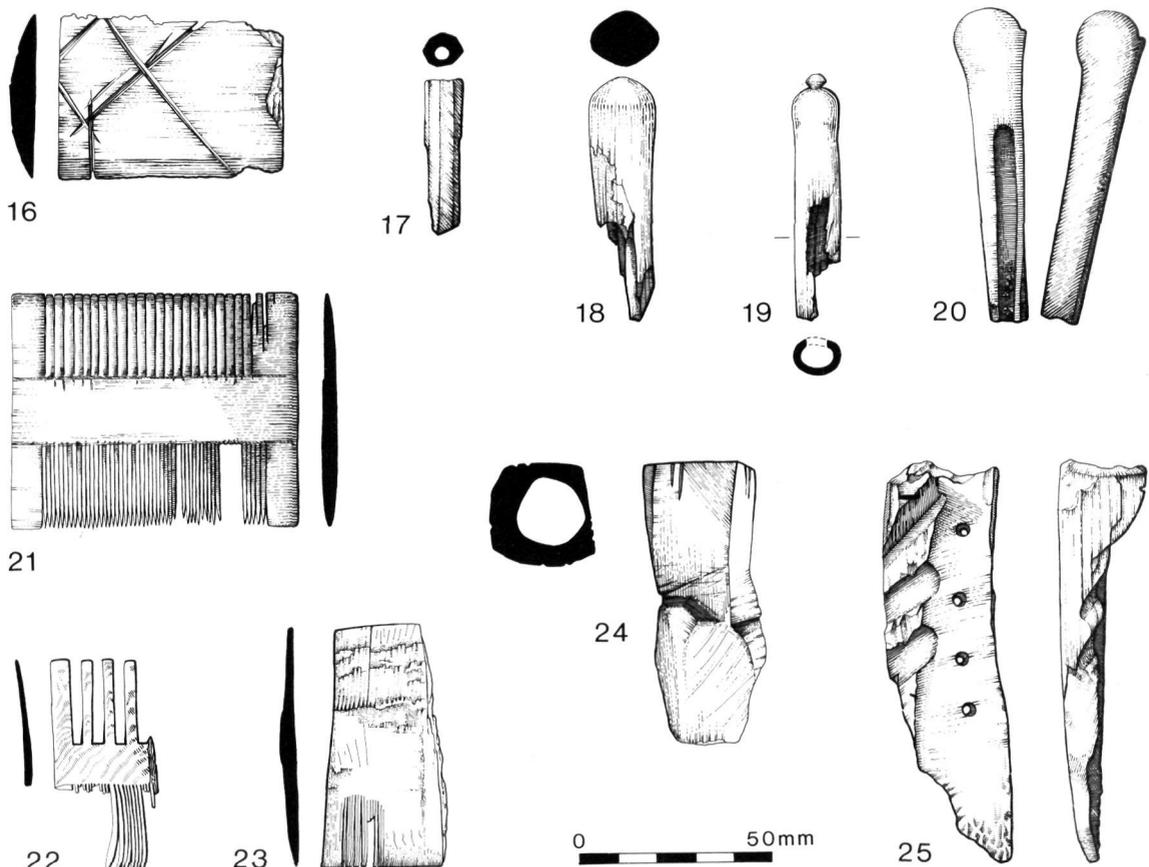


Fig 21. *The ivory off-cuts and worked bone. Nos 16-25. Scale 1/3*

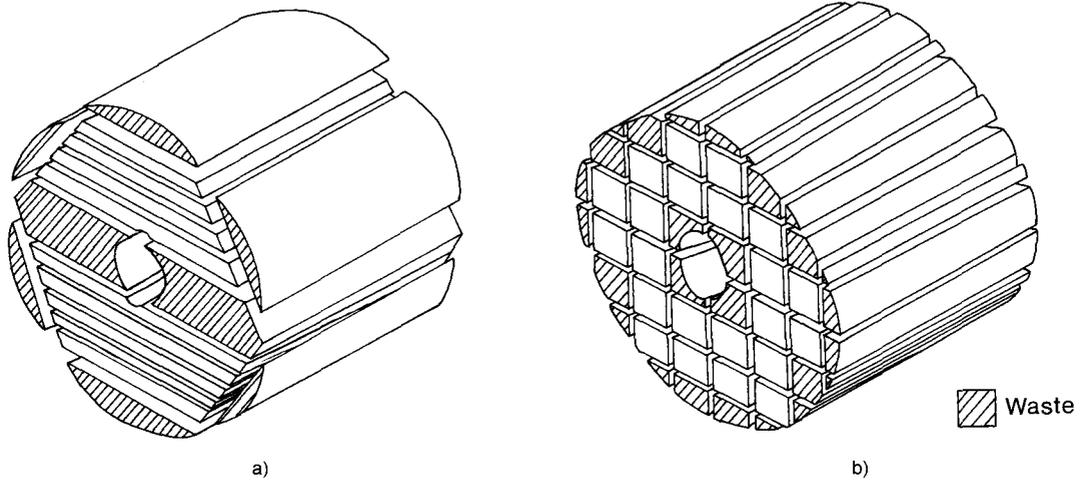


Fig 22. The ivory off-cuts: diagram showing details of tusk preparation. a) production of triangular and quadrilateral pieces; b) production of tangential pieces. Scale 1/3

and their maximum diameters to the nearest 10mm, using a pottery rim diameter chart. The results are illustrated in Fig 23.

The two ranges of lengths illustrated essentially reflect the information gleaned from the whole assemblage. In addition however, it appears that the length range of the tangential group is far more modal than that of the triangular/quadrilateral group. This indicates either the more precise cutting of the sections represented by the tangential group, or else a narrower range of length requirements. Furthermore, the tangential group appears to fall into two sub-groups.

The diameter ranges of the two groups overlap considerably, as shown in Figs 23c and d. The range of the tangential group however, is wider than that of the triangular/quadrilateral group, and in this case it is the range of the latter group that is the more modal. This suggests that selection according to tusk diameter, or tusk section diameter, was more important for the triangular/quadrilateral group.

A scatter plot of lengths against diameters is illustrated in Fig 24, which demonstrates that the major tangential group and the triangular/quadrilateral group hardly overlap at all, largely due to differences of length. A completely separate tangential group emerges, some pieces having the smallest diameters.

The waste nature of this material is borne out by the high proportion of outer surface pieces present in the assemblage, and also by the presence of pulp cavity, or staining, on most of the interior pieces. Although of inferior quality,

these pieces represent quite a large quantity of potentially usable ivory, especially taking into account the incompleteness of the assemblage. It can be inferred from this that artefact production was of such a scale, and so specialised as to make exploitation of the material discussed here uneconomical.

Following the initial trimming of the tusks, two distinct processes can now be suggested which would result in the two major groups of waste ivory. In the one case sections largely measuring between 55mm and 65mm in length were cut from the tusk; these were then sliced longitudinally as shown in Fig 22a, so as to obtain wide but thin pieces of core ivory, which could then be further shaped into comb components. The waste product of this process would be the larger of the two tangential groups of dentine-faced pieces, together with unusable core pieces of corresponding dimensions.

The other process would involve cutting the tusk into sections largely between 80mm and 105mm in length, which were then longitudinally sliced as shown in Fig 22a, so as to obtain approximately square-sectioned core pieces. The dimensions of these would be appropriate to knife handle production. The waste product of this process would be the triangular/quadrilateral group of dentine-faced pieces, together with unusable core pieces of corresponding width and length. 'Wedges' would be the result of cutting curved tusk sections.

Both hypotheses are supported by the presence

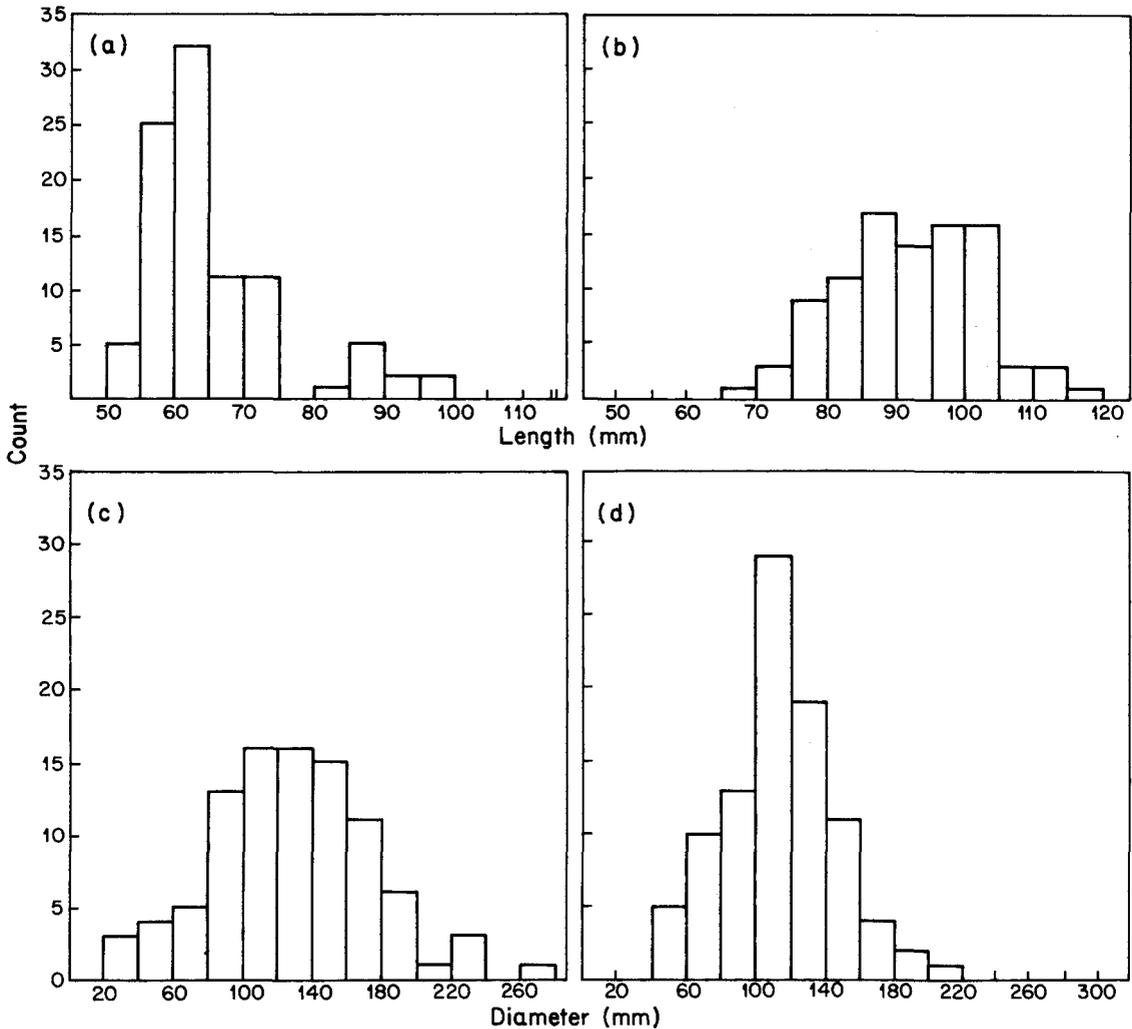


Fig 23. The ivory off-cuts: a) length of the triangular and quadrilateral cross-sectioned wedges; b) Length of the tangential fragments; c) Diameter ranges of the triangular and quadrilateral cross-sectioned wedges; d) Diameter ranges of the tangential fragments

of combs and knife handles, which are discussed below.

The worked ivory and other bone artefacts

Lyn Blackmore

Miscellaneous fragments

Amongst the assemblage of off-cuts are 26 fragments with incised markings on them. Whether these can be accurately described as trial pieces is debatable – in several cases the markings appear to have been made before the tusk was sawn up, so the original intent is

unknown, although Fig. 20 No. 9 appears to be imitating bamboo. These markings appear on all shape categories, which are illustrated in the following sequence: internal pieces with no dentine (Fig 20, No. 3), various wedge-shaped pieces with external cortex (Nos 4–12), which include some laminated fragments of cortex only (Nos 9–12) and tangentially cut fragments (Fig 20, Nos 13–15; Fig 21, No. 16). Most marks are random geometric, either straight lines or arcs, but three fragments apparently bear letters, an 'H' carved on before the piece was cut into its present wedge-shape (Fig 20, No. 3), a 'P', and an 'M' or 'W', (Nos 14, 15).

A number of small cubes and rectangular

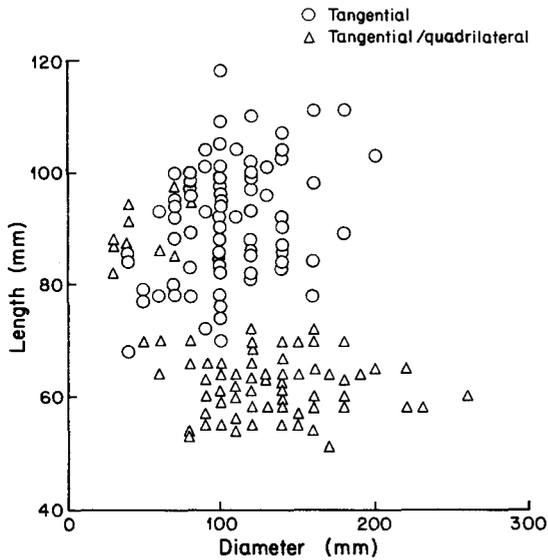


Fig 24. Ivory off-cuts. Scatter plot of length: diameter ratios of the off-cuts

blocks of various dimensions were possibly blanks for dice. One complete 'ring' and two fragments were also found, although these may simply be a

product of the sawing technique rather than unfinished artefacts.

Knife handles

Fragments of 11 handles were found, which fall into three groups: faceted or angular, cylindrical and flat. Unless stated, all were found in layer [77]. All are of solid form rather than plates secured by rivets. Dating of knives relies heavily on the form of the blade, of which none were found, but these handles appear to be of earlier 17th-century date, when the handle was normally half the length of the knife-blade or less (see MacGregor 1985, 170).

Of the three faceted handles, two are unfinished beyond the initial shaping, and the surfaces bear rough diagonal striations. One has a lozenge-shaped cross-section, another (Fig 21, No. 17) has an irregular octagonal section with sawn ends; this was probably designed to have a metal ferrule and cap, as seen on a finely worked knife with a faceted ivory handle in the Victoria and Albert Museum (Somers Cocks & Blair 1979, 13, fig 4, no. 39, dated to c.1650-73). The most exotic handle (Fig 25, No. 26) is decorated all

Table 3a. The distribution of the ivory off-cuts by shape and length (external pieces)

Lengths	4.1-5.0	5.1-6.0	6.1-7.0	7.1-8.0	8.1-9.0	9.1-10.0	10.1-11.0	Sub-Total	Total
Triangular	0	0	6	42	194	175	44	461}	846
Quadrilateral	0	0	3	18	116	108	34	279}	
Tangential	0	44	50	2	6	4	0	106}	
Triangular wedge	0	3	1	9	11	7	0	31}	114
Quadrilateral wedge	0	5	11	19	26	22	0	83}	
Sub-total		52	71	90	353	316	78	960	

Table 3b. The distribution of the ivory off-cuts by shape and length (internal pieces)

Lengths	4.1-5.0	5.1-6.0	6.1-7.0	7.1-8.0	8.1-9.0	9.1-10.0	10.1-11.0	Sub-Total	Total
Internal pieces <3 cm max width									
Pulp Cavity	0	0	5	5	18	17	7	52}	85
No Pulp Cavity	0	2	3	10	9	9	0	33}	
Wedges <3 cm max width									
Pulp Cavity	0	3	4	13	8	2	0	30}	76
No Pulp Cavity	3	6	9	14	10	4	0	46}	
Internal pieces >3 cm max width									
Pulp Cavity	1	4	2	0	0	1	0	8}	10
No Pulp Cavity	0	2	0	0	0	0	0	2}	
Totals	4	17	23	42	45	33	7		171

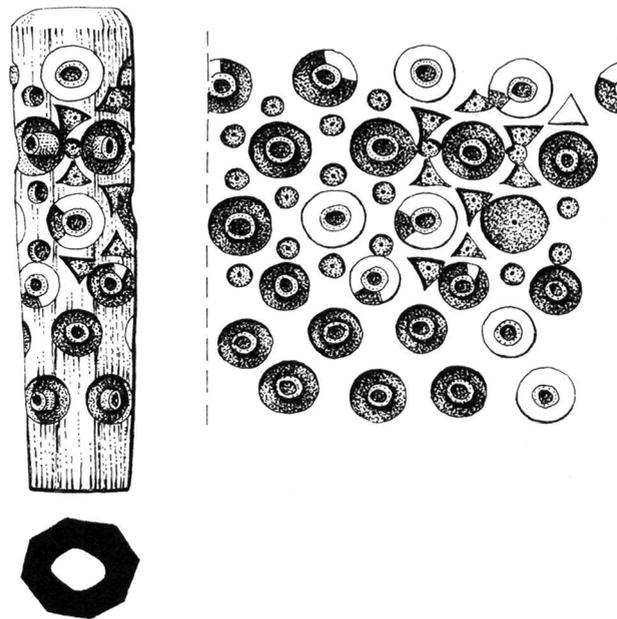


Fig 25. Ivory knife handle with amber inlay. Scale 1/2

over with incised ring and dot motifs of two different sizes, interspersed with simple incised dots. The rings were inlaid with amber, some of which still remains *in situ*. The inlaid handle comes at the end of an earlier 16th-century tradition which lasted for some one hundred years; the use of amber, however, was most common in the period 1610–1630.

Five cylindrical handles were found, apparently finished, of which the most delicate (Fig 21, No. 19) has a finial at the terminal. Four others have a simple rounded end, slightly swelling at the terminal as seen on No. 18. A close parallel for this form in the Museum of London collection (80.153/1) has a blade with a symmetrically pointed end, and dates to c.1630–50. Two handles have split longitudinally into two unequal parts, in one case probably as a result of the iron tang which has corroded *in situ*. A complete handle in this group also has an iron tang. These handles are all undecorated, but finely carved examples are known, for example a conical bone handle with carved interlace decoration (no inlay) in the Victoria and Albert Museum, dated to the early 17th-century (Somers Cocks & Blair 1979, 12; fig 4, no. 29).

The flat handles comprise three sub-rectangular rough-outs, tapering from the terminal to the shoulder, and one more finished piece (No. 20) which has laminated longitudinally

into two unequal parts. This handle appears to be of a slightly later date, having a flat upper edge with a slight kick at the terminal, and a curved lower edge which swells at the terminal in the manner of the later 'pistol grip' handles. A similar example in the Museum of London (A893, slightly squarer handle-end) has a square-ended blade and is dated to the mid 17th century.

The combs

Four combs were found, one finished but obviously badly made (Fig 21, No. 21), one possibly finished but broken (No. 22), and two trial pieces. Of the latter, only No. 23 was found in the main dump of off-cuts [76/77]; the others were in later deposits. No. 22 has the normal close spacing on one side, but large, widely spaced teeth almost 3mm apart on the other. A similar, finished comb (length 110mm+, width 60mm) with closely-spaced teeth on one side and wedge-shaped teeth 2mm apart on the other was found in 1978 at Goodman's Yard, Tower Hill (Whytehead 1980). The trial piece No. 23 is of interest in having several 'layers' of saw marks on one side, and a short length of normally sawn teeth on the other. A similar trial fragment was found at the Tower Postern in 1979 (Stevenson in preparation).

Other worked bone and shell

This comprises a pinner's bone (Fig 21, No. 24), here possibly used in the preparation of copper alloy wire or rivets associated with the cutlery, and a fragment of cow mandible with perforations (Fig 21, No. 25; function unknown). Two shells with mother of pearl suggest that this was being used for decorative inlay in knives or buttons. Mother of pearl was also found at the Tower Postern (Stevenson in preparation).

Discussion

The cutlery trade comprised four main areas of work; those of the bladesmith, the hafter, the sheather, and the cutler, who assembled all the component parts. In the larger cutleries some or all of these activities were carried out in the same workshop. In the 17th century, the high point of English knife-making, handles were made of more varied materials than at any other time (bone, ivory, metal, glass, stone, or combinations thereof), and were probably commissioned from specialist craftsmen. At this time the fork had not come into regular use and knives were normally carried everywhere on the person in a leather case, rather than provided by the host. As such, the knife was not only functional, but also a means of showing personal taste and wealth

(Somers Cocks & Blair 1979, xii-xiii). Knives of the period 1600-1650 were generally small and delicate, often decorated with a finial at the terminal; this feature continued until c.1700 and dating generally relies more on the shape of the blade than the handle. Bone was used for knife handles in the 16th century (Somers Cocks & Blair 1979, 4, fig 3, no. 11, dated c.1519); carved ivory handles were popular from 1600-1625, but it has generally been thought that they were not made in England between c.1625 and c.1675, reappearing c.1670-80. Hayward (1957, 8) suggests that this was probably due to the absence of skilled craftsmen in England rather than to a change in fashion.

The evidence from Tower Hill West, however, shows conclusively that ivory was being worked, and that knives and other artefacts were being assembled on or near the site in the early-mid 17th century. This is supported by further finds of ivory waste and worked bone recovered from post-medieval deposits near Tower Hill underground station (comb waste and a bone fragment used for button manufacture), at the Royal Mint (Goffin in preparation) and at the Tower Postern, where ivory waste was found together with mother of pearl (Stevenson in preparation). Whether the ivory was worked by immigrant or English craftsmen, and for whom it was intended (clients within the Tower, the City, or both) is not known.

Catalogue of ivory and bone

No.	Context	Acc no.	Comment
<i>Fig 20</i>			
1.	77		Tusk fragment with bored hole
2.	77	<40>	Quadrilateral wedge with pulp cavity
3.	77		Quadrilateral wedge with letters 'HP'
4.	77	<41>	Quadrilateral wedge
5.	77	<39>	Tapering quadrilateral wedge
6.	77	<42>	Triangular wedge
7.	77		Triangular wedge
8.	77	<43>	Triangular wedge
9.	87	<69>	Triangular wedge
10.	77	<72>	Triangular wedge
11.	77	<56>	Outer cortex only
12.	77	<78>	Outer cortex only
13.	87	<64>	Tangential section
14.	U/S	<61>	Tangential section with letter 'P'
15.	U/S	<62>	Tangential section with letter 'M' or 'W'
16.	U/S	<60>	Tangential section
17.	77	<75>	Facetted handle
18.	77	<37>	Cylindrical handle with finial
19.	77	<74>	Cylindrical handle

No.	Context	Acc no.	Comment
<i>Fig 20</i>			
20.	77	<35>	'Pistol grip' handle
21.	88	<1>	Double-sided comb, complete
22.	88	<19>	Double-sided comb, fragment
23.	77	<67>	Trial piece
24.	52	<12>	Pinner's bone, cow
25.	131	<70>	Cow mandible, perforated
<i>Fig 25</i>			
26.	77	<13>	Facetted ivory handle with amber inlay

The other finds

Lyn Blackmore

Finds of other materials are few in number, and mostly derive from layer [76]. These include a fragment of window glass in a lead came and a small pharmaceutical bottle made in a clear yellowish glass (Fig 19, No. 12). Two other pieces of lead came and a few unidentifiable copper alloy objects were also found. The remaining finds are nails or fragments of iron building materials.

The coins

Michael Hammerson and Peter Scott

1. Copy of antonianus of the Gallic emperor Tetricus I, dating to c.270–300. Although apparently cast (flan slightly small, edges rather rough from the unfinished coin mould, easily visible remains of sprue from where the metal entered the mould, and reverse type a normal one of Salus with altar and sceptre, taken from an original produced c.270–73, the legend is very garbled as in a 'normal' irregular copy with a badly inscribed legend. It may be that the coin was produced from an irregular mould of a regular coin, where the legend has been amended. [32], SF18.

2. Jetton, incomplete, corroded, but appears to be O: Shield of France modern R: Field of France ancient French jetton of second half of 15th century. [90], SF23.

3. Jetton, copper alloy O: Winged lion of St Mark, fictitious legend R: Reichsapfel, fictitious legend. Diameter 28mm. Jetton probably manufactured in Nuremburg, early 16th century although possibly earlier (Archibald 1985, 182). [95], SF4.

4. Charles I Rose farthing token, type 2. 1635–44. [89], SF6.

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Tony Dyson edited this paper; Figures 1–4 and 7–15 were drawn by Michael Hutchinson with Lesley Dunwoodie. The small finds were mainly illustrated by Dorrie Orchard; Fig 19, No. 11 and Fig 20, Nos 1, 3, 7 were illustrated by James Bennett. The pottery was mainly illustrated by Richard Sewart; Figs 16, Nos 1, 5, 6, and 11 were drawn by Lyn Blackmore. The tiles were drawn by Amy Grey. The diagrams and histograms are the work of Alison Hawkins.

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THE EXCAVATION OF A TRIAL TRENCH ACROSS THE MOAT AT HAMPTON COURT PALACE

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With contributions by Dr David A. Higgins, Dr Mark Robinson, Dr Rob Scaife and Lucy Whittingham

SUMMARY

The Historic Royal Palaces Agency (HRPA) commissioned the Oxford Archaeological Unit (OAU) to excavate a trial trench in the north arm of the Tudor moat at Hampton Court Palace. The excavation provided a 12.5m-wide section through the north side of the moat. The full width could not be established as the southern edge of the moat lay beyond the area available for excavation. The northern edge had a stepped, then gradually sloping edge which had no revetment wall at this point. The bottom of the ditch was located 4.2m below the present ground surface at the south end of the evaluation trench.

Study of the environmental samples taken from the bottom of the ditch suggest that common lime, horse chestnut and box were being grown in the vicinity of the moat in the early post-medieval period. The finds retrieved from the layers of backfill consisted mostly of 18th and 19th-century pottery, glass and clay pipe fragments; a small quantity of earlier post-medieval pottery and clay pipe was also found.

A narrow brick wall was found c.1.5m below the present ground surface. The wall had a gravel path running parallel to its north; a layer of loamy (?garden) soil was associated with these features, which appear to represent a 19th-century garden layout or border along the line of the moat. The foundations of a number of 19th-century brick structures were also found. These can be related to buildings shown on contemporary maps. The walls were left in situ.

INTRODUCTION

A trial trench was excavated across the north arm of the moat at Hampton Court Palace

(NGR TQ 15776862) in June 1994. The site lies to the south of the 17th-century Royal Tennis Court and lies within the width of the backfilled moat. The aims of the excavation were to establish the construction techniques and (as far as possible) dimensions of the Tudor moat, and to characterise its backfill. Documentary sources attest to the use of parts of the moat as a dumping ground for demolition material from Tudor lodgings and other buildings during the 17th and 18th centuries. The trench was thus also intended to determine whether architectural fragments relating to these early buildings had been dumped in the north arm of the moat.

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Hampton Court began its life as a small, moated site owned by the Order of St John of Jerusalem, generally known as the Knights Hospitallers. The Knights held the site from the 12th century until 1505, when they leased it to Giles, Lord Daubeny, Chamberlain to Henry VIII. Daubeny died in 1508, and the site was subsequently leased to Thomas, Cardinal Wolsey, in 1514. Daubeny had probably begun to develop the site, but Wolsey was responsible for building many of the Tudor buildings seen today.

Wolsey built extensive lodgings for Henry VIII at Hampton Court. These were completed in 1525, but by 1528 Wolsey had fallen from favour. The king himself took over Hampton Court and

continued to develop it (Thurley 1988). Henry made extensive use of the palace and it continued to be favoured as a royal residence for several centuries. William and Mary were responsible for extensive rebuilding works in the late 17th century, during which time most of the Henrician royal lodgings were demolished. George II was the last monarch to live at the palace, and it was increasingly used for 'grace and favour' apartments from the middle 18th century onwards. The palace was opened to the public by Queen Victoria in 1838.

Wolsey probably began the excavation of the moat around Hampton Court during his tenure. The moat appears to have been a continuous feature around the whole of the palace in the Tudor period, when its function would have been as much sanitary as defensive. It must have been dry in places, as there was a pheasant yard in the moat. There were several bridges, the principal one being on the west side to coincide with the Great Gatehouse. The moat was already being filled in during the 17th century (Colvin *et al* 1976, 160), and the bridge in front of the Great Gatehouse was buried at this time. Late 17th and early 18th-century plans show that only the north half of the west arm and the north arm of the moat were still open, and even these had been filled in by the middle of the 19th century. The moat at the west front was re-excavated in 1910 (Chettle *et al* 1982, 6).

SITE TOPOGRAPHY

Hampton Court lies on Thames terrace gravels. Alluvial deposits are present on the floodplain. The trench site is part of the southern border of an area of extensive gardens known as the Wilderness. The border contains mature trees, saplings and shrubs, and landscaping has completely obscured the position of the moat on the ground. Some buildings which lie on the line of the moat, however, have suffered serious problems of subsidence, most noticeably in a post-medieval brick tower attached to the mason's yard at the north-west corner.

The trench falls partly within the open moat shown on John Rocque's map of 1736. A mid 18th-century plan does not positively depict the moat, but neither does it show any other buildings in the area (PRO Works 34/44). Brick buildings and structures are shown here, however, on maps of 1841 (PRO Works 34/1349) and

1851 (Map of the Royal Parks of Hampton Court and Bushy). It is assumed that they were built in the early 19th century, but most of them had been demolished by 1912, by which time the existing greenhouse and office had been built (see Fig 1).

METHODOLOGY

A single trial trench measuring 14m long and 4m wide was excavated at right-angles across the moat. The position and size of the trench was dictated by several physical constraints. These included the avoidance of Tudor and later masonry and modern services, and the position of mature trees. The site of the trench, on an area of managed rough grass, presented the only possible location for a trench wide enough to allow stepping in of the sides. This was necessary so that excavation could proceed to the bottom of the moat in at least one area.

The trench was excavated to a depth of c.1.2m using a JCB mechanical excavator equipped with a toothless ditching bucket. The first undisturbed moat fills, and structures/features cutting them, were observed at this level. The trench was then stepped in to a width of 1.7m. Deeper excavation continued by hand up to a depth of 2.4m below the surface, whereupon further work was concentrated in two selected areas where shoring was used to secure the trench sides.

All deposits, structures and features were assigned a unique context number in a continuous sequence. The various phases of deposits and structures were described, planned and photographed as excavation proceeded, using standard OAU methods and formats (Wilkinson 1992). Finds were collected by context, and environmental samples were taken from deposits of potential interest.

ARCHAEOLOGICAL DESCRIPTION

The moat

The natural sandy gravel was overlain by a 0.7m-thick deposit of light brown silty sand [121] in the first 1.5m at the north end of the trench. Layer [121] was then cut away by the north edge of the moat ditch, which had two steep steps at its north end before assuming a more gradual slope to the south.

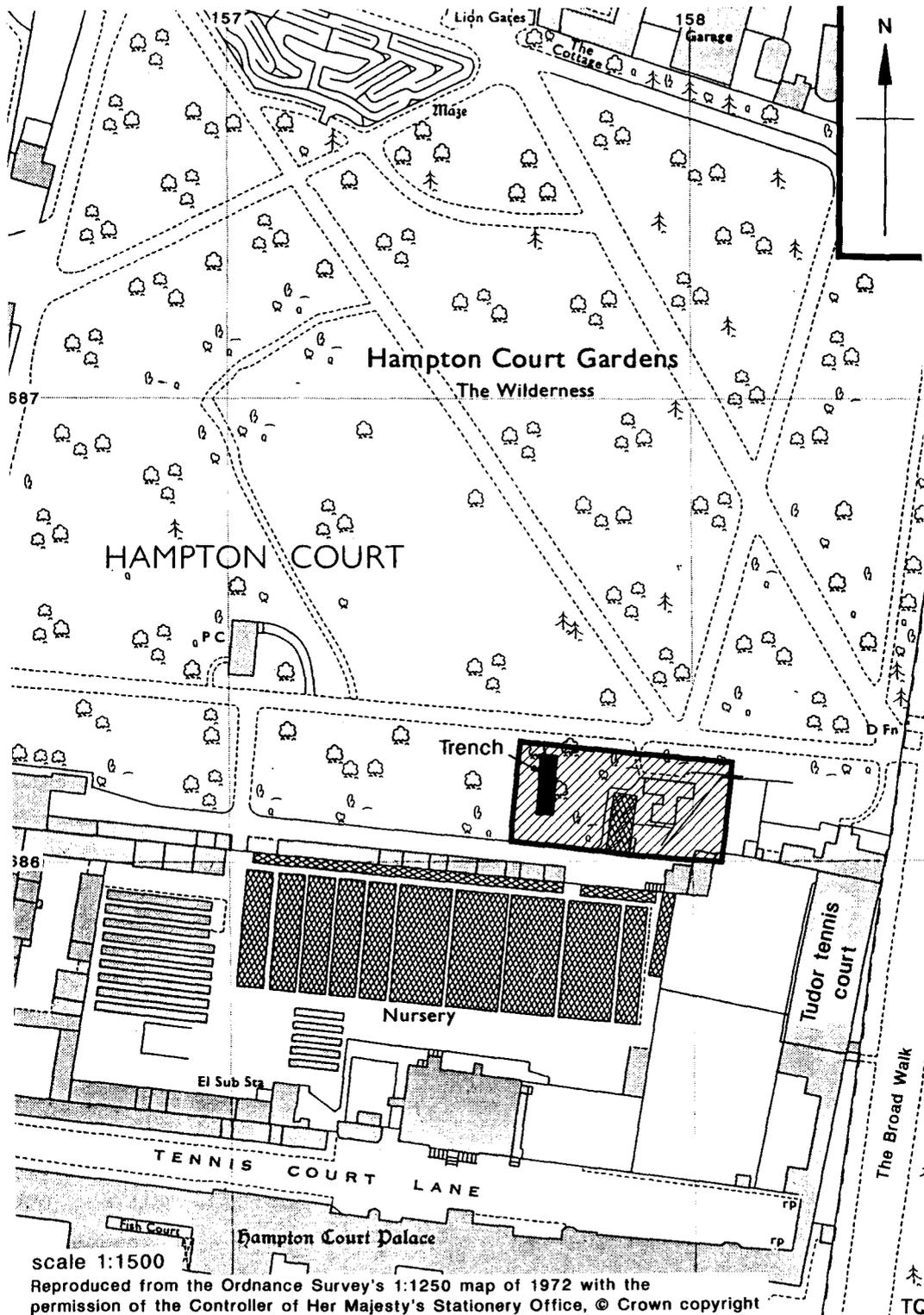


Fig 1. Hampton Court Palace moat trench: location plan

A 5.5m long \times 1.7m wide segment was excavated through the moat backfill at its north end. The bottom of the moat was 3m below the present ground surface (or 7m above Ordnance Datum) at the southern end of this segment, and it continued to slope down to the south. A further segment was excavated to the bottom of the moat near the south end of the trench. The undisturbed natural sand was found at a depth of 4.2m below the present ground surface (or 5.8m above OD). The base had flattened out by this point. The considerable depth meant that the area of excavation had to be stepped in three times. Only a 0.5m \times 0.4m slot could be excavated to the very bottom of the moat.

The moat backfill

The primary fill of the moat was only found in the base of the southern segment, and consisted of dark grey, organic, fibrous loam [181]. This visibly contained macroscopic plant remains, including horse chestnut seeds. The only find was a large, undiagnostic fragment of ceramic roof tile. The organic layer was sealed by a sequence of layers containing variable proportions of sand, clay and silt [177–80], the latter containing lenses of organic material). The layers sloped in from the north, but it was noticeable that they levelled off at a consistent point (see Fig 2). The layers were between 0.08m and 0.28m thick. Layers [177] and [178] contained pottery and clay pipes suggesting a deposition date in the late 17th or early 18th century.

The primary deposits in the southern segment were sealed by a sequence of predominantly sandy or silty layers with a variable gravel fraction [160; 166–7, 172–6]. Pottery, glass and clay pipes dating from the 17th to 19th centuries were found in these layers. A few sherds of 16th-century pottery were also found, but these were residual. The layers all sloped in from the north, but again they mostly levelled off at the same point as the primary deposits. The only exceptions to this were [160] and [166–7] (see Fig 2). These might represent a slightly later episode of filling, although the pottery from layers [160] and [172] has a very similar date range. The top of these deposits lay 1.8m–2.15m below the present ground surface (or at 8.15m–7.8m above OD).

The moat backfill in the northern segment consisted of layers of sandy silt and deposits of sand and gravel, all tipping down to the south [119, 151–2, 161–2, 164–5, 174]. Pottery, glass and clay pipes dating from the 18th and 19th centuries were retrieved from these deposits, along with a few residual pot sherds of 16th and 17th-century date. No architectural fragments other than roof tile were retrieved from this segment. The only unusual find was that of an articulated horse skeleton [153], comprising the back half of the horse with the hind legs missing. The remainder of the torso lay beyond the limit of excavation. A single posthole [158] was found towards the north edge of the moat (Fig 3a). The posthole cut through [156], and was in turn sealed by [125], showing that the feature was not part of the primary moat construction.

Section 1 (composite)

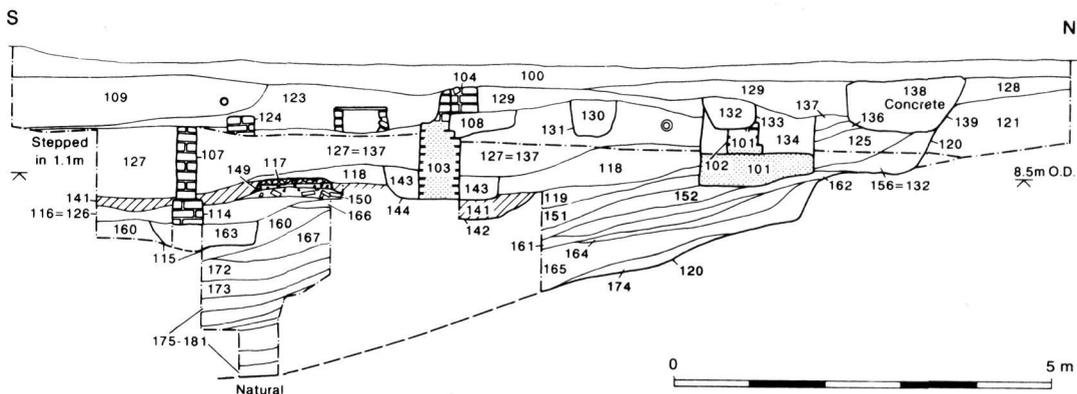


Fig 2. Hampton Court Palace moat trench: section of the trench (scale 1:75)

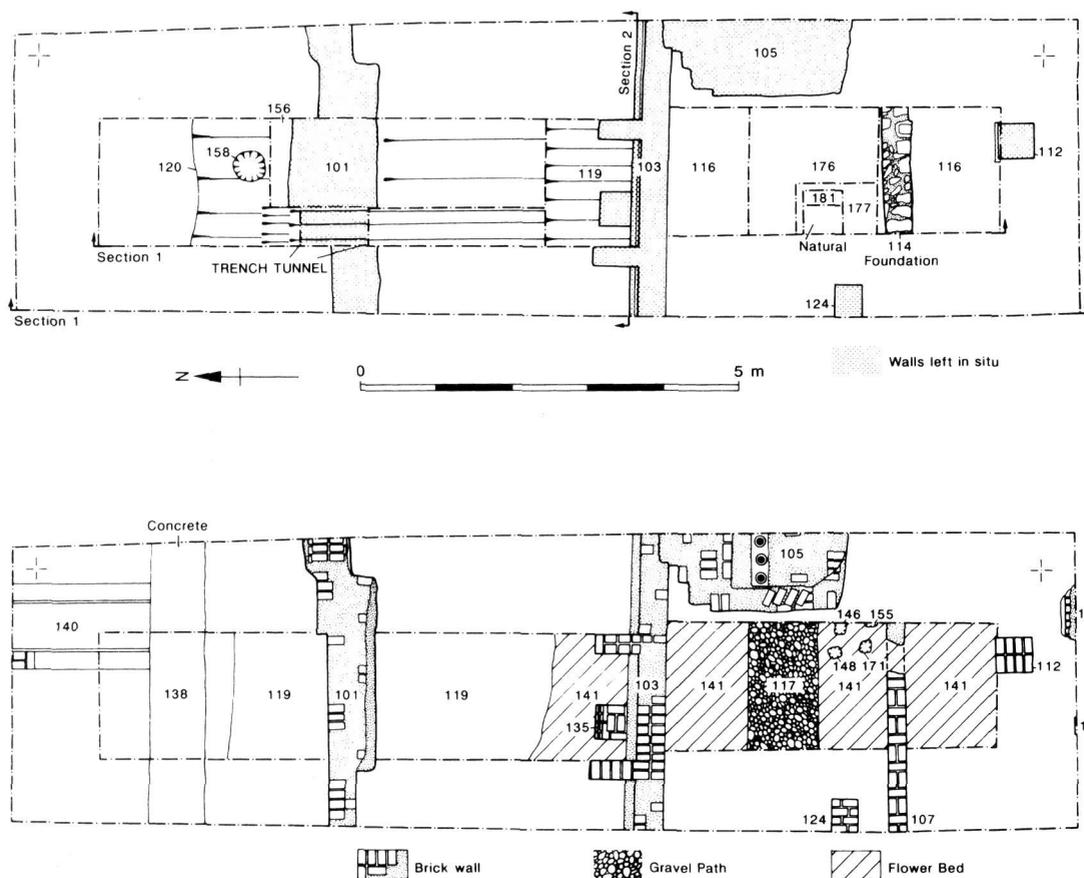


Fig 3. a) Hampton Court Palace moat trench: plan showing north edge of moat (scale 1:75); b) Hampton Court Palace moat trench: plan showing principal 19th-century contexts (scale 1:75)

Victorian structures, features and associated deposits

An east-west foundation trench [115], some 1.4m wide and 0.3m deep, cut the top of the moat backfill layers close to the south end of the trench. The trench was filled with clinker and brick hardcore, and contained 19th-century pottery. It represented the foundation for wall [114/107]. The offset base courses [114] were 0.4m wide and 0.35m high, and were built from reused pieces of Reigate stone (including one moulded fragment) and early post-medieval bricks. The upper part of the wall [107] was 0.22m wide, and was made of 19th-century bricks. The top of the wall lay 0.85m below the modern ground surface.

A layer of loam [116/126] containing fragments of post-medieval bricks abutted wall [114]. A 1.35m-wide linear deposit of densely-packed

post-medieval brick rubble [150] overlay the loam approximately 0.8m to the north of wall [114]. The rubble formed the base for a narrower (1.1m wide) layer of sand containing crushed mortar and brick [149]; this was in turn overlain by compacted sand and gravel [117]. The top of this surface lay 1.5m below the current ground level. A deposit of grey brown loamy soil [141] abutted both the linear feature and wall [114/107] (see Figs 2 and 3). Four closely-spaced post-voids [146, 148, 155, 171] were visible from the top of layer [141], in the area immediately to the north of wall [107] (Fig 3b). The post-voids were at least 1.6m deep; they still contained fragments of the decayed posts.

A deposit of silty loam [118] overlay the linear gravel strip and layer [141], and extended throughout the central area of the trench. An east-west foundation trench [144] cut this layer and contained brick wall [103]. The wall had an

open relieving arch springing from the top of the foundation, and two buttresses on the north side. A further buttress [135] had been inserted on the north side to underpin the arch, which had a large crack at the crown.

A number of other brick structures lay partly within the trench [105, 112, 122, 124]; Fig 3b). The stratigraphic relationship between these structures and wall [103] could not be determined, but they appeared to have been built from the same level. They are therefore considered to be at least broadly contemporary. Structure [105] appeared to abut wall [103], and consisted of a brick vault containing a metal tank. A similar feature could be seen in the east face of the trench, where soil had fallen away from the section to reveal a brick void immediately to the north of wall [103].

Modern features

A series of dump layers [109, 123, 127, 128, 129, 137] abutted and/or overlay the brick structures. The dumps were truncated by concrete foundations, drains, and other modern disturbances.

THE POTTERY

Lucy Whittingham

A small assemblage of pottery (126 sherds, 3.997kg) was recovered during the excavation. The sherds were catalogued by context, using standard fabric codes based on the Museum of London's recording system. The earliest red earthenwares present are 16th century (or possibly late 15th century) in date, but they always occur with wares of a later date and are probably residual. The assemblage as a whole dates from the 16th to early 20th centuries.

The majority of the pottery (65 sherds) consisted of glazed red earthenwares. There were three distinct types: Tudor Brown (TUDB), Red Borderware (RBOR), and glazed/unglazed red earthenwares (GREW/REW). The Tudor Brown wares are the earliest of these fabrics found in the London region, characterised by their reduced external surface and dated as late 15th to 16th century. The ten sherds include three rims from a cooking pot, a jar, and a large storage jar. Red Borderware is a distinctive product of the Surrey-Hampshire Borderware

industry and appears to be a slightly later product than the more common Surrey White wares, beginning in the 17th century and continuing into the 18th century. It is characterised by well-made finely thrown forms and glossy lead glaze. The nine sherds here include seven from one 17th-century bowl/porringer. The remaining 46 red earthenware sherds are found in both the coarse and fine quartz-gritted fabrics which began to dominate the London market in the early 17th century and continued into the 19th century.

One handle and 21 sherds from an imported Rhenish Westerwald Seltzer bottle (WEST) are of 18th-century date and represent the only import in the collection. The bottle is stamped with the letters 'SELT ...' around a central cross and further blurred letters. The stamp is ringed in blue cobalt.

Nine sherds of tin-glazed ware (TGW) include one with a mixed lead and tin glaze which can be dated from early to mid 17th century, while the others have a distinctive blue glaze which is characteristic of the 18th century. The 18th century vessels include the rim of a drug jar, a shallow open bowl, and the footring from a large dish/charger. Seven sherds of Staffordshire white salt-glazed ware (SWSG) include two moulded plates with decorated rims of 'dot, diaper and basket' and 'seed or barley' designs, and one thin-walled bowl. These vessels date from 1720 to 1770. Creamwares (CREA), comprising nine undiagnostic sherds and one footring base from a bowl, are a late 18th to 19th-century introduction to the site.

The rest of the assemblage comprises one or two sherds of the following fabrics: English stoneware and London stoneware (ENGS & LONS); English porcelain (ENPO); Staffordshire press-moulded slipware (STAFFS); Pearlware (PEAR); Mocha Ware; transfer-printed ware (TPW); and Red Basalt (RBAS).

CLAY PIPES

Dr David Higgins

Fifty-six fragments of pipe were recovered, comprising seven bowl, 46 stem and three mouthpiece fragments. The earliest bowl is a variant of a London type 19 bowl from context 119 (Atkinson & Oswald 1969). This style was very common south of London during the late

17th and early 18th century but they were almost always unmarked, making it impossible to identify the individuals who made them.

Two London type 25 bowls, a form current from c.1700–70, were recovered. The example from [151] has a quite chunky, 'heavy' feel to it, with thick walls. These features suggest that it is an early form, probably dating from the first 30 or 40 years of the 18th century. The heel is marked with the moulded initials RT. In a study of Surrey pipes, five examples of 18th-century bowls marked RT were recorded (Higgins 1981, 226–238). There were single examples from Nonsuch Palace, Epsom and Ewell and two examples from Kingston. The RT pipe from Epsom was recovered from a pit group dated to c.1714–20 (Higgins 1987, 416). This supports the earlier 18th-century date suggested for the Hampton Court example. The identity of the RT maker is not known although the marked cluster of these pipes in north Surrey is significant. This strongly suggests that the maker worked in this area, perhaps in Kingston where the pipemaking industry has been little studied.

Another marked pipe came from [141]. This has a damaged heel so that only the christian name initial R is intact although the lower part of the surname initial survives, showing that it had a single vertical stroke to it. This can only have been an F, I, P or T suggesting that this may also have been an RT pipe. This example is of a slightly later form, having a thinner stem, bowl walls and heel and with later finishing techniques, such as the lack of trimming to the base of the heel. This pipe is particularly interesting since it is decorated with the Prince of Wales feathers and motto and therefore belongs to a class of armorial designs first produced in London during the early 18th century and which continued to be produced, in various forms, until the demise of the industry in the 20th century (Le Cheminant 1981a, 1981b). Armorial pipes were never particularly common outside London although they were copied in some parts of Britain and quite large numbers were exported from London to America (Noël Hume 1970). The large, simple feathers and bold open leaves on the seam of this example are both characteristic of pipes produced from the 1740s to 70s (Atkinson & Oswald, 1980). This is in keeping with the form of the bowl and a date of c.1740–80 is suggested for this piece.

There do not appear to be any 'RT' armorial pipes documented from London, which might

support a local origin for this piece. This suggestion is supported by the fact that the N of the motto 'ICH DIEN' has been cut in reverse. A small Prince of Wales bowl fragment with similar feathers, leaves and motto with a reversed N has been found at Kingston (Higgins 1981, Fig 44.2) and it seems highly probable that these two examples are from the same mould. Given the distribution of RT pipes in Surrey and the matching armorial bowl fragment there is no reason why all of the marked pipes from this excavation could not have been made by an 'RT' maker working in or near Kingston from c.1710–50.

The final bowl fragment from the excavation came from [175] and consists of a fine spur from a London type 26 pipe of c.1740–1800. This was never a common form of pipe, the type 25 being much more common. This example has quite a narrow bore and the base of the spur has not been trimmed. Both these tend to be later features and suggest a date in the second half of the century for this piece. There are slight undulations in the bowl surface which suggest that the pipe may have had a decorated bowl.

The stems recovered from the excavation are almost all of a medium or thin diameter with a medium sized stem bore and a strongly cylindrical, neatly finished form. These features are all characteristic of 18th-century groups. One notable exception is a very thick stem from [175] with a bore of 8/64" and diameter of 11mm. It is made of a soft fabric with a finely burnished surface, the only piece to be so treated from the excavation. This unusual piece may well represent a very early and well finished pipe, but it came from an 18th-century deposit where it was clearly residual.

MACROSCOPIC PLANT AND INVERTEBRATE REMAINS

Dr Mark Robinson

Two samples, each of 0.5kg, were studied for macroscopic plant and invertebrate remains from the lowest fills of the Hampton Court Palace moat. One sample came from layer [181], a black organic detrital sandy silt at the base of the moat; the other from [177], a dark brown humic sandy silt including mollusc shells.

The sample from [181] contained much waterlogged plant material such as deciduous

Table 1. *Waterlogged macroscopic plant remains from [181] (seeds unless specified)*

<i>Ranunculus sceleratus</i> L.	Celery-leaved crowfoot	1
<i>Tilia</i> cf. <i>x europaea</i> L.	Common lime	53
<i>Aesculus</i> cf. <i>hippocastanum</i> L.	Horse chestnut	1
<i>Buxus sempervirens</i> L. – leaf frag.	Box	2
<i>Aphanes microcarpa</i> (B.& R.) Roth.	Parsley-piert	1
<i>Bellis perennis</i> L.	Daisy	1
<i>Leontodon</i> sp.	Hawkbit	5
deciduous leaf fragments		+

tree leaf fragments, and was gently broken up in water; the lighter fraction was washed over onto a 0.2mm mesh. All waterlogged macroscopic plant remains are listed in Table 1. The heavier material was checked for mollusc shells, which were absent.

The organic component of the other sample was very humified and the only waterlogged macroscopic plant remains to survive were seeds of *Sambucus nigra* (elder), which are particularly resistant to decay. The mollusc shells in this sample proved to be very fragile and could not be extracted by sieving. Shells were therefore dissected from the broken up sample, a total of eight specimens of *Valvata piscinalis* (Müll.) being recovered.

The most numerous plant remains from [181] were seeds (fruits) of *Tilia* sp., lime. Some resembled the fruits of *Tilia platyphyllos*, being pyriform with five oblong ribs, but the majority were more elongate, with less well-developed ribs. They fell within the range of variation of fruits of *Tilia x europaea*, common lime. This is a hybrid of *T. cordata* Mill. (small-leaved lime) and *T. platyphyllos* Scop. (large-leaved lime) and is regarded as introduced or very doubtfully native to the British Isles (Clapham *et al* 1987, 165). It is a large, long-lived tree well-suited to parkland or avenue planting, and was first recorded as being cultivated in Britain during the early 17th century (Krüssmann 1986, 395; Mitchell 1981, 140).

A single seed (conker) of *Aesculus* sp., horse chestnut or buckeye, was recovered from [181], and others were noted by the excavators. It could be closely matched with seeds of *Aesculus hippocastanum*, horse chestnut, but it was not possible to compare it with seeds of all the North American and Asian species of *Aesculus* that are now grown as ornamental trees. *A. hippocastanum* is native to the mountains of Northern Greece and Albania. It was not known in Western Europe until 1576 when seeds were sent to the botanist Clusius in Vienna from Constantinople

(Bean 1914, 170; Krüssmann 1984, 120). It makes a spectacular large specimen or avenue tree unlike any other European tree when in flower and was rapidly distributed after its introduction to Vienna. The tree was first grown in England in about 1616 and a few trees known to date back to 1662 are still in full health (Mitchell 1981, 67). The North American species of *Aesculus* started to arrive in Britain in the 18th century and the Asian species were not introduced until the 19th century (Hillier's 1977, 28–9).

These remains suggest that common lime and horse chestnut were being grown as ornamental trees in the vicinity of the moat. The leaf fragments of *Buxus sempervirens* (box), although a native evergreen shrub, are also likely to have been derived from shrubs grown for ornament in the garden. *Leontodon* sp. (hawkbit) and *Bellis perennis* (daisy) seeds from the moat suggest the proximity of grassland. Both species would have been favoured by the conditions of scythe-mown lawns. The botanical remains give little evidence for the state of the moat other than that there must have been waterlogging for their survival. Seeds of aquatic and marginal plants that readily colonise bodies of stagnant water were absent from [181] apart from a single seed of *Ranunculus sceleratus*, an annual weed of nutrient-rich mud.

The documented dates of introduction of *Aesculus* species to Western Europe mean that it is very unlikely that the lowest fills of the moat are early 16th century, when it is assumed that the moat was constructed. It is probable that they accumulated at an early 17th-century or more recent date following refurbishment of the moat.

Valvata piscinalis, the mollusc identified in [177], is a flowing water species which does not live in closed ponds (Boycott 1936, 140). However, if a source of flowing water were used to feed the moat, this would have been sufficiently slow to allow the colonisation of various species of *Lymnaea* and the Planorbidae in addition to *V. piscinalis*. In the absence of these species, it seems

more likely that the clay represents the dumping of calcareous alluvial sediments in what was an otherwise non-calcareous environment, perhaps in order to seal the bottom of the moat.

POLLEN SAMPLES

Dr Robert Scaife

Pollen analysis was carried out on organic deposits from the basal context [181] of the Hampton Court moat. A single sample of c. 500ml was examined, comprising highly organic material which contained amorphous, detrital and fibrous plant matter. Three sub-samples of this material were analysed using standard procedures for extraction of the sub-fossil pollen and spores (Moore *et al* 1991). Identification and counting was carried out using an Olympus biological research microscope with phase contrast facility at magnifications of $\times 400$ and $\times 1000$. Pollen sums of between 250 and 400 grains were counted for the three sub-samples. The raw data from these counts are presented in Table 2. The pollen has also been calculated as a percentage of the total pollen and the spores as a percentage of the total pollen plus spores. These data are given in Table 3. One sample was also examined prior to acetolysis for the presence of cysts of human intestinal parasites.

The depositional environment in moats can be extremely favourable for preservation of plant material and this is the case here. Moats were a readily accessible area for disposing of domestic refuse, including ordure, and it was felt that the pollen spectra from [181] might contain a component derived from human faecal material, *ie* containing a substantial cereal and associated weed component (Greig 1981; Scaife 1986). This appears not to be the case. Samples were examined for the cysts of human intestinal parasites (*Trichuris* and *Ascaris*) but none were found. Furthermore, the pollen component does not contain assemblages typically associated with a high faecal component or large numbers of grasses from floor coverings. It is, therefore, considered that the pollen recorded derives predominantly from the vegetation which grew locally to the site.

Tilia (lime) dominates the tree pollen, while *Betula* (birch), *Pinus* (pine), *Quercus* (oak), *Ulmus* (elm), *Acer* (field maple) and *Carpinus* (hornbeam) occur sporadically. Shrubs are represented by

Table 2. Pollen counts obtained from [181]

Sample	1	2	3
TREES			
<i>Betula</i>	1	—	1
<i>Pinus</i>	4	3	2
<i>Acer</i>	0	1	1
<i>Ulmus</i>	2	3	9
<i>Quercus</i>	9	3	—
<i>Tilia</i>	55	59	11
<i>Carpinus</i>	0	1	3
SHRUBS			
<i>Cornus</i>	1	—	—
<i>Corylus</i> type	4	1	—
<i>Erica</i>	—	—	1
<i>Calluna</i>	—	1	—
<i>Hedera</i>	1	—	—
HERBS			
<i>Ranunculaceae</i> undiff.	1	—	1
<i>Ranunculus</i> type	1	—	—
<i>Papaver</i>	1	—	—
<i>Dianthus</i> type	1	—	—
<i>Spergula</i> type	—	1	—
<i>Chenopodium</i> type	1	1	—
<i>Papilionaceae</i> undiff.	—	1	1
<i>Trifolium</i> type	—	—	1
<i>Filipendula ulmaria</i>	1	1	—
<i>Apiaceae</i>	—	1	—
<i>Polygonaceae</i> undiff.	1	—	—
<i>Polygonum aviculare</i>	—	1	—
<i>Fallopia convolvulus</i>	1	—	—
<i>Convolvulus</i>	1	—	1
<i>Odontites</i> type	1	—	—
<i>Plantago media/major</i>	1	1	1
<i>Plantago lanceolata</i>	68	71	64
<i>Plantago coronopus</i> type	5	2	16
<i>Bidens</i> type	8	5	3
<i>Anthemis</i> type	3	—	—
<i>Centaurea nigra</i> type	1	—	—
<i>Centaurea cyanus</i>	1	—	—
<i>Liguliflorae</i>	84	62	258
<i>Poaceae</i>	23	27	13
Cereal type	1	4	1
<i>Cyperaceae</i>	—	—	1
Unidentified	3	3	3
Pollen sum	287	253	392
SPORES			
<i>Pteridium aquilinum</i>	3	6	—
<i>Dryopteris</i> type	1	1	1

small numbers of *Corylus* (hazel) and a single *Cornus* (dogwood). The herb spectra are dominant (72–93% of the samples) with 28 taxa identified. The plantains are important with *Plantago lanceolata* type (ribwort plantain), *P. media/major* and *P. coronopus* present. The former is particularly important with values of 28% of total pollen in sample 2. Asteraceae are similarly important comprising *Bidens* type (a large pollen group including daisies), *Anthemis* type (a large pollen

Table 3. Pollen percentages obtained from [181]

Sample	1	2	3
TREES			
<i>Betula</i>	0.3	1.2	0.3
<i>Pinus</i>	1.4	0.4	0.5
<i>Acer</i>	—	0.4	0.3
<i>Ulmus</i>	0.7	1.2	2.3
<i>Quercus</i>	3.1	1.2	—
<i>Tilia</i>	19.2	23.3	2.8
<i>Carpinus</i>	—	0.4	0.8
SHRUBS			
<i>Cornus</i>	0.3	—	—
<i>Corylus</i> type	1.4	0.4	—
<i>Erica</i>	—	—	0.3
<i>Calluna</i>	—	0.4	—
<i>Hedera</i>	0.3	—	—
HERBS			
Ranunculaceae undiff.	0.3	—	0.3
<i>Ranunculus</i> type	0.3	—	—
<i>Papaver</i>	0.3	—	—
<i>Dianthus</i> type	0.3	—	—
<i>Spergula</i> type	—	0.4	—
<i>Chenopodium</i> type	0.3	0.4	—
Papilionaceae undiff.	—	0.4	—
<i>Trifolium</i> type	—	—	0.3
<i>Filipendula ulmaria</i>	0.3	0.4	—
Apiaceae	—	0.4	—
Polygonaceae undiff.	0.3	—	—
<i>Polygonum aviculare</i>	—	0.4	—
<i>Fallopia convolvulus</i>	0.3	—	—
<i>Convolvulus</i>	0.3	—	—
<i>Odontites</i> type	0.3	—	—
<i>Plantago media/major</i>	0.3	0.3	0.3
<i>Plantago lanceolata</i>	23.7	28.1	16.3
<i>Plantago coronopus</i> type	1.7	0.8	4.7
<i>Bidens</i> type	2.8	2.0	0.8
<i>Anthemis</i> type	1.0	—	—
<i>Centaurea nigra</i> type	0.3	—	—
<i>Centaurea cyanus</i>	0.3	—	—
Liguliflorae	29.3	24.5	65.8
Poaceae	8.0	10.7	3.3
Cereal type	1.0	1.6	0.3
Cyperaceae	—	—	0.3
Unidentified	1.0	1.2	0.8
SPORES			
<i>Pteridium aquilinum</i>	1.0	2.3	—
<i>Dryopteris</i> type	0.3	0.4	0.3

group containing chamomiles), *Centaurea nigra* type (knapweed) and particularly Liguliflorae. The latter comprise *Taraxacum* (including dandelion, hawk's-beard and hawkweeds). Other herbs include a range of taxa (including the Poaceae) typical of grassland and pasture habitats. A small number of cereal pollen grains and some possible segetals (*Centaurea cyanus* and *Spergula* type) were recorded. The range of herb taxa present therefore indicates that the local area consisted of grassland and associated weeds.

The tree taxa *Betula*, *Pinus*, *Quercus* and *Ulmus* are considered to be the background component, *ie* pollen derived from longer distances by wind pollination. *Tilia* contrasts with these taxa, and attains relatively high values. This is particularly so considering the entomophily and consequent small pollen production of lime. This usually results in its marked under-representation in pollen spectra. Where it does occur in quantity, it is usually regarded as being from a source close by. Furthermore, *Tilia* is a relatively rare occurrence in deposits of later prehistoric and historic date. Although it was a dominant element of the 'natural' woodland of southern and eastern England, prehistoric clearances caused its demise from the late Neolithic onwards and the last recorded natural or semi-natural woodland existed in Epping Forest during the Saxon period (Baker *et al* 1978). It is postulated, therefore, that limes were deliberately planted at Hampton Court and were growing in close proximity to the moat. They may have been planted in an avenue typical of stately homes (Wilson 1991). Examination of the pollen grains was carried out in an attempt to determine the species of *Tilia* found. Unfortunately, no conclusive determination was made (*ie* *T. cordata* or *T. platyphyllos*) and it is possible that the tree was an introduced exotic or a hybrid form.

Carpinus betulus (hornbeam) and *Acer* sp. (maple) are more enigmatic since both could have been planted trees but could also have been part of the background floral component. *Acer*, however, is not frequently encountered in pollen analysis because of its poor pollen production, and therefore it is likely that this was also growing close to the moat.

With regard to the character of the moat, it appears that there was no permanent standing water with aquatic and/or marginal plants growing, at least during the earliest phase. Certainly, no pollen of such plants was found. This may have changed subsequently since the ditch environment must have remained wet for such fine preservation of organic material to have occurred.

DISCUSSION

The gradually-sloping character of the north edge of the moat, and the lack of any masonry, suggests that a revetting wall (equivalent to that on the approach to the Great Gatehouse) was not required along this part of the moat. The north edge was stepped in, but there was no

evidence either for a wall or that such a feature had been robbed out. The ditch itself (and its fills) sloped gradually for approximately 7m from the stepped edge and bottomed out at 5.8m above OD c.2.5m from the south end of the trench. The width of the flat bottom cannot be determined on the evidence available. Nevertheless the ditch would probably have been more than 20m wide if its profile was broadly symmetrical. No direct evidence for the date of the moat's construction was recovered, but a Tudor date still seems most appropriate on the basis of documentary and cartographic evidence.

The primary moat fill [181] consisted of organic debris which had been preserved by waterlogged conditions within the moat. Unfortunately the environmental analysis provides little evidence for the state of the moat except for a single seed of *Ranunculus sceleratus*, which might suggest that conditions were not especially wet. The environmental remains included seeds and pollen of lime, seeds of horse chestnut, and leaf fragments of box. These probably represent species which were present, and had been deliberately planted, in the immediate vicinity of the moat. Limes were used extensively in the late 17th-century layout of the park and gardens at Hampton Court, especially in the great avenues which radiate away from the east façade (Chettle *et al* 1982, 30–2). Limes may well have been the principal species used in the lines of trees which flank the north arm of the moat in Leonard Knyff's early 18th-century paintings of the palace (and Johannes Kip's contemporary engravings from them). Horse chestnuts may also have been used, and box hedges were probably present. Other seeds and pollen indicate the presence of grassland managed with scythes.

Layer [177] also provided useful environmental evidence. Dr Robinson suggests that the layer represents dumped alluvial sediments rather than a water-lain deposit. This would fit in with the general character of the contexts above the primary fill. It would suggest that the conditions of waterlogging which preserved the seeds *etc* in [181] were only prevalent for a relatively short time. The backfill layers above [177] were generally of similar character. The small quantities of finds recovered are notable, showing that domestic rubbish was not a significant element in the backfill. The fairly consistent thickness of most of the layers is notable, and they all maintain the slope of the bottom of the moat ditch. The layers were probably dumped at fairly regular intervals.

No Tudor architectural fragments such as terracottas were found in the layers of backfill. The north arm of the moat is in fact at the furthest remove from the Henrician domestic ranges which were demolished in the late 17th century. Moreover surviving Tudor ranges lie in between the demolition site and the north arm of the moat. Economy of effort alone would suggest that material would be dumped at the nearest possible locations, either in the moat or elsewhere. Indeed terracotta fragments have recently been found on the Privy Garden excavations, in a deposit very close to the palace (I am very grateful to Steve Parry of Northamptonshire Archaeology for this information).

The dating of the fills is difficult because of the small quantities of finds. The single find of undiagnostic tile from the primary fill, for instance, is of little use. The seeds of horse chestnut and lime from the same context are unlikely to have been deposited before the early 17th century. This suggests that the moat was kept meticulously clean in the second half of the 16th century if a Tudor date for the moat's construction is accepted. Layer [178] is the earliest one containing datable finds in the sequence of fills. A single sherd of early-mid 17th-century tingleware was found. This fits well with the suggested dating of the primary fill. The possibility that the sherd is residual cannot be discounted, however, and the deposit could be later in date. The pottery and clay pipes suggest that the remaining layers of backfill were deposited during the late 17th, 18th and 19th centuries.

The final fills of the moat date to the 19th century (*ie* [119, 150–1, 160], and perhaps [125]). The moat therefore contained about 2.2m of backfill by the time Victorian landscaping took place. The ditch must have been an obvious and still quite deeply-hollowed feature.

The narrowness of brick wall [107] suggests that it was a boundary wall. None of the other walls was definitely contemporary with it stratigraphically, and most were in fact clearly later (*eg* the foundation trench for wall [103] cut a layer which was stratigraphically later than [107]). It is notable that wall [107] lies several metres to the south of the building shown on maps of 1841 and 1851 (respectively PRO Works 34/1349, and Map of the Royal Parks of Hampton Court and Bushy). The strip of gravel [117] running parallel and to the north of wall [107] is interpreted as a path, while the loamy soil [141] to either side was a garden soil. It is most likely that these contexts were part of a

garden layout or border along the line of the partially backfilled moat. Wall [103] is stratigraphically later than [107/141] and appears to coincide with the south wall of the building shown on the 1841 and 1851 maps. Brick structure [105] is not shown on the maps, but appears to be a liquid fuel store. The building was probably a hothouse.

CONCLUSIONS

The trial trench represents the first modern excavation in the Henrician moat at Hampton Court Palace, and the data retrieved are therefore of considerable interest. Evidence for the construction, maintenance and filling of the moat was recovered, and the environmental analyses will be of lasting value not only for studies of Hampton Court but also for research into late medieval and post-medieval moats and palaces in general. The site was landscaped for gardens in the 19th century, and structures associated with this phase still survive below ground. The excavation left these buildings intact.

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EXCAVATION OF AN EARLY-MODERN SITE AT THE GERMAN HOSPITAL, DALSTON, LONDON BOROUGH OF HACKNEY

Kieron Tyler

SUMMARY

The physical remains of the earliest building yet recorded in Dalston were revealed during excavation. A continuous sequence of occupation in the form of brick buildings dating from the mid to late 16th century was recorded. Other, later, buildings which appear in the historic and cartographic record were observed. These include a mansion dated to the early 18th century that subsequently housed the Infant Orphan Asylum and then the German Hospital. Dwellings which appear on a plan of 1796 were recorded. One building on this plan, identified on site, is thought to have been owned by George II.

INTRODUCTION

The Museum of London Archaeology Service (MoLAS) undertook an evaluation of the site occupied by the German Hospital, Dalston in the London Borough of Hackney between 1 and 11 June 1993 (Fig 1). The site code was GMN93. The Ordnance Survey grid reference for the site is TQ 3420 8490. The work was commissioned by the New Islington and Hackney Housing Association and the City and East London Family Health Services Authority in anticipation of their redevelopment of the site.

For the evaluation, seven trenches were machine excavated to assess the nature, date, extent and condition of any archaeological remains (Fig 2). Masonry features and stratified occupation material extending back to the 16th

century were recorded. These deposits were confined to the area north of the railway line which bisected the site. The material was threatened with disturbance or destruction in the proposed redevelopment, and further assessment of its extent outside the trench areas was

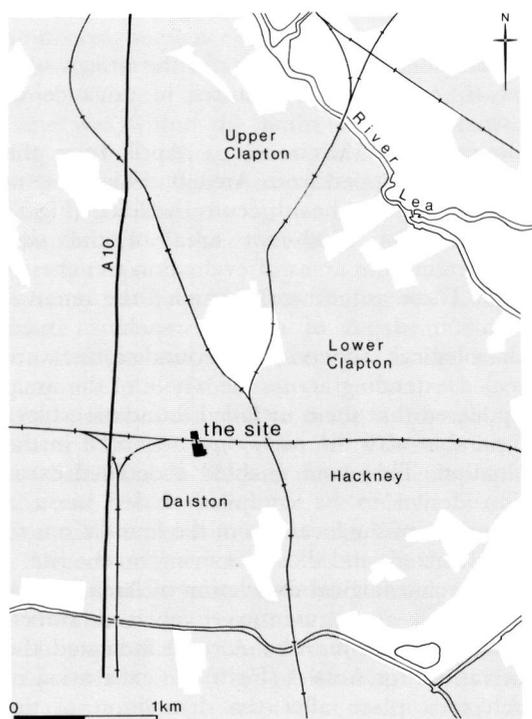


Fig 1. Site location

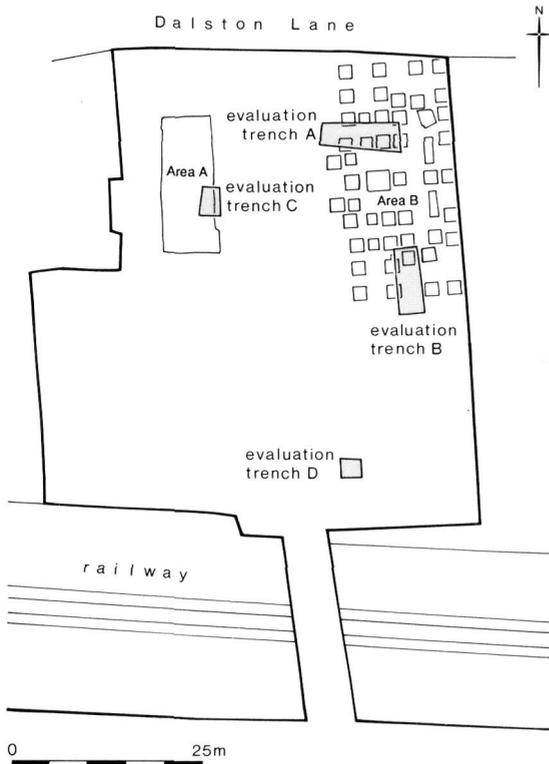


Fig 2. Trench and area location

recommended. This was to aid the design of a brief to record these features in advance of construction.

Between 21 March and 1 April 1994 the topsoil was stripped from Area B, which was to be developed as a health centre building (Fig 2). This was the north-east area of the site, incorporating the areas of evaluation trenches A and B. These groundworks entailed the removal of c.0.60m depth of soil by machine under archaeological supervision. Foundations were revealed extending across the whole of the area. It appeared that these included foundation types comparable with the early ones recorded in the evaluation. This work enabled a detailed excavation design to be compiled, based upon a comparison of the locations of the foundations to be constructed, and those surviving on the site.

The archaeological excavation of Area A took place from 8–20 August 1994. Evaluation Trench C had been within Area A, and indicated the expectations for Area A (Fig 2) the excavation of which took place after the demolition of the adjacent hospital block. The excavation area, roughly rectangular in plan, measured some 7m

east-west \times 18m north-south overall, and partially overlapped with evaluation Trench C. Immediately before the excavation of Area A a watching brief was undertaken on the excavation of a north-south drain trench which was excavated between Areas A and B.

Between 12 and 23 September 1994 the final archaeological work on Area B was completed. This entailed the excavation by machine under archaeological supervision of the location of each future foundation base hole in the areas where archaeological survival had been anticipated.

A BRIEF HISTORY OF DALSTON

The early hamlet of Dalston was situated some 600m east of Ermine Street, the Roman road to Lincoln, which followed the route of the current Kingsland Road and Kingsland High Street (Margary 1955, 195). Dalston developed between the villages of Kingsland and Hackney about halfway along a lane between the two which is known to have existed by 1553.¹ Dalston may have been settled by this date, its earliest firm reference. The settlement at Kingsland was centred around the current junction of Balls Pond Road and Kingsland Road. The main development in Hackney had grown up along what is now Mare Street (Church Street on the 1745 Rocque map), c.850 m to the east of Dalston.

It has been suggested that Dalston derives from *Deolef's Farm* (EPNS 1942, 106). The same source cites *Derlestone* in 1294,² *Dorleston* in 1388 (Hardy & Page 1892–3, 23), *Derlestone* in 1443,³ and *Dorleston* in 1581 (Simpson 1884). The 1388 reference from Hardy is 'William Dorleston, and Katherine his wife', where no linkage is implied or given to Dalston in Hackney. When examined, the 1581 date from Simpson was found to include no reference to Dalston. Simpson (Simpson 1889vi) does note that 1581 is the date of the first book of Vestry minutes for the church of St. John at Hackney.⁴ The other early dates given by the English Place Names Society may also be etymological speculation which do not necessarily apply to Dalston in Hackney.

Rating records give some indication of the population of Dalston. In 1605 33 leaseholders were assessed for church rates;⁵ 1720, 17 were assessed for poor law rate.⁶ These figures do not necessarily imply a drop in population, as the definition of what constituted Dalston is unknown

and different types of rates were applied at different periods.

The future Bishop of Exeter lived in Dalston at some point between 1654 and 1688, and possibly later. In 1795 Lysons stated 'Offspring Blackall ... resided in the early part of his life, with his father at Dalston, in an ancient brick house, now let as lodgings' (Lysons 1795, 463). Offspring Blackall (born in 1654) was Bishop of Exeter 1707–16. Robinson (published 1824) states 'his father Thomas Blackall (Alderman of London, died 1688, *ibid*) had a house which stood next to the Red Cow public house ... nearly opposite Smiths Nursery' (Lysons 1795, 263–4). This 'ancient' house would have been north of Dalston Lane towards the corner with Wayland Avenue within 180m of the site. Both the Red Cow and Smiths Nursery appear on Greenwood's 1826 map.

During 1992 MoLAS undertook archaeological work at The Samuel Lewis Trust Dwellings, c. 75m east of the site on the opposite side of Dalston Lane to the east of the centre of the hamlet of Dalston and the orchard noted above. Blackall's house (see above) was known to have been in this area. Evidence for agricultural activity dating to the 17th and 18th centuries was recovered (Phillpotts 1992, 9).

A survey of 1692 described springs and wells in two fields near Dalston as being the source of the water for a piped conduit which led to Aldgate. Clarke has stated that this was in the area of Navarino Road, some 200m to the east of the site (Clarke 1986, 239).

Further early contemporary sources do not reveal much beyond noting the existence of a settlement at Dalston. Messuages⁷ in Darlston are referred to in court rolls dated 29 March 1695⁸ and surrender and admission documents dated 22 April 1699.⁹ In *A Tour Through London About the Year 1725* Daniel Defoe included Dalston in the section on Hackney: 'Hackney is of great extent containing no less than twelve hamlets of separate villages ... (including) ... Dalstone. All these, though some of them are very large villages make up but one Parish of Hackney. The town is remarkable for the retreat of wealthy citizens, that there is at this time near a Hundred Coaches kept in ...' (Defoe 1929, 81). It is known that by 1733 there were two inns at Dalston (VCH 1995, 28).

The first indication of the character of early Dalston is John Rocque's map of 1745. A group of at least 15 or so buildings is situated on both

sides of Dalston Lane, with a pond towards the east of the centre of the settlement area.¹⁰ To the east of the centre of the hamlet, north of Dalston Lane, is what appears to be an orchard with related buildings fronting onto the road. This is the site later known to be occupied by the Red Cow public house. A plan of 1796 includes further detail of the area around the site (Fig 3). The surrounding land is largely rural, with orchards and field boundaries visible. Hackney Brook (Dalston Brook on the Rocque map) crossed Dalston Lane to the east of the hamlet at Dalston Bridge. The rustic nature of the area is confirmed by the presence of cress beds along Hackney Brook (Barton 1962, 109).

Dalston found itself in favour during the reign of George II (1727–60). Clarke notes that George II was 'visiting his lady love, The Baroness de Bode, at a residence he took for her in old Dalston ... which is still standing. I refer to the houses Nos 152 and 154 Dalston Lane, now occupied by Mr Arnold and Mr R. P. and the Misses Atkins. It has been called a "shooting box" I know not why. The central part is the original house – almost intact; but it has been added to in front, bringing it nearer the road. It was then divided as is now seen, into two dwelling houses' (Clarke 1986, 245). The current numbering sequence of this part of Dalston Lane remains the same as that during the period in which Clarke was writing (1892–3).¹¹ 154 Dalston Lane was within the limits of the present site (Fig 3; the Graham Estate building within the site). These buildings at 152–154 Dalston Lane were demolished during the period between the compilation of the 1912 and 1938 Ordnance Survey maps.

Some standing buildings in Dalston Lane are dated to the period close to the compilation of the Rocque map; number 160 to the second quarter of the 18th century, 162 and 164 to the 18th century, and 168 to the early to mid 18th century (DOE 1989, 35–6). All of these structures are listed Grade II, and the basement plans to 160 and 168 Dalston Lane are held by Hackney Council Environmental Services Department.¹²

Greenwood's map of 1826 shows that expansion had taken place around Dalston, with the surrounding area remaining largely undeveloped with expansion confined to the alignments of major roads. The 1831 parish map (Fig 4) shows the site area with somewhat more detail than Greenwood's map. By the time of the 1873 Ordnance Survey map the area was fully built

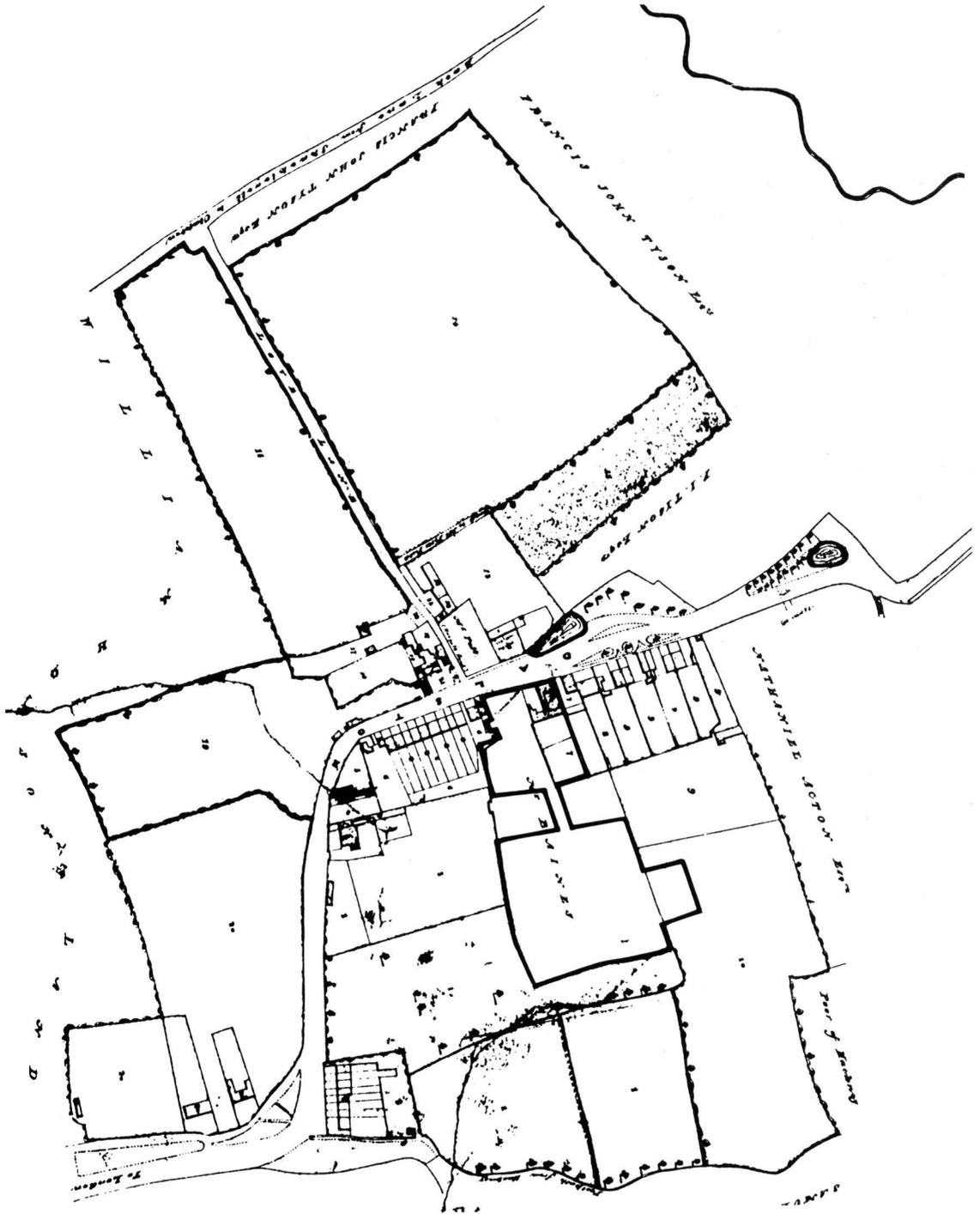


Fig 3. Plan of Graham Estate, 1796 (courtesy Hackney Archives Department)



Fig 4. Map of the parish of St John Hackney, 1831 (courtesy Hackney Archives Department)

up, with new streets laid out. The former hamlet was indivisible from the rest of Hackney.

OWNERSHIP OF THE SITE

It is clear from Rocque's map that the frontage onto Dalston Lane was built up by 1745, with the remainder of the site area being open land.

By 1773 the bulk of the site was owned by John Burdon (this area corresponds to 'Mr. Baines' on the 1796 plan; Fig 3). In 1773 John Burdon died and left the house and grounds to his wife Mary. The property was then granted in trust to Daniel Mildred, John Roberts, and Richard Chester in trust for Mary's daughter Priscilla, wife of John Baynes (*sic*). Priscilla Baynes's oldest son Burdon promised to Thomas Hankey and Thomas Mole that they would have

possession of the land and property after his admission to the manorial court of Hackney. Baynes received £6,000 for this deed of covenant on 1 September 1812.¹³

The area of the site outside the Baynes land was, by 1796, owned by Robert Graham. A 1796 plan of the Graham Estate details the outline of the buildings on this land (Fig 3).¹⁴ It is known from later maps and plans that Robert Graham was, by 1831, 'Baron Graham'¹⁵ and died by 1843.¹⁶ The residence visited by George II was located within this part of the site. The 1873 Ordnance Survey map names the large (still standing) building opposite the Dalston Lane entrance to the site as 'Graham House'; a Grade II listed building dated to c.1800 (DOE 1989, 34). This was probably the residence of Robert Graham. Clarke stated that 'Graham House seems to occupy the site of a much older

building' (Clarke 1986, 242). No supporting evidence is given for this statement. The 1800 'Land Use Map of London and its Environs' by Thomas Milne concurs with other maps in depicting the north of the site, fronting onto Dalston Lane, as built up and the remainder as 'meadow and pasture'.¹⁷

By 1827 the land owned by Baynes was sold to the Infant Orphan Asylum which opened on 3 July 1827 (Robinson 1824, 141). It is conceivable that the Infant Orphan Asylum moved into the house and grounds formerly owned by John Burdon. By 1841 it was realised that the Infant Orphan Asylum required larger premises and in 1843 it moved to Wanstead. Subsequent to this the property was sold at auction by Shuttleworth and Sons on Friday 7 April 1843 (for £3,000) to the committee which had been set up to establish a hospital for 'the reception of all poor Germans and others speaking the German language' (McKellar 1991, 6). The sale plan represented the site in some detail (Fig 5).¹⁸ To the north-east, the site area within the adjacent property was not drawn, but annotated as 'The Executors of Baron Graham'. The 1831 parish map represents the land owned by Graham as *BG*. Unfortunately, during the preparation of this article no archive relating to Robert Graham or his estate has been located.

The German Hospital was funded by both the wealthy German colony in England and English contributors. Initially interest free loans were made by the King of Prussia, and two committee members: Mr Frederick Huth and Mr C. A. Prellor. The Hospital was officially opened on 15 October 1845 (McKellar 1991, 6; Spechte 1989, 13). The *Illustrated London News* of 18 October 1845 included a report on the opening of the German Hospital which refers to 'the healthy suburb of Dalston'.

On 6 November 1849 an east-west strip of the site was granted to the East and West India Docks and Birmingham Junction Railway.¹⁹ The North London Railway was subsequently constructed, and a bridge crossing the railway was completed, linking the northern and southern halves of the site.

By the early 1860s it had become apparent that the buildings on the north part of the site were not large enough for the hospital. Thomas Leverton Donaldson was commissioned to design a 100-bed hospital in 1862 (McKellar 1991, 11). This building was completed in 1864 on the south of the site in the area of the previous

Orchard Garden.²⁰ The *Illustrated London News* of 5 November 1864 included an article on the opening of the new hospital building which was 'erected in what was formerly the garden of the old hospital'. The new building was opened on Saturday 15 October 1864, and is still standing.

The Infant Orphan Asylum buildings were demolished by the time of the compilation of the 1873 Ordnance Survey map. The north end of the site remained clear, but by 1876, the date of the gate house, new buildings had been begun. These were added to by an outpatients block in the 1930s.

On 7 March 1944 a plan was compiled to complement the deed which conveyed the German Hospital from being a private institution, to being 'the German Hospital Trust Ltd'.²¹ This plan shows the hospital as still within the limits of the land owned by Baynes in 1796.

After 1944 the area formerly owned by Baron Graham was incorporated into the German Hospital and a garden area laid out. This development supplied the site outline which survives today.

THE BUILDINGS ON THE SITE

Three sources describe buildings on the site which had been demolished before the archaeological work began: the 1796 plan of the Graham Estate (Fig 3); the 1843 sale plan of the Infant Orphan Asylum (Fig 5); and an illustration in the *Illustrated London News* of 18 October 1845 (Fig 6).

The 1796 plan of the estate of Robert Graham includes the north-east area of the site, *ie* land adjacent to that owned by Baynes. The structures within the site limits were leased by a Mr Bord. There were three conjoined buildings fronting onto Dalston Lane with an open area to the north-west of the property. The north-south axis measured *c.*23m with the maximum east-west measurement being *c.*18 m. To the rear (south) was an open garden area.

The 1843 sale plan (Fig 5) is of the property previously occupied by the Infant Orphan Asylum and probably formerly owned by Baynes (Dalston Lane is referred to as Dalston Road).

The *Illustrated London News* article of 18 October 1845 includes an illustration of the rear of the standing Infant Orphan Asylum buildings which were subsequently taken over by the German Hospital (Fig 6). The building layout matches the 1843 plan. Certain suggestions can be made

from Kingsland

DALSTON ROAD

to Hackney

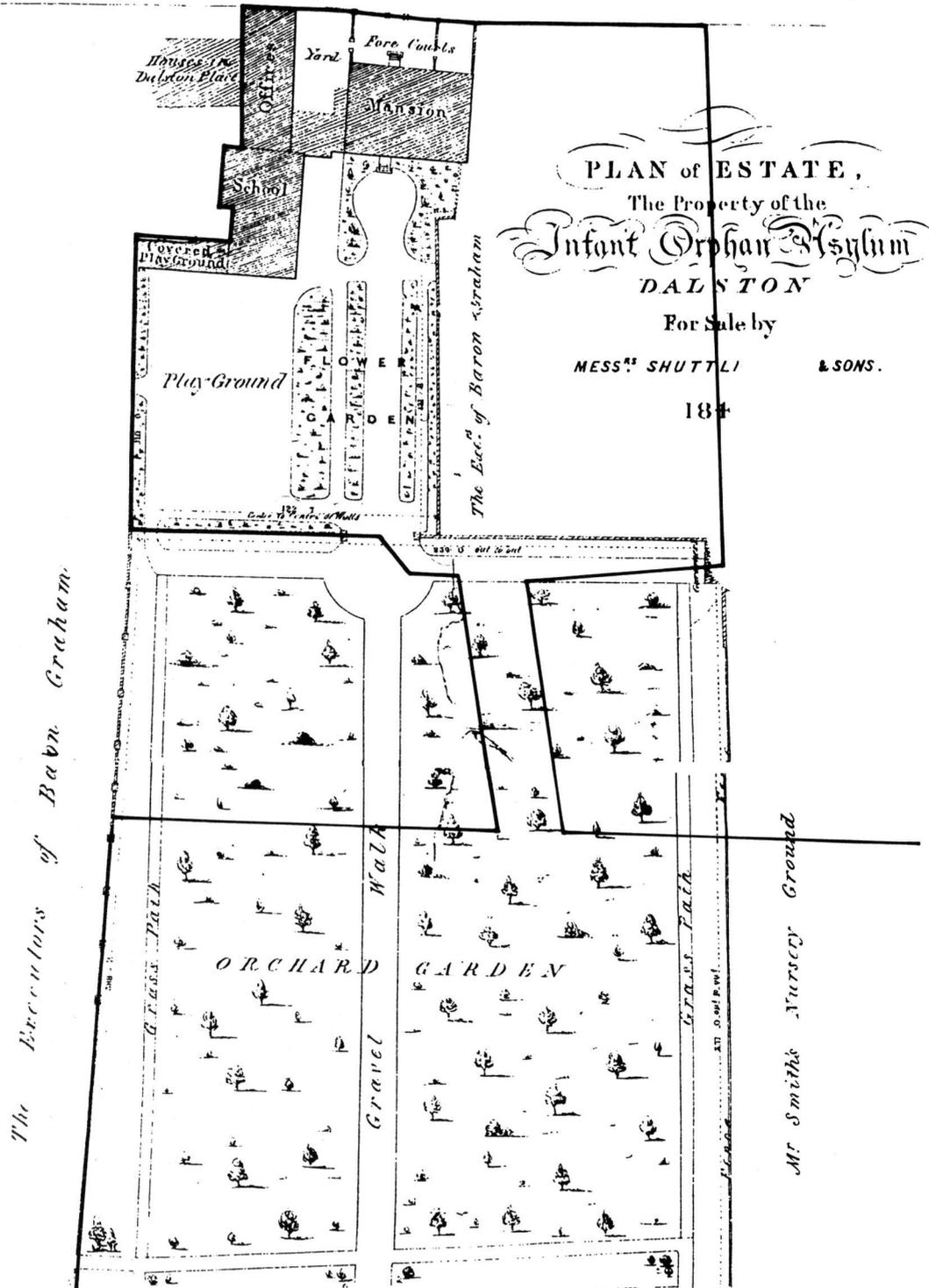


Fig 5. Sale plan of Infant Orphan Asylum, 1843 (courtesy the Archive Department St Bartholomew's Hospital, Royal Hospitals NHS Trust)

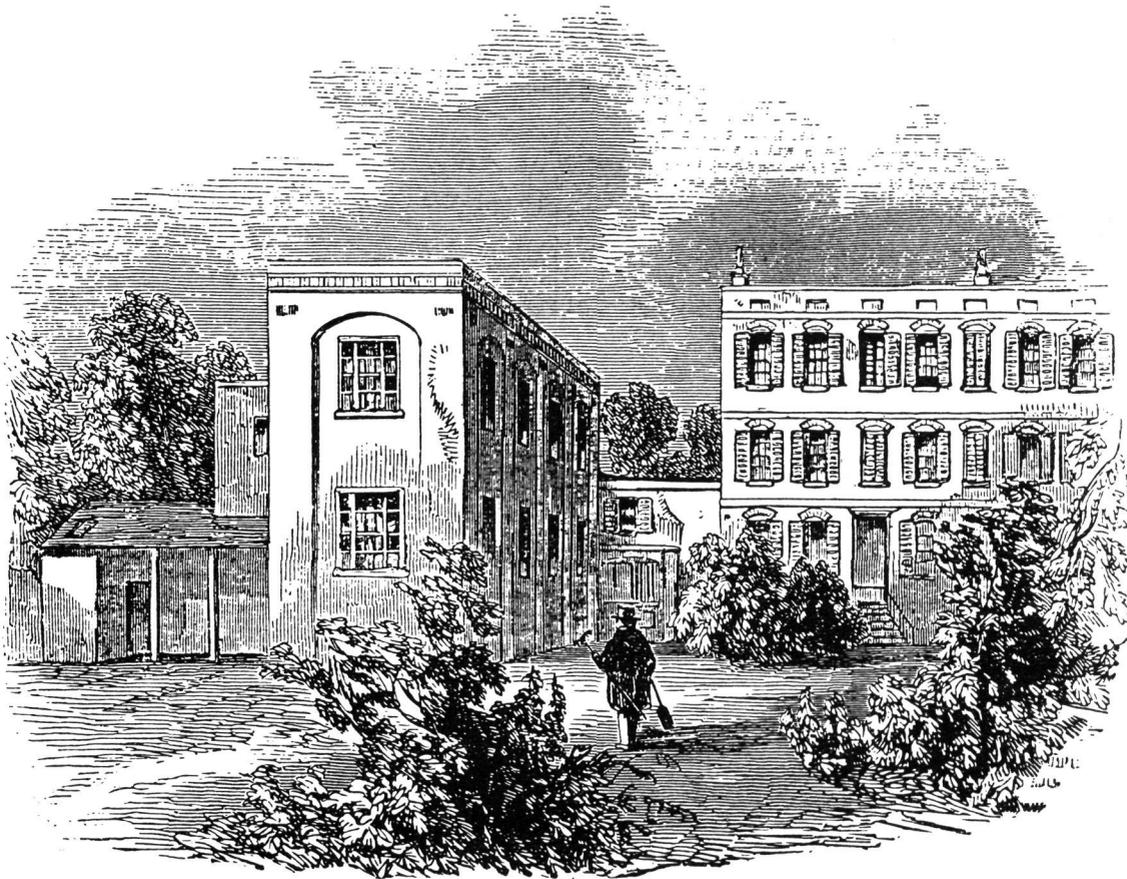


Fig 6. *The Infant Orphan Asylum, from Illustrated London News, 1845 (courtesy The Illustrated London News)*

about the architectural style of these buildings, and deductions made about their date of construction. It can be proposed that the main building (the mansion, to the right of the drawing) was constructed in the early to mid 18th century,²² contemporary with the listed buildings which still stand in Dalston Lane. The building aligned north-south at the left of the drawing (the school) was added in the early 19th century and is represented on the 1831 parish map (Fig 4).²³ The complex of buildings associated with the Infant Orphan Asylum is represented as substantially the same on both the 1831 parish map and the 1843 sale plan.

In summary, the mansion was constructed on the site by 1773 (when it was under the ownership of John Burdon), probably during the early 18th century. The school was added during the period from the early 19th century to 1843. Both of these buildings and the related structures were demolished by 1873. The land within the site

limits owned by Baron Graham was built up by 1796, when the property was leased by Mr Bord. By 1938 this building was no longer standing. As buildings dated to the 18th century survive along Dalston Lane, it is conceivable that Mr Bord's buildings may have survived in some, perhaps altered state, to that date.

THE SITE SEQUENCE

Open Area I (Natural ground – mid 16th/17th century)

The earliest deposit recorded on the site was natural brickearth (surface levels 17.265–17.86m OD), which overlay the Corbets Tey Gravel (Gibbard 1994, 43).

The earliest archaeological deposit was Open Area 1, a layer of mixed silty brickearth (surface levels 17.65m–18.10m OD). The natural brick-

earth had been levelled, and this deposit had subsequently built up. Open Area 1 was dated to 1550–1600 by pottery, and represents evidence of the earliest cultural activity on the site. Open Area 1 subsequently became the base for building activity.

Building 1 (late 16th century – early 18th century)

The earliest feature, which postdated Open Area 1, was Building 1, a brick dwelling which dated from the late 16th century (Fig 7). Within the building was a brick-lined pit. To its south was a sunken tile surface, probably a feature within a garden. This building dated to a period before the compilation of any maps, when Dalston is known to have been settled. As such, it is the earliest physical evidence for Dalston hamlet.

The foundations shared a common base level of c.17.90 m OD. The lowest seven courses of the

foundations consisted of a splayed footing, which would have spread the weight of the superstructure. Floor level would normally have been at the point where the splay met the vertical face of the wall (c.18.30 m OD in this case). This floor level is similar to that of Open Area 1: 18.10m OD. Building 1 had no basement. The bricks used in the construction of Building 1 were of types dated to the late 15th–16th centuries.

The brick-lined pit was cut directly into the natural brickearth. There was no integral base and the inside face was unstained. It was therefore not a cesspit and may have been an ice house, larder or similar storage feature.

The surviving foundations allow the following dimensions for Building 1 to be suggested: at least 8.00m east-west at the northern frontage, and between 9.90m and 16.80m north-south.

To the rear of Building 1 was a surface formed of reused peg tiles (dated to 1500–c.1800) at 17.65m OD. This level (some 0.65m below the suggested floor level of Building 1) suggests that

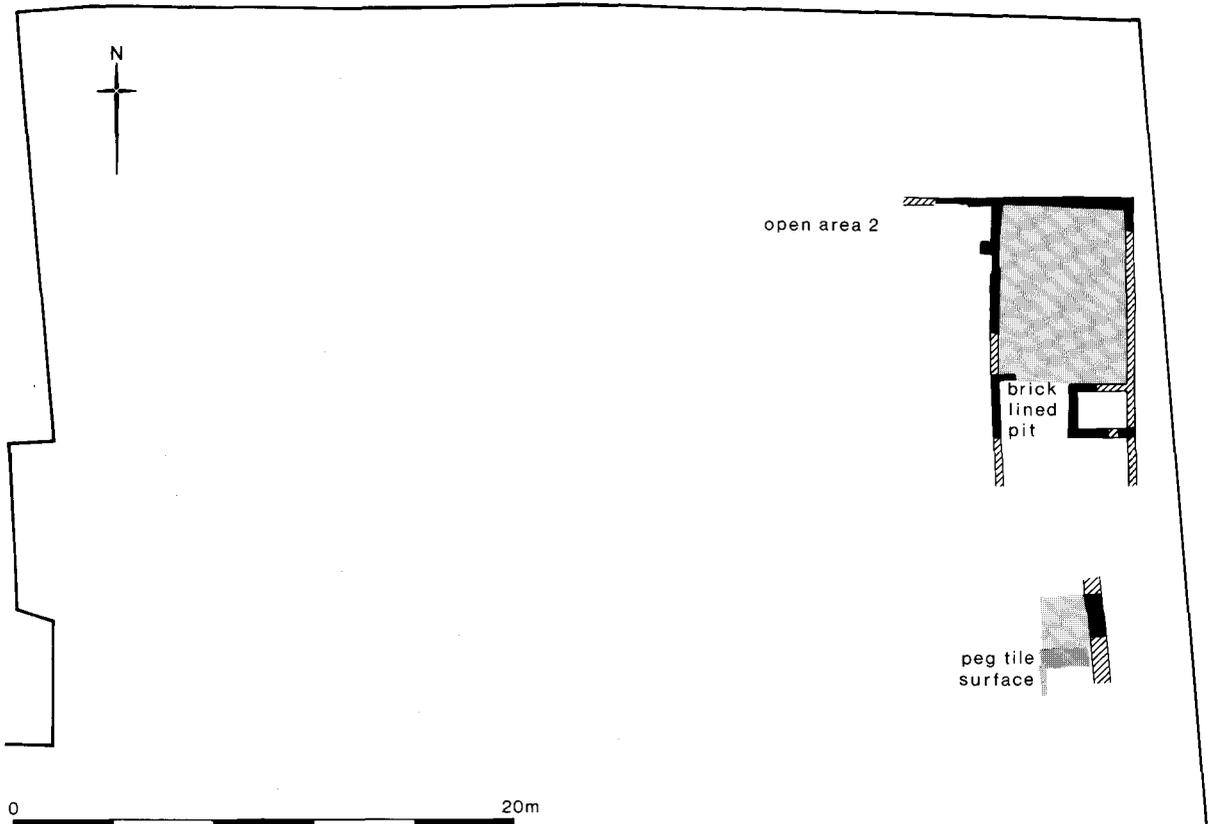


Fig 7. Building 1

it was either a basement feature, or more possibly a sunken external feature within a garden area. Fragments of brick from the underlying make-up layer were dated to the 16th century. Werra ware pottery dated to the late 16th-early 17th century was recovered from a cut feature associated with the tile surface. A north-south foundation of the Building 1 type retained the east side of the surface. Evidently this feature was contemporary with Building 1.

Some conclusion can be made as to the status of Building 1. No contemporary rubbish pits were found (as the area surrounding the building was probably a garden), therefore it would appear the status of the building was sufficiently high for the refuse to have been taken away during the life of the building.

Open Area 2 (late 16th-18th century)

Open Area 2 was in use during and after the life of Building 1. A ploughsoil to the west of Building 1 acted as the base for a horizontal gravel metalling at 18.50m OD (Fig 7). This surface was some 0.20m higher than the proposed floor surface level of Building 1. The plough soil included a fragment of Red Border ware tripod pipkin dated to 1670-1750.

Open Area 3, Phase 1 (late 16th-mid 18th century)

Open Area 3, Phase 1 postdated the disuse of the Building 1 sunken garden feature (Fig 8). It comprised dumps of demolition debris which raised and consolidated the ground level supplying an open area to the south of Building 1 after the demolition of its superstructure (the foundations survived to be archaeologically recorded).

The external tile surface to the south of Building 1 was sealed by rubble dumps of demolition debris which included bricks and mortar of fabric types used in Building 1. The demolition of Building 1 would appear to be the source of this debris. The dumps included pottery dated to the 17th century.

Open Area 3, Phase 1 postdated the demolition of Building 1, and is therefore considered separate from Open Area 2 which was in use during and after the life of the building. In effect Open Area 3, Phase 1 was deposited in preparation for the construction of Building 2

(and its associated Open Area), and although associated with that building is phased between Buildings 1 and 2.

Open Area 3 was cut into by truncated rubbish pits with fills dated to 1670-1750 and after 1750. Therefore Open Area 3 was out of use by the mid 18th century at the latest.

Building 2 (early 18th century to between 1912 and 1938)

Building 2 was constructed on the site of Building 1 (Fig 8). The latest date by which Building 2 was constructed was 1796 (the date of a map on which it appears), and the earliest was during the early 18th century (the date of the latest brick type used in its construction). It is Building 2 which made up the western half of the house bought between 1727-60 by George II for his mistress, at 152 and 154 Dalston Lane, which was subsequently divided into two (Clarke 1986, 245). Building 2 is on the site of 152 Dalston Lane.

Building 2 was constructed after the demolition of Building 1 and reused some of the earlier party wall lines and property limits. Phase 1 represented the earliest constructional phases; make-up layers and related features which underlay the building. Phase 2 was the construction of the perimeter/external walls to the west and east sides of the structure (the south end did not survive and the north incorporated that of Building 1). Phase 3 included the internal masonry features, party walls and surfaces to the building. Phase 4 was the later extension of the building to the north (towards Dalston Lane) with the addition of a new frontage, an 'area' to the north of the building and the construction of a property boundary to the north of the area.

After the addition of Phase 4, which was described by Clarke in 1892-3, the building survived until the period between the 1912 and 1938 Ordnance Survey maps.

Phase 1 (18th century)

After the demolition of Building 1 a series of make-up layers were deposited abutting the surviving Building 1 foundations. A linear brick drain aligned south-west/north-east cut into the make-up layers. The drain had an arched profile with a brick base (at 17.495m OD). The bricks and mortar of the drain were of types dated to

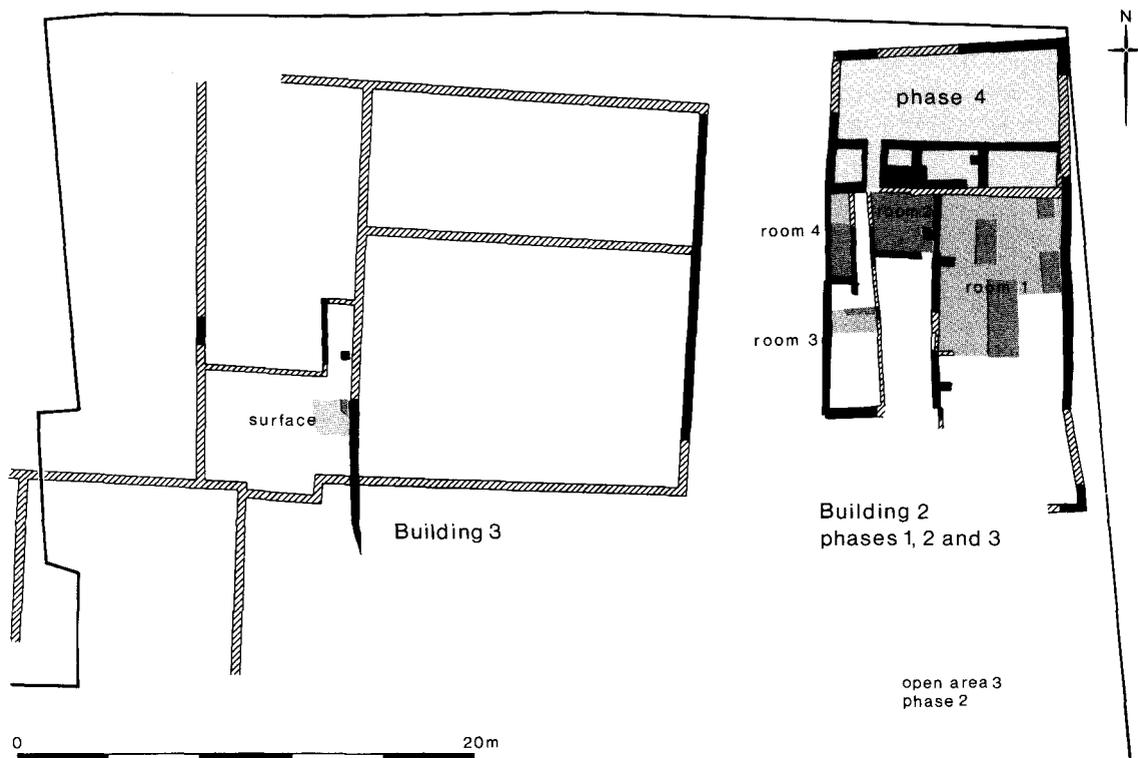


Fig 8. Building 2, Phases 1, 2, 3, 4 + Building 3 (with extent superimposed from 1843 sale plan)

the 16th to 18th centuries with evidence of reused material. This date range postdates the disuse of Building 1.

The brick drain included reused brick dated to the 16th-17th centuries, as well as bricks of an 18th-century type. The make-up layers into which the drain was cut included residual medieval pottery dated to 1270-1500. The drain can be dated to the 18th century.

Phase 2 (18th century)

The west and north sides of Building 2 were recorded. The foundations of the front of Building 1 were reused. The southern limit had been removed by later activity, and the eastern limit of the building was beyond the limit of excavation. The foundations cut into the make-up layers deposited during Phase 1 of Building 2, and therefore postdated the drain discussed above.

Bricks employed in the construction of this phase of building were dated to the late 15th-16th centuries and the 17th century. As this phase

postdated the drain noted above, these bricks were clearly reused and this phase of building was dated to the same period as the drain; the 18th century.

Phase 3 (18th century)

Building 2, Phase 3 included the internal features of the structure. Four distinct rooms with surfaces were observed.

Open Area 2, Phase 1 was in use at the same time as Building 2, Phases 1-3. West of, and contemporary with, Building 2, its surface level was 18.50m OD. The levels of the internal surfaces of Building 2 ranged from 17.875m OD to 18.22m OD. Therefore it is clear that the surviving floors were within a basement. The ground floor was above external ground and would have been walked up to from Dalston Lane.

As with Phase 2, there was reuse of building materials, and therefore the date assigned to the latest brick type dates this phase to the 18th century.

Room 1 was at the eastern side of Building 2. The floor surface was of brick and tile with surface levels of 18.075m OD to 18.275 m OD. The northern and western extent of this surface was constructed from stretcher bonded bricks set on bed, dated to the late 15th to 16th centuries. It is evident that there was reuse, as the surface stratigraphically postdated the drain partially constructed of 18th-century brick. The reused bricks may have derived from the demolition of Building 1. Towards the south the surface was constructed of red ceramic tiles 240mm square.

At its most southerly recorded point the surface extended across the backfilled, out of use, truncated lined storage pit (Building 1). The pit was backfilled with a compact redeposited brick earth similar to that of make-up layers of Building 2. The internal dimensions of Room 1 were 5.25m east-west by at least 8m north-south. The eastern limit of Room 1 was an internal partition, beyond which the building originally continued, on the site of 154 Dalston Lane.

Room 2 was to the west of Room 1. Between the two rooms was the central party wall, which reused foundations from Building 1. The floor of Room 2 was a brick surface (dated by brick type to the late 17th to 18th centuries) at 17.875m OD. The internal dimensions of Room 2 were 2.60m east-west by 2.70m north-south.

Room 3 was located to the south-west of the building. A York Stone surface survived at 18.22m OD. The south-west corner of this room marked the south-west corner of Building 2. The east side of Room 3 was marked by the wall line which continued north to delimit the west side of Room 2. The internal dimensions of Room 3 were 1.40m east-west by 4.70m north-south.

Room 4 was a narrow rectangular chamber some 1.40m east-west by 4.70m north-south. These restrictive dimensions imply that this was not an occupied room. It may be that Room 4 was a storage area, perhaps a coal cellar or large pantry. Within Room 4 was an unstained tile surface at 18.05m OD.

The area between Room 2 and Room 4 was an internal passageway leading into Room 3. The area between Room 3 and Room 1 revealed no surviving foundations due to truncation.

Phase 4 (19th century – 1912 to 1938)

Phase 4 of Building 2 represented the extension of the building to the north by the addition of a

new frontage, an 'area' to the north of the building and the construction of a property boundary to the north of the area (Fig 8). The bricks used were of an 18th-century type. Evidently there was reuse. The extension of the building towards the road line implies that Dalston Lane had become narrower, or that the area between Building 2 and Dalston lane had not previously been built upon.

These foundations had base levels of between 17.05m OD and 17.35m OD. They were constructed with a similar grey to off-white mortar, with some reused yellow brown mortar adhering to some bricks.

An internal passageway 0.60m wide ran through the front of the building leading to a basement at the west side. This was an entrance to the passageway noted above under Building 2, Phase 3. To the east of the passage was a foundation added as the base for the stair which would have led up to the front door.

North of the frontage was a horizontal brick surface at 17.085m OD to 17.195m OD. This represented the external 'area' between the front of the building and the property limit. This level is somewhat below (c.0.80m) that of the rooms detailed in Building 2, Phase 3.

As reused bricks were employed in the construction of Building 2, Phase 4, the brick typology is of little use in dating. The 1796 plan does not show this extension towards Dalston Lane. Therefore Phase 4 dates to after 1796, and can be assigned a 19th-century date. Clarke, published 1892, noted that the building had 'been added to in front, bringing it nearer the road'. Evidently the Phase 4 extension was quite apparent during the Victorian period.

The building appears on the 1873, 1894–6, and 1912 Ordnance Survey maps, but not on the OS map for 1938. It was therefore demolished after 1912 and before 1938.

Open Area 3, Phase 2 (18th century)

Open Area 3, Phase 2 included features to the south of Building 2 which appeared to have been in use during the life of the building (Fig 8). An east-west gravel metalling was recorded with a surface level of 18.50m OD. This had been deposited on Open Area 3, Phase 1.

An east-west linear brick drain survived to the south of Building 2. It cut through the foundation which retained the external surface to the south

of Building 1, so certainly did postdate the disuse of Building 1. The base level to which the drain was cut was 17.575m OD; below the basement level of Building 2. The off-white mortar was comparable with that used in Building 2, Phase 4.

Building 3 (early 18th century – c.1864–1873)

Building 3 represented the remains of the mansion and related structures depicted on the 1843 Infant Orphan Asylum sale plan (Fig 5). Fig 8 is the superimposition of the plan of the mansion (derived from the 1843 plan) onto the foundations recorded on site. This building was dated architecturally to the early 18th century, and was certainly occupied by 1773. The structure appears as a discrete entity to the north-west of the site on the 1745 Rocque map. It had been demolished by the time of the compilation of the 1873 Ordnance survey map, after the German Hospital moved to its new building in 1864.

The Building 3 foundations were of shared brick type, mortar type and base level and alignments (parallel or at right angles). Building 2, Phase 3 (dated to the 18th century) made use of the same type of bricks as Building 3, it is therefore apparent that both buildings were standing during the same period. The foundations of Building 3 cut into Open Area 2, Phase 1 (dated to 1670–1750). Its construction is placed in the early 18th century, as argued above.

Building 3, the mansion, and Building 2 were not parts of the same property. Building 2 was within land owned, from at least 1796–1843, by the Graham Estate, while Building 3 was separately owned from at least 1773²⁴ to the date of its demolition (between 1864 and 1873).

Elements of the mansion, forecourts, yard and the structure between the mansion and the school were recorded. For clarity in archaeological discussion the surviving foundations were split into two phases to differentiate between external walls, and internal features.

The foundations to the west and east side of the mansion were recorded. The northern extent of the eastern foundation continued as the foundation of the forecourt wall. Therefore the forecourt was integral to the construction of the mansion. The bricks were of a type which dated from the post-Great Fire period to the 18th century, and were clearly reused. The mortar was off-white. The base levels of the foundations

were within the range 17.985m OD to 18.235m OD. This is an 0.25m variation over the recorded foundations.

A brick surface that was part of the basement of the building between the mansion and the school (to the south of the yard) was recorded. This was at 18.205m OD. Bricks were dated to the late 15th century to 16th century, and were therefore reused. There were later repairs of bricks dated to the 19th century. These repairs give an indication of the length of time that the building was in use.

To the north of this surface were parallel foundations which were part of the west and east sides of the south end of the yard. These were of the same construction type as the mansion foundations.

It is clear, therefore, that the mansion, forecourts, and yard were constructed together. The unnamed part of the building to the south of the yard which linked with the school was also integral to this building. The date range suggested by the brick typology falls within the date range ascribed by the assessment of the building's architectural features; construction during the first half of the 18th century.

The school building was constructed before 1843, during the first half of the 19th century. It is reasonable to suggest that the school was constructed around, or shortly after 1827, the date the Infant Orphan Asylum took over the mansion. It appears on the 1831 parish map. Although the school was not archaeologically recorded, it can be considered an addition to Building 3.

Open Area 4 (c.1873–1876)

Open Area 4 came into use after the demolition of Building 3, the Infant Orphan Asylum building. After the completion of the 1864 Hospital building to the south of the railway line the asylum was vacated and demolished.

The Open Area is depicted on the 1873 Ordnance Survey map. The standing gate-house in this area is dated to 1876. Therefore Open Area 4 is dated to 1873–1876. It may date from earlier than 1873, but after 1864. Phase 1 was the layer of demolition rubble which consolidated the ground after demolition. Phase 2 was the surface subsequently laid out.

The consolidation layer included a fragment of a residual medieval mortar and a piece of an

18th–19th century copper buckle. Also found within the clearance of the consolidation layer was a tile which depicted a biblical scene of ‘The Shearing of Samson’. The scene is within a roundel and the corners have barred ox-head motifs and small pin holes. The tile is decorated using manganese which gives the design a purple colour. The tile measures 130 × ? × 8mm and has been carefully cut across the bottom and neatly chamfered so as to fit into a panel, probably in a fireplace. This tile was probably manufactured in London in the first half of the 18th century. It is likely that the tile derived from the 18th-century buildings used by the Infant Orphan Asylum and was redeposited after demolition (Tyler 1995, 48–9).

CONCLUSIONS

Dalston may have been settled by 1294, and at least by 1553 when Dalston Lane is known to have been in use. By 1605 the population numbered at least 33 households. The 1745 Rocque map depicts a hamlet within a largely rural environment, with the excavation site slightly to the west of the centre of Dalston. Standing buildings in Dalston Lane date from around the time of the compilation of this map and are shown on it.

To the north-east of the site area was Building 1 (Fig 7), a brick dwelling which dated from the late 16th century. This was a high-status free-standing building with a sunken garden area to its rear. Within the building was a brick-lined storage pit. It had no basement. No other buildings dating from this period have been recorded in Dalston.

By the 18th century Building 2 had been constructed on the site of Building 1 which had been demolished (Fig 8). Building 2 represented the western half of a larger dwelling. The recorded portion included a basement with at least four rooms; the frontage and some foundations from Building 1 remained to be incorporated into the newer structure. During this period the future Bishop of Exeter resided in Dalston in a house across Dalston Lane, north-east of the site.

Building 2 is known to have been part of a house bought by George II (1727–60) for a mistress that he kept in Dalston. This house was later known as 152 and 154 Dalston Lane and was subsequently divided. Building 2 is on the site of 152 Dalston Lane.

Building 3, a mansion, was constructed during the early to mid 18th century to the west of Building 2. There were no structures on the site of Building 3 which predated it; it was constructed on open land. The type of brick employed was in use from the late 17th century. The mansion is depicted in *The Illustrated London News* of 18 October 1845 (Fig 6). By 1773 this building was owned by John Burdon.

There are five standing buildings dating from the first half of the 18th century in Dalston Lane, and Buildings 2 and 3 were constructed during this period. It would appear that the first half of the 18th century was a period of unprecedented development in Dalston, which was expanding westwards.

Building 2 was, by 1796, within the estate owned by Robert (by 1831 Baron) Graham, who had died by 1843.

In 1827, after having passed through various hands, the mansion (Building 3) was bought by the Infant Orphan Asylum. Around this period, before 1831, an extension (the school) was added to the south-west of the mansion. It may be that this extension was added by the Infant Orphan Asylum. Building 2, at 152 Dalston Lane, remained under separate ownership.

In 1843 the Infant Orphan Asylum vacated the site, and its buildings (*ie* including Building 3, the mansion) were taken over by the German Hospital. Between 1864 and 1873 these buildings were demolished and the German Hospital moved into a newly constructed complex on the south of the site, beyond the North London Railway line.

Building 2, at 152 Dalston Lane, was extended to the north during the 19th century, and demolished between 1912 and 1938. Possibly the building was divided from 154 Dalston Lane at the time of the extension. Clarke, writing in 1892–3 (Clarke 1986), states ‘the central part is the original house, almost intact; but it has been added to in front, bringing it nearer the road. It was then divided as is now seen, into two dwelling houses’. After the Second World War the site of 154 Dalston Lane was added to the German Hospital as a grassed over recreation area.

NOTES

¹ GLRO M79/LH/85

² PRO Assize Rolls nos 536–8, 542–3, 546,9

³ Court Rolls (unpublished)

⁴ HAD D/F/TYS/A/1

⁵ HAD D/F/TYS 1 63–71

⁶ HAD P/J/P/76

⁷ OED: 'dwelling house with outbuildings and land assigned to its use'

⁸ GLRO Q/HAL/60

⁹ GLRO Q/HAL/61

¹⁰ The pond is represented in more detail on the 1796 plan (Fig 4)

¹¹ Confirmed by LCC plan 6679 20 December, 1910, the only renumbering of Dalston Lane between 1872 and the present; GLRO AR/BA/5/323

¹² File TP 7717 III DG 11/16374, File TP 7717 II DG 11/17977

¹³ The archive of the Barts NHS Trust, indexed under The German Hospital

¹⁴ HAD AP224

¹⁵ Annotated as BG on 1831 parish map

¹⁶ Annotation as 'The Executors of Baron Graham' on 1843 plan

¹⁷ Guildhall Library LTS 118/9

¹⁸ Archive Department St Bartholomew's Hospital, Royal Hospitals NHS Trust; GHC1

¹⁹ Information from The Barts NHS Trust archive

²⁰ See 1843 sale plan (Fig 7)

²¹ Information from The Barts NHS Trust archive

²² The ground floor is above external ground level, therefore there was a basement. The brick arches and string courses are typical of the late 17th-early 18th centuries (Cruikshank & Wyld 1975, 47). The segmental window arches were fashionable between 1710-1730 (*ibid* 161). During the 1730s the straight arch reappeared. The details of the sashbox and its relationship to the facade are impossible to glean from the drawing. The roof appears to be of the gambrel type; a two angled pitched roof, partially concealed behind a parapet. Therefore the construction date would appear to be the first half of the 18th century

²³ The row of arches on the east side of the building would appear to be influenced by the work of Sir John Soane (1753-1837). This type of feature is seen in early 19th century buildings (Cruikshank & Wyld 1975, 78). The roof is bounded by a long external cornice at the eaves level, a fashionable element in the early 19th century (*ibid* 168). It would appear that it was constructed between the early 19th century and 1843 (the date of the sale plan upon which it appears).

²⁴ The date of ownership by John Burdon, see above

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CLISSOLD HOUSE, STOKE NEWINGTON

Jon Bolter

SUMMARY

Clissold House is a late 18th-century villa set in about 50 acres of parkland in the Borough of Hackney. The usual attribution of the building is that it was designed by Joseph Woods for his uncle Jonathan Hoare in the early 1790's (VCH 1985; Pevsner 1952). Joseph Woods was, however, only born in 1776, suggesting that either the date of the building or the identity of the designer must be incorrect.

Rees Bolter Architects carried out repair works to the house during 1996–7 and this paper summarises recent documentary research carried out by Jon Bolter of that practice in an attempt to clarify the issue.

The discussion of the authorship of the design is preceded by a brief description of the house and those characteristics which might be considered unique or unusual, together with an account of Jonathan Hoare himself.

THE HOUSE

Clissold House (Fig 1) lies to the north of Stoke Newington Church Street on the outside of one of the many loops of the New River as it winds its way from Ware to Islington. It is a five bay house of three storeys; attached are two storey wings with semicircular bays. The house is quite plain and is constructed of stock brickwork with a sparing use of Portland stone dressings. The roofs are all flat and were originally covered in copper; the staircase to roof level suggests that the roof was intended to be used as a promenade. The severity of the building is relieved by the stone balustrade around the perimeter of the main roof, by the unusual pediments set within the prominent chimney stacks and by the colonnade on the entrance front.

The grounds were entered at the gatehouse on Church Street,¹ revealing the house in a three quarter view. The driveway approaches the house along the bank of the New River and then sweeps dramatically up in front of the house to allow entry at the middle floor level. The lowest storey is set at ground level, perhaps to avoid excavating basements in close proximity to the New River, and the arrangement of lower wings and approach ramp around the main body of the house serve to anchor the house visually to its surroundings. The entrance colonnade also serves to conceal the asymmetry of the main entrance.

Internally, the floors are linked by a toplit circular stairway, placed towards one end of the main block and leading at each level to central corridors. The original layout of the house has not yet been fully determined and a reconstructed plan based on the most recent evidence is illustrated in Fig 3. Recent works have revealed the existence of a toplit service stair within the north wing linking the two lowest levels and suggesting that the servants' rooms were confined to the northern half of the lowest floor and the adjacent external vaults, leaving the remainder of the building, including the internal vaulted spaces of the lowest floor, for the family. Additional service buildings and kitchen gardens appear to have been positioned to the north of the house.

Although a great deal of the internal fabric, particularly plasterwork and other decorative finishes, has been lost, through a combination of successive alterations and a fire in the 1950's which resulted in the loss of the main roof, much of the joinery and carpentry remains and is able



Fig 1. Clissold House from the south west, photographed in about 1876. The carriageway sweeps up to allow guests to enter the house on the middle floor level (courtesy Hackney Archives Department)

to provide a valuable record of high quality construction of the late 18th-century. The floor and roof structures are of massive construction, using substantial sections of timber to form complex structures (see Fig 4). The walls too are substantial and the quality of workmanship in hidden areas² confirms that this was constructed as a building of quality. Work in the north wing has revealed that the roof was insulated with a layer of rye straw approximately 3" deep immediately underneath the roof boarding. The sweeping handrail to the main staircase is constructed of laminates of oak, each approximately 6mm across, glued together and arranged to follow the sweeping lines of the stair.³

During the recent work, the stones of the colonnade balustrade were found to be inscribed with masons marks as shown on Fig 5. These marks seem to be intended to identify the maker rather than to locate the stone.

The house and grounds were purchased by the Metropolitan Board of Works in 1887 (VCH

1985) in order to provide a public park, which opened in 1889. The house ceased to be used as a single family house at that time and has been altered on many occasions since. Throughout its life as a public building it has housed the park cafe; in recent years it has provided accommodation for park staff and changing facilities for nearby sports pitches.

THE HOARE FAMILY

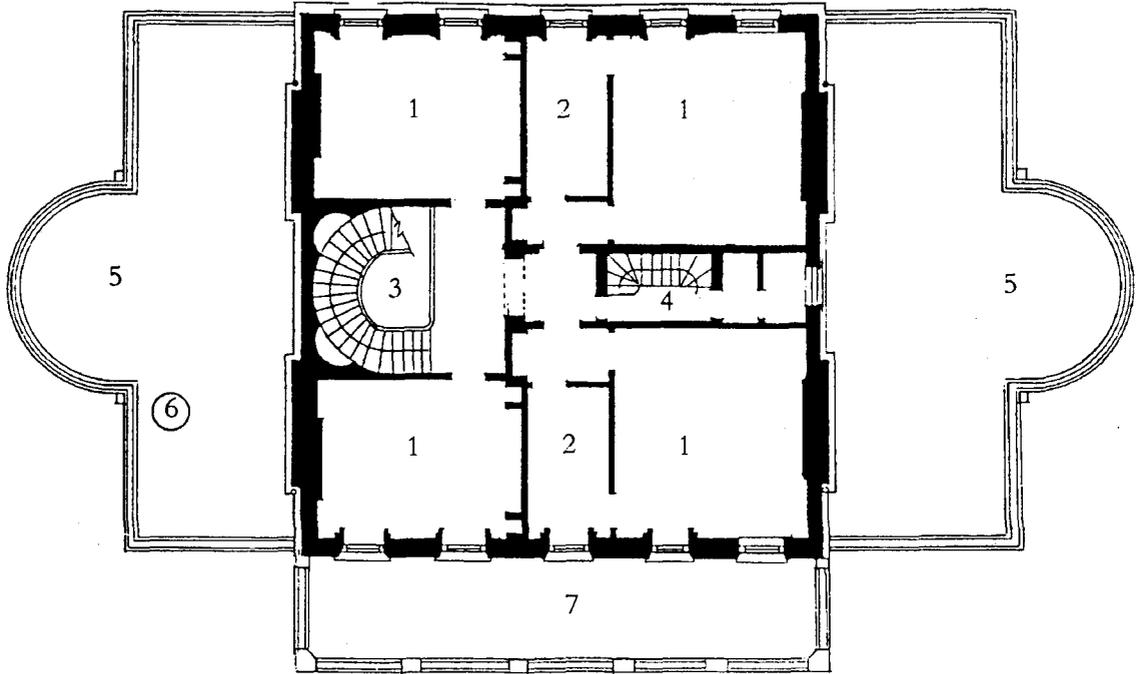
The Hoares were prominent Quakers; Stoke Newington was, in the late 18th century, well known for its Dissenting residents. The Hoares moved to London from Cork in the early 18th century and were part of the Hoare banking family; other branches of the family included the Hoares of Stourhead and Luscombe Castle. Samuel Hoare the elder (1716–96) became wealthy through international trade and was a partner in Gurnell Hoare. In 1744 he married



Fig 2. The house and grounds in about 1870 (courtesy of Alan Godfrey Maps) **Key:** A) Clissold House; B) New River; C) entrance lodge; D) stables; E) Paradise Row; F) St Mary's Old Church; G) lakes formed from brick excavations

Grizell Gurnell⁴ and by her had seven children. The eldest son, Joseph, died at the age of 24, leaving Samuel Hoare the younger (1751–1825)

to become head of the family. Samuel became a partner in the banking firm of Hoare, Barnett & Co.



FIRST FLOOR PLAN

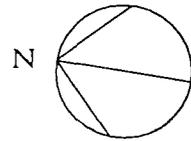


Fig 3. Suggested original layout of the house based on evidence exposed during recent works

a) FIRST FLOOR PLAN b) GROUND FLOOR PLAN c) BASEMENT (LOWER GROUND FLOOR) PLAN

Key: 1) bedroom; 2) dressing room; 3) main stair with glazed lantern over; 4) stair to flat roof; 5) copper flat roofs to wings; 6) circular lantern over service stair; 7) flat roof over colonnade; 8) main entrance; 9) entrance hall; 10) service stair; 11) principal room; 12) eating room; 13) principal room (library?); 14) study? (note restricted access); 15) ante room; 16) vaulted corridor; 17) secondary entrance; 18) service entrance; 19) kitchens; 20) service rooms; 21) vaulted wine cellar; 22) bedrooms?; 23) vaults below entrance ramp

Jonathan Hoare (1752–1819), the third son, was, in many ways, the black sheep of the family. He went into his father’s business, being in partnership with his cousin John Harman, of whom more later. In 1783 he married Sarah, daughter of Thomas Beswick; they had one daughter, Sarah, who died in 1805 at the age of 19.⁵ Samuel the Younger’s daughter Sarah wrote of him (Pryor, 1911):

Though engaged in the excellent business which was once my grandfathers he spent far beyond his income and was engaged in transactions which a parent with so high a sense of honour would have regarded with the highest disapprobation.

His circumstances were made known to his family not long after this period, and proved the greatest vexation my father ever knew. Many thousands were given by him

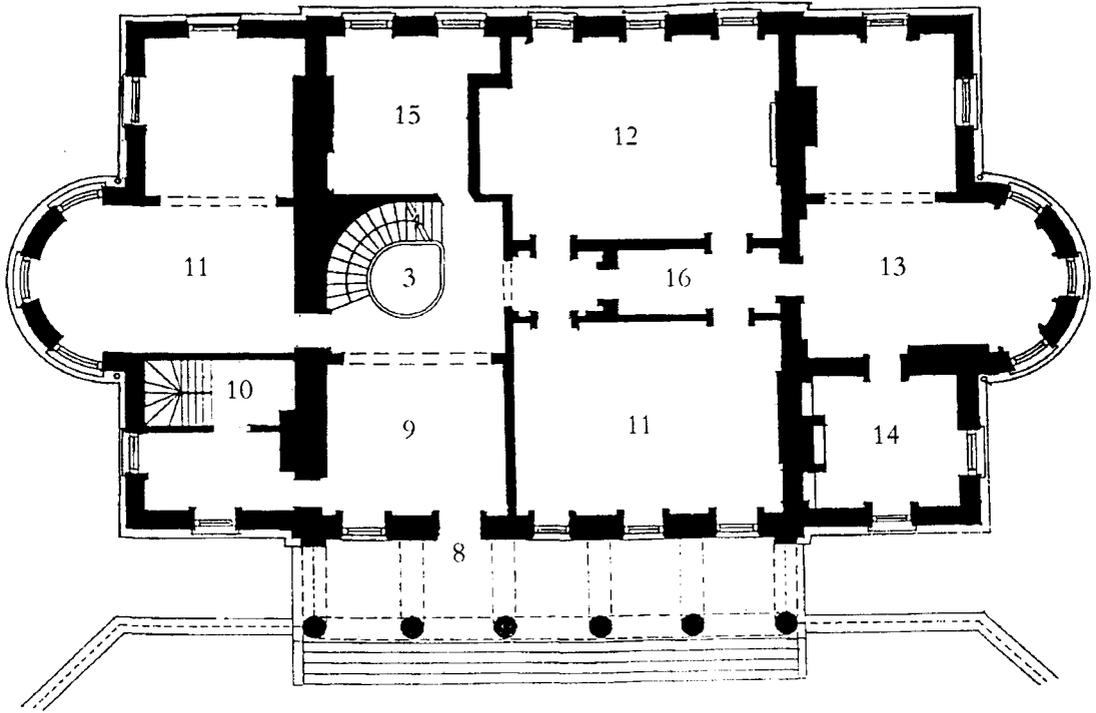
to pay my uncle’s debts, who unmindful of all this assistance, continually deceived him and made promises which he broke when it suited his own convenience.

Though my uncle was conscious of the uneasiness he gave, and lived in a state of half-intoxication, friendly intercourse was not entirely stopped between the two families. No quarrel ever took place between the brothers.

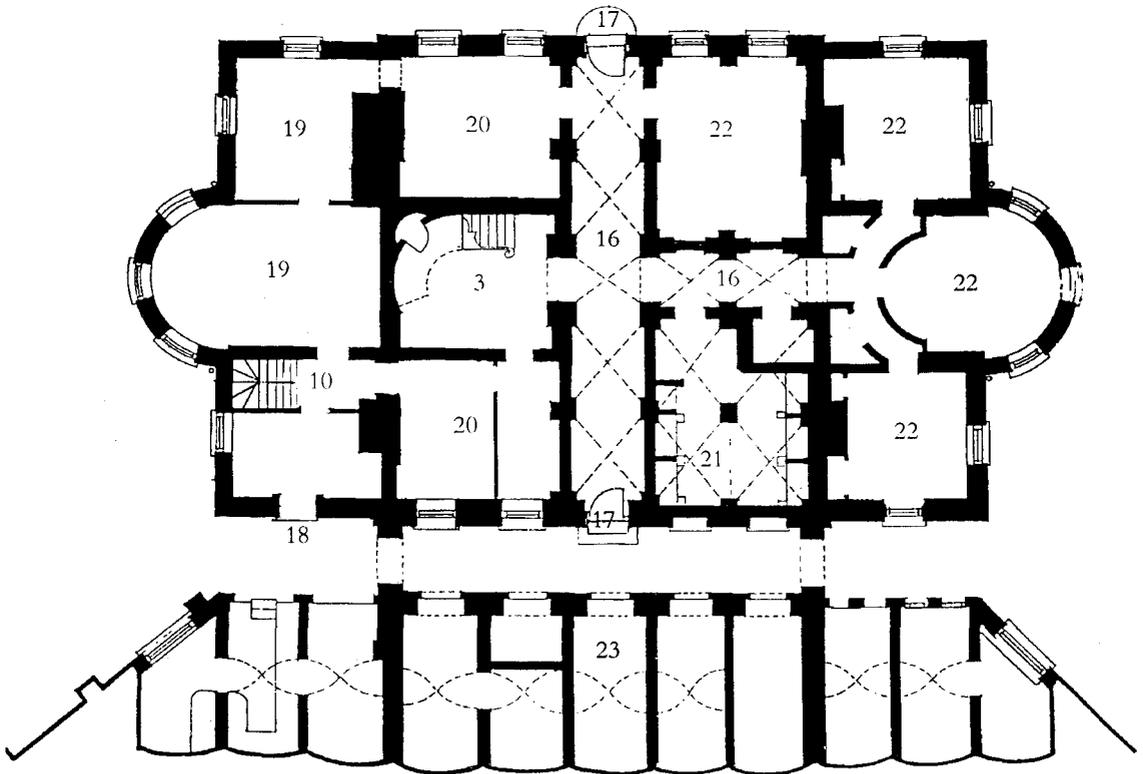
Speaking of her grandfather’s death in 1796 Sarah Hoare notes:

There was one among us who could have shed no heartfelt tear but whose improvidence made even the death of such a father an unspeakable relief. I mean my uncle Jonathan whose affairs were extremely perplexed.

In Viscount Templewood’s account of the family (Templewood 1949, 56), Jonathan is described as having been a zealous Quaker at an early age but . . .



GROUND FLOOR PLAN



BASEMENT (LOWER GROUND FLOOR) PLAN

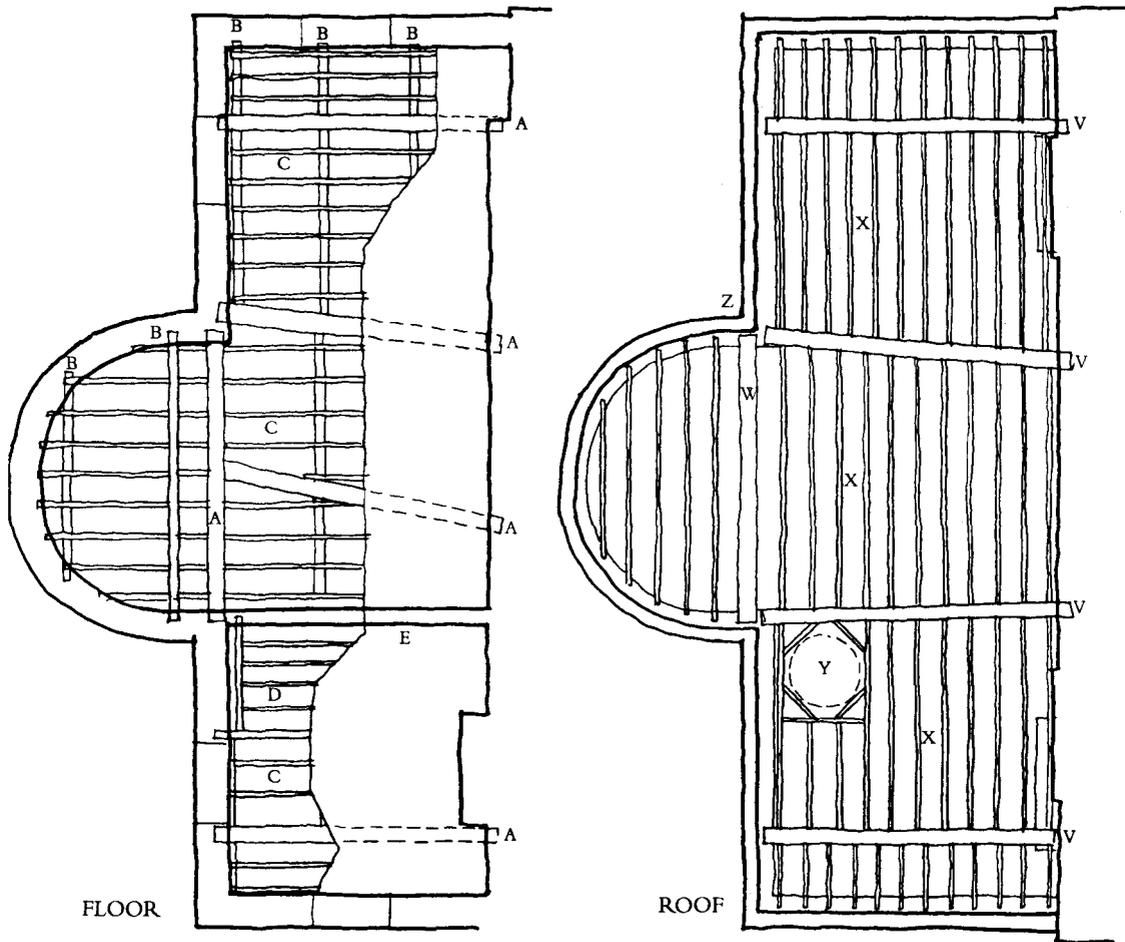


Fig 4. North wing ground floor and roof structures

a) FLOOR (not all exposed during works) Key: A) primary beam (typically 10" × 12"). Angled to avoid bearing on flues or hearths; B) secondary beam (typically 9" × 5"); C) separate floor joists (4.5" × 2.5") and ceiling joists (3" × 2"); D) early 19th-century infill flooring where service stair removed; E) brick supporting wall

b) ROOF Key: V) primary beam (typically 10" × 10"); W) this 'primary' beam carries no secondary load; it may perhaps have been intended for overall structural stability; X) roof joists (typically 10" × 2.5") above ceiling joists (4.5" × 2.5"). Rye straw insulation between roof joists; Y) roof structure trimmed for circular rooflight over service stair; Z) stone parapet to north wing

the young fanatic's fervour soon cooled and going to the other extreme he embarked on a career of wild extravagance, became a friend of the Prince Regent and bought himself 50 acres in Stoke Newington where he built Clissold House, a large mansion in the Classical style. Thereafter the prodigal brother went the way of the prodigal son and was soon so utterly ruined that 'he was reduced to soliciting orders for milk and butter'.

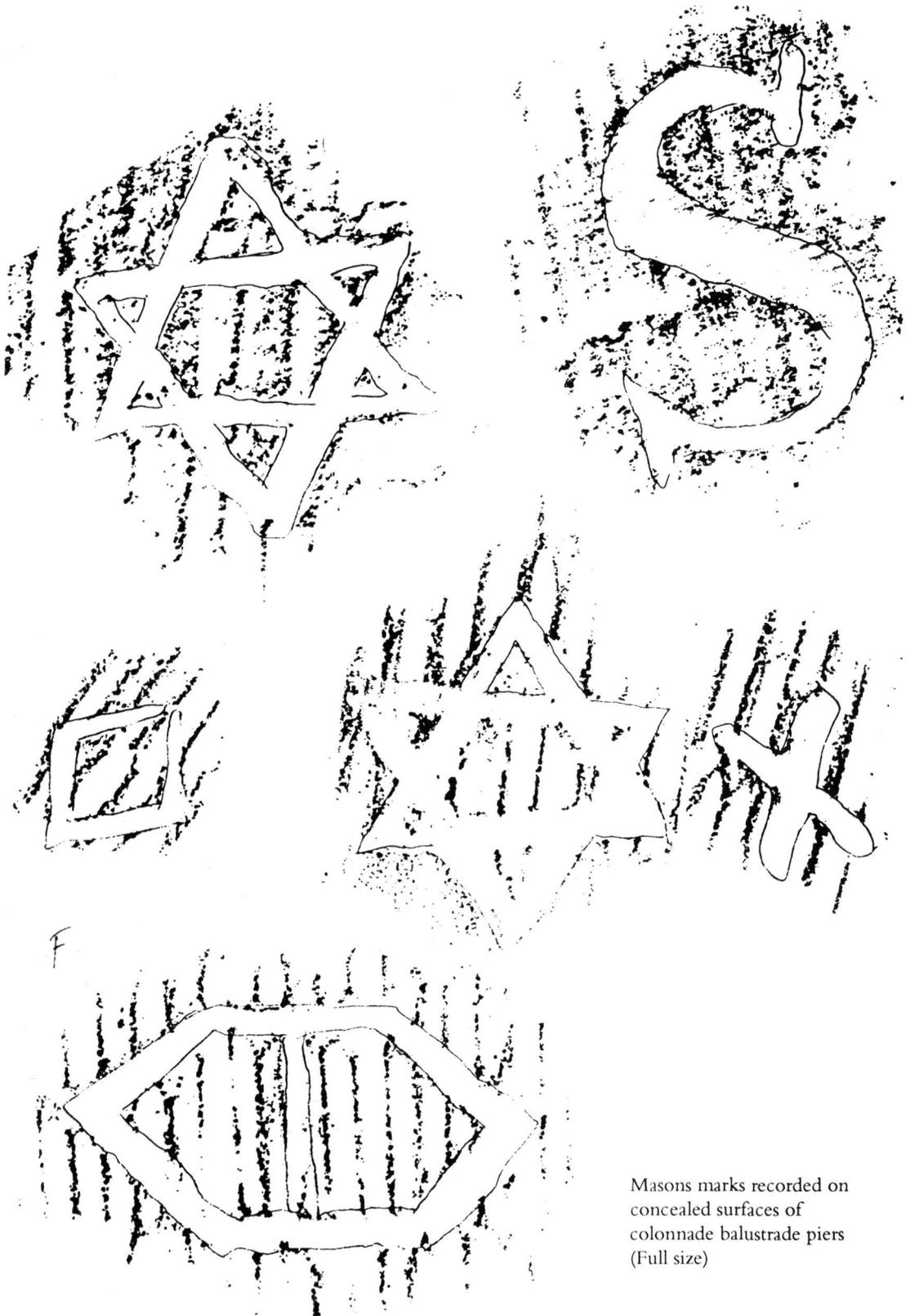
Relationships were clearly strained between Jonathan and other members of his family but were not broken off. In her diaries⁶ Margaret Wood, his eldest sister, refers to their taking carriage trips into Hertfordshire together. Jonathan died after a lingering illness in August 1819.⁷

Margaret (1748–1821) married Joseph Woods, a wealthy woollen draper. They had four children, their second son being Joseph Woods the architect.

Another cousin of both the Stoke Newington Hoares and of John Harman was Mary Gurnell. In 1772 she married the architect George Dance the Younger.

DATE OF CONSTRUCTION

As this is a key factor in the attribution of the building, it is considered first. The date is usually



Masons marks recorded on concealed surfaces of colonnade balustrade piers (Full size)

Fig 5. Masons' marks to the colonnade stonework recorded during recent works

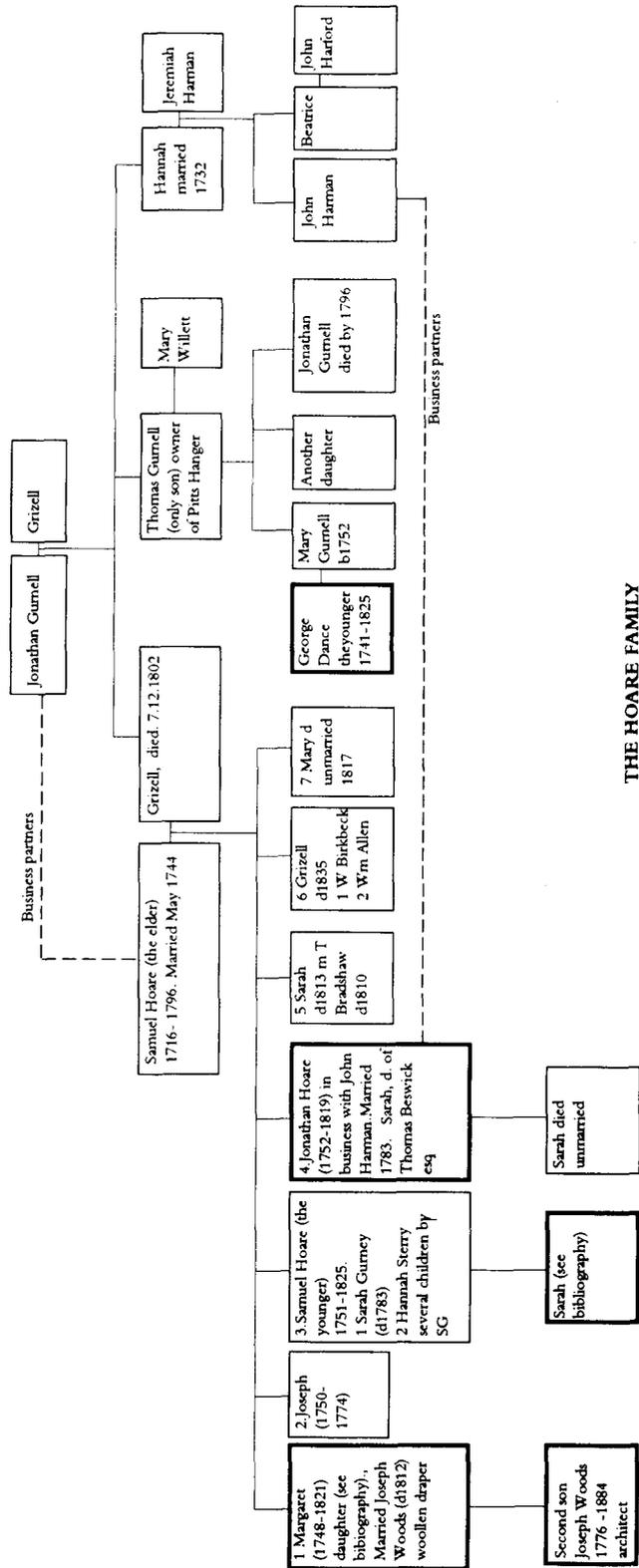


Fig 6. The Hoare family tree

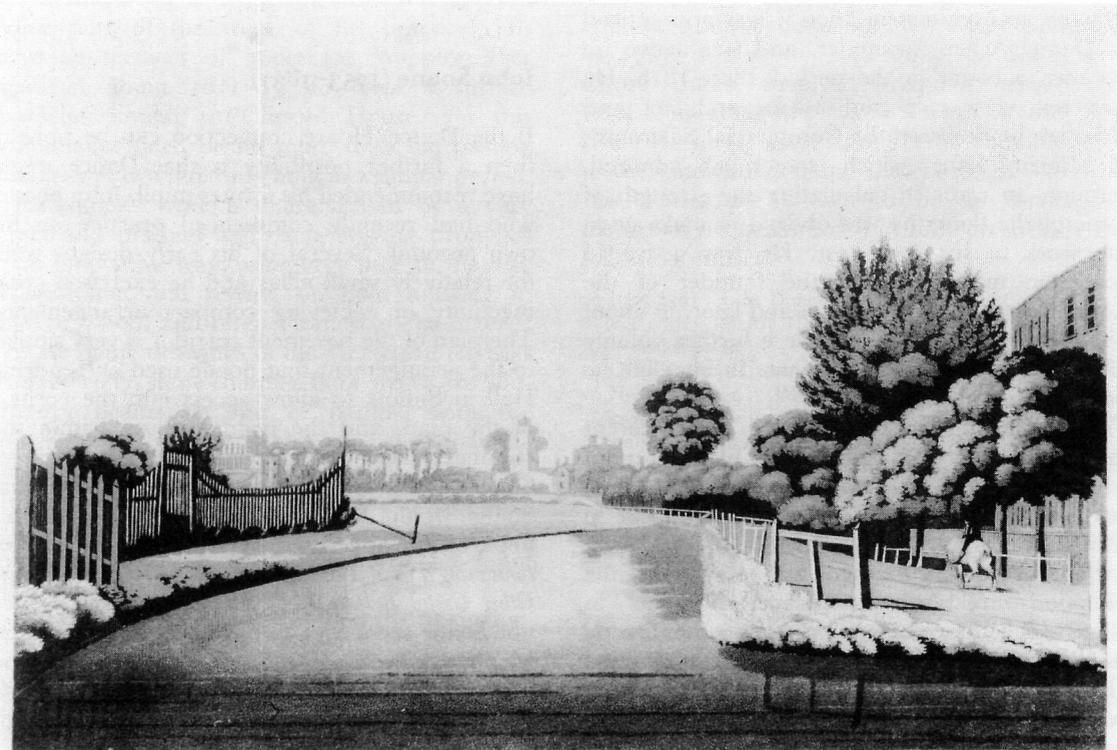
determined by the engraving by Ellis of Stoke Newington published on 1 January 1793 (Fig 7). Although it is possible that the engraving shows a partly completed building, the depiction is undoubtedly of the present house.

This date is generally reinforced rather than contradicted by further documentary evidence. Jonathan Hoare obtained leases of the land on which the house stands in 1789 together with a licence to demolish the buildings then standing on the land.⁸ He is said to have been in financial difficulty by 1796 (Pryor, 1911) and mortgaged the property to Robert Pryor in 1798.⁹ Pryor's executors foreclosed in 1799¹⁰ and in 1800 sold the lease to Thomas Gudgeon. It therefore seems entirely likely that the dated engraving is correct and that construction was carried out in about 1790–92. A stone standing by the New River, said to have been part of the former gatehouse (Pryor, 1949, editor's note), bears the date 1790.

WHO DESIGNED CLISSOLD HOUSE?

Clissold House was designed in a very severe Greek style. The design incorporates many quite original ideas although few are entirely successful in execution. These include the entrance sweep, the double symmetry, ingenious internal planning, flat copper roofs throughout, and 'pediments' applied to chimney stacks.

The house appears to have been conceived from the outside; this has then compromised the layout of the interior, particularly in arranging access to the corner rooms of the wings. The asymmetry of the original entrance (required because of the small size of the main part of the house) is concealed by the colonnade but the arrangement of the larger rooms behind the semicircular bays does not seem well resolved. In addition, although the massing of the building and the proportions of the elevations appear to



STOKE NEWINGTON.

Fig 7. Engraving by Ellis of the view from Paradise Bridge, published on 1 January 1793. Old St Mary's church is straight ahead and Clissold House may be seen towards the left of the picture (courtesy of Hackney Archives Department)

have been carefully considered from the principal viewpoint on the approach road, these are much less successful when carried round to the east elevation, where there is no approach ramp or colonnade, and the resulting elevation seems rather unresolved.

The house is, however, carefully detailed and very substantially constructed and even incorporates novel ideas, such as the rye straw roof insulation. It might therefore be considered that this is the work of a relatively young architect, working in a fashionable style, but not afraid to try new ideas, and yet sufficiently experienced to have sound grasp of constructional matters.

Joseph Woods (1776–1864)

Joseph Woods was born on 24 August 1776 and so was only fourteen years of age in 1790. He had been a sickly child and was sent to learn the trade of a merchant in Dover in 1792¹¹ in order to benefit from the sea bathing. He decided to become an architect in 1802,¹² was apprenticed to Daniel Asher Alexander, and was active on his own account in the period 1806–1816. He was not very successful as an architect and although he designed the Commercial Salerooms in Mincing Lane, which were much admired, through an error in calculating the strength of some of the floors he was obliged to make good the work at his own cost. He was active in academic matters, being the founder of the London Architectural Society and later, in about 1814, being invited to compile a further volume of Stuart's *Antiquities of Athens*. In later life he became a notable botanist.

All of the above is referred to in four different mid 19th-century accounts of his life,¹³ none of which refer to Clissold House. The first attributions of the building to Woods appear to date from about 1890 (Giltspur, 1893; Beck c.1890). Woods published an essay 'On the Situations and Accompaniments of Villas' in 1807 which does not refer directly or indirectly to Clissold House. His mother's diaries do note his decision to 'start a second apprenticeship ... and ... struggle to get forward in the architectural line of business',¹⁴ and they record concern for his health in his youth, but they make no mention of so remarkable an event as having designed a house for his uncle at such an early age.

It seems inconceivable that a boy of fourteen can have designed the house, particularly one

who was singularly unsuccessful in his later architectural work.

George Dance the Younger (1741–1825)

George Dance the Younger had a long and successful career as an architect. There are family connections between Dance and the Hoares and it is tempting to make a link between the two. Dance did develop a stripped Neo-Classical style but Clissold House appears even more severe than his other known work.

His marriage to Mary Gurnell in 1772 took place at St George's, Bloomsbury and, because the event did not take place at a Meeting of Friends, was the cause of Mary Gurnell being disowned by her family (Stroud, 1971). It might be considered that the likelihood of family connections having provided Jonathan Hoare with his architect are lessened by this rift and also by the apparently strained relations between Jonathan Hoare and his own family.

John Soane (1753–1837)

If the Dance/Hoare connection can be upheld, then a further possibility is that Dance might have recommended his former pupil, John Soane, who had recently commenced practice on his own account. Several of his early designs were for relatively small villas and he exercised great ingenuity in achieving compact arrangements. The plan of the basement corridor is very similar to the arrangement that Soane used at Tendring Hall in Suffolk to allow access into the corners of the plan, and the pediments set within the chimney stacks are certainly devices typical of Soane, but it might have been expected that Soane would have included the design in his book of self advertisement *Sketches in Architecture, containing Plans and Elevations of Cottages, Villas and Other Useful Buildings* of 1793 and neither Dance nor Soane seem ever to have proposed a plan in which a curved bay sat at one end of the long side of a rectangular room.

Daniel Asher Alexander (1768–1846)

The reasons for Woods being apprenticed to Alexander are not stated. There is no documented link between Alexander and Clissold House but

there are a number of circumstantial pieces of evidence.

Alexander was apprenticed to Samuel Robinson, where he learned much of dock, warehouse and engineering works. It is possible that Alexander and Hoare may have met through an involvement with warehousing for foreign trade. He commenced practice on his own account in about 1790 and his early works include a house at Highbury Hill for Dr William Saunders. This was demolished in 1936 but surviving photographs show a rather severe five bay elevation with a projecting semicircular bay on the rear. He designed Mote House for the Earl of Romsey in Maidstone in about 1793. This is extremely severe, makes use of projecting curved bays, double symmetry and a single storey Ionic colonnade. The house is large and there would have been no need for the intricate planning evident at Clissold House.

His later works include warehouses at London Dock (including the Skin Floor), prisons, lighthouses and bridges. Domestic work was never a major part of the work of his practice. His surviving terraces of houses at Wapping Pier Head of about 1811-13 do have a surface character similar to Clissold House, yet this resemblance need be no more than the passing similarity of two buildings built at a similar period.

Alexander's work is characterised by a very direct and original approach, solving problems in an innovative way, using very little in the way of ornament and relying on bold massing to achieve a bold and often Piranesian character.¹⁵ The surviving drawings of the Pier Head terraces (Harris, 1967) show complex floor structures with primary beams set out of parallel with the adjacent walls in exactly the same way that the north wing floor and roof structures of Clissold House follow the need to bear on the most suitable points. Again this is an interesting and common characteristic that need be no more than the practice of the times.

Alexander's obituary¹⁶ included the following:

His engagements were with a generation that has almost passed away. The late earls of Egremont, Camden, Romney, Radnor and Folkestone were his patrons and many of the commercial aristocracy who were prominent at the beginning of the present century might be enumerated as his friends and supporters; but we should have to mention, perhaps, some names who, owing to the changes incident to a trading community, have long since sunk below the commercial horizon and who would now scarcely be remembered.

Jonathan Hoare could certainly have been included in this last description. On the basis of the descriptions of his character, it is perhaps most likely that his choice of architect would have been influenced by the circle of friends that he would most have wished to impress. It is also noted that Dr Saunders was in 1807 appointed as physician to the Prince Regent,¹⁷ and may have been included in that circle of friends at an earlier date.

Robert Mylne (1733-1811)

Robert Mylne is a major figure in the development of architecture in the late 18th century, whose work has been overshadowed by his contemporaries, Robert Adam and William Chambers. Practising as both architect and engineer, his extensive practice included a great deal of domestic work, much involving the construction of villas on the periphery of London for wealthy merchants. In addition he was appointed Surveyor to the New River Company in 1767, a post he held until his death, and whose duties involved frequent travel and inspection along the whole length of the New river. He surely must have been a familiar figure to the landowners along the course of the river. His diaries are known to be an incomplete picture of his activities¹⁸ but they do include the following entries:¹⁹

- 29 June 1791 L M Duncan. Mr Hoare.
- 8 July 1791 At Mr Hoare's, Newⁿ: Set out the sides of River at his place.
- 22 October 1791 Examined Mr Hoare's part of the River.
- 16 November 1791 Went to Mr Hoare's
- 5 April 1794 Went to Mr Hoare's ponds etc and on bridges in the road, wastes, and Highbury bank.
- 31 July 1794 5-5-0 received from Mr Hoare by the hands of Mr Dowdily for Plans to his Deeds.
- 19 July 1798 With Mr Hoare - examined roof and rainwater pipes of his house, and also the course of the drains and stink traps.

These entries seem likely to relate to Jonathan Hoare rather than other members of the Stoke Newington Hoares. They may only be the result of works to the New River itself, although the 1794 payment of five guineas suggests the existence of some wider relationship between the two parties.

In addition there are a series of further entries in the period 1798-1802 for surveys and advice for Mr Hoare but it seems likely that these will have been for Henry Hoare of Hoare's bank in

Fleet Street. The entry of 1798 above may well be linked to this latter series but, in view of the apparently perpetual problems with the rainwater pipes, it is very tempting to link it to Clissold House.

Mylne was not a young man when this house was designed, but he had been a friend of Piranesi in Rome; they remained correspondents for many years (Richardson, 1955). Amongst his other offices was that of Surveyor to St Paul's Cathedral and amongst his designs for villas is that of Addington Lodge in Surrey (1773–9); this too is approached from a three quarter view, has lower wings pinning the house to the landscape and has markedly different front and rear elevations.

John Summerson (1983) wrote of Mylne that 'it might be proper to class him ... as a man primarily of an engineering bent, whose capacities as an artist were sound but limited', a description that suits Alexander as well as it suits Mylne. Like Alexander his buildings are characterised by the absence of decoration and, like Alexander, none of his surviving works seem to exhibit sufficient of the characteristics of Clissold House to prove authorship on the basis of style alone.

The unknown designer

In the absence of direct evidence, there must always remain the possibility that the house was designed by yet another hand, possibly with advice or guidance from Dance, Alexander, Mylne or another member of Hoare's circle of friends. The extent to which the builder may have made influential decisions on constructional matters is also a matter of speculation.

CONCLUSION

The current evidence suggests that Joseph Woods was clearly not the architect of Clissold House; that Clissold House could not have been designed without the involvement of a designer familiar with the leading architecture of the day and with the imagination to develop a number of original ideas in a single building; that neither Dance nor Soane were the architects; that either Alexander or Mylne could well have designed Clissold House, the balance perhaps favouring Alexander the younger man.

Without more definite and documented links, the identification of the designer remains speculative.

ACKNOWLEDGEMENTS

Thanks are due to all who gave help and advice, particularly the staff and archivists of the Greater London Record Office, Hackney Borough Archive and the Society of Friends; Gina Douglas of the Linnean Society of London; Mary Lynch; Alan Baxter & Associates, structural engineers for the works at Clissold House.

NOTES

¹ Now Stoke Newington Church Street.

² As an example, the timber floor of the lowest storey is suspended over a void 3 feet deep; the 9" sleeper walls are pierced by ventilation openings with semicircular arches.

³ Although not unique, this appears to be quite rare. The only other example I have been able to trace is Wren's stair inside the SW tower of St Paul's Cathedral.

⁴ The Gurnells were another prominent Quaker family. Grizell was the daughter of Jonathan Gurnell, with whom Samuel Hoare was in business.

⁵ Woods 18 August 1805.

⁶ Woods 1802.

⁷ Woods 15 August 1819.

⁸ Hackney Local History Library; Marcham Digest.

⁹ Hackney Local History Library; Marcham Digest 2/12/1799.

¹⁰ Hackney Local History Library; Marcham Digest 2/12/1799.

¹¹ Woods 18 July 1792.

¹² Woods 17 February 1802.

¹³ Transactions of the RIBA xv 1863–4; Proceedings of the Linnean Society v8 1865 xxxii–xli; *Builder* Jan 23 1864; M A Lower *The Worthies of Sussex* 1865 pp 312–4.

¹⁴ Woods 17 February 1802.

¹⁵ Although Harris places the timing of this influence as possibly subsequent to his introduction to the work of Piranesi by Robert Mylne from about 1800. (Harris, 1967).

¹⁶ *Gentleman's Magazine* Aug 1846 210–213.

¹⁷ *Dictionary of National Biography*.

¹⁸ Compare for instance the diary entries (British Architectural Library; Mylne family papers) with Lindsay and Cosh 1973.

¹⁹ British Architectural Library; Mylne family papers 13/3 and 14/1. See also Richardson 1955.

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HIORT PATENT CHIMNEY BRICKS FROM LAMBETH, LONDON

Terence Paul Smith

SUMMARY

Post-excavation work by the Museum of London Archaeology Service (MoLAS) on material from Coronation Buildings, South Lambeth Road SE11 has brought to light a rare example of early to mid 19th-century ceramic building material. This is a brick of distinctive and unusual shape manufactured according to a patent for chimney-flues taken out by J. W. Hiort in 1825. Also found (in a different archaeological context) was a fragment, about one quarter, of a similar brick. Flue-bricks, by their very nature, are not normally visible in standing buildings; nor are they a common find in archaeological excavations. The examples from Coronation Buildings tell us something about their use and manufacture which is relevant to the social history of 19th-century London.

INTRODUCTION

The site at Coronation Buildings, South Lambeth Road SE11 (NGR: TQ 303776) was of interest mainly for its evidence of prehistoric activity and topography, sealed by probably medieval plough-soil. There were also some medieval and post-medieval features and post-medieval buildings. The complete Hiort brick was found in context [9] and the fragment in context [56]; both these contexts were stone foundation walls of 19th-century date which incorporated various materials. The site code for Coronation Buildings is COR89; the accession number for the complete brick, <362>; the fragment, <363>.

THE BRICKS

The complete brick (Fig 1) is part-octagonal in shape on its outer face and curved on its inner

face, so that four plan-forms make up an octagonal shape with a central circular flue. In elevation the brick tapers from one end to the other, the bedfaces being radial (Fig 2). The lower bedface (as in the mould) is stamped with the words 'HIORT' and 'PATENT' in raised letters within sunken rectangles; between the two is a stamped numeral '2'. The sunken rectangles would have provided a mortar-key – acting as frogs, in effect – as well as serving as an 'advertisement'. Mortar-keying was also provided by a vertical semi-circular groove, set closer to the inner than to the outer face, in each end. The impressed '2' is a pattern or setting mark, indicating to the bricklayer where the brick was to be laid, for Hiort's system required a number of bricks of different forms (see below). The stamped impressions were presumably formed by a metal die in the bottom of the mould. The curved face is glazed; it is black though purplish in places, indicating a manganese glaze.

The maximum length of the complete brick is 257mm, its width at the centre 69mm; the thicker end is 102mm; the thinner end 70mm thick. The mortar-grooves have a diameter of 10mm. The upper bedface, which is not quite straight, shows strike-marks where excess clay was scraped off using a wooden 'strike' during moulding (Fig 3). This was clearly done with a sweeping motion, more or less following the curve of the brick. This face has a small accidental splash of glaze and there is also a distinct curved 'scar' showing where a similar glazed brick was placed upon it during firing.

The fragment is the thinner end of a similar (number 2) brick. The fabric is orange-red in colour and is very fine, with no large inclusions.

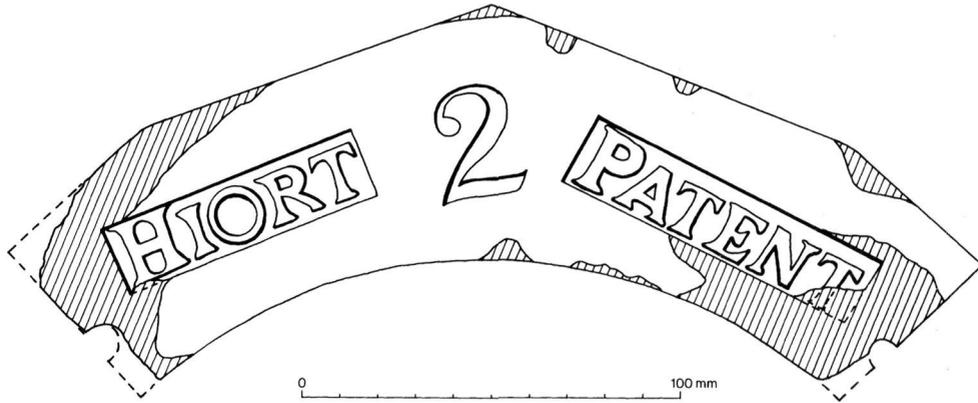


Fig 1. The lower bedface of the complete Hiort's patent brick from Coronation Buildings, Lambeth, showing the patentee's name and the numeral '2' (hatching indicates damage)

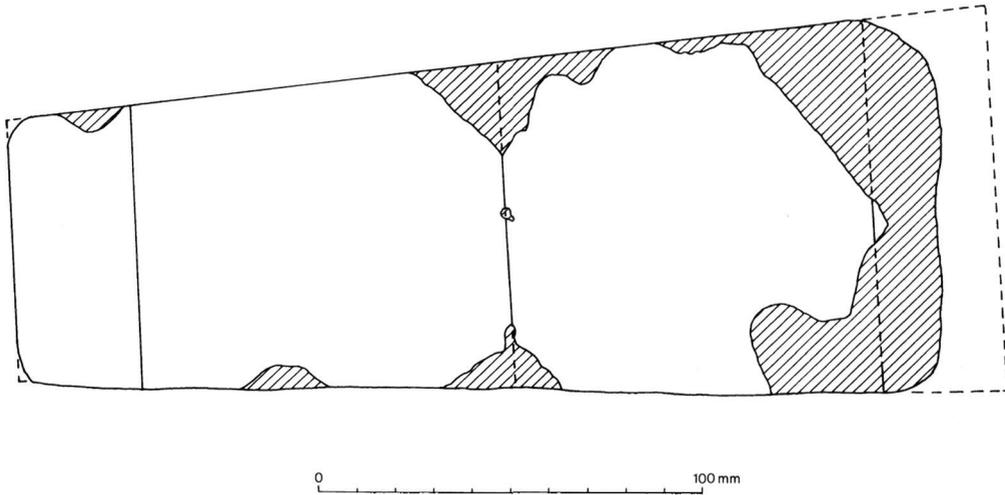


Fig 2. The outer face of the complete brick (hatching indicates damage)

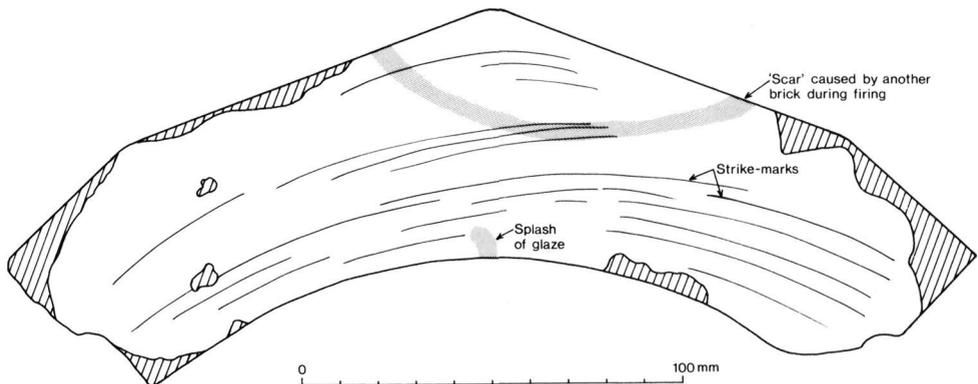


Fig 3. The upper bedface of the complete brick, showing strike-marks, the 'scar' caused by another brick during firing, and a small splash of glaze (hatching indicates damage)

There is some small quartz within the matrix and there are also some tiny black iron oxides. The surfaces have a fine sandy feel, but are fairly smooth, although there are a few 'crease-marks' where the clay was thrown into the mould.

The complete brick is entirely free of mortar, suggesting that it was never used; the fragment, on the other hand, has mortar on its bedfaces and one surviving end.

WILLIAM HIORT AND HIS PATENT

The patentee of these bricks, John William Hiort, was born in London on 16 April 1772, to a Swedish father and an English mother (Colvin 1978, 421–2). He was employed in the Office of Works and retired in 1832, when that department was merged with that of Woods and Forests. He spent a long retirement, partly in Bath, partly back in London. He died at Bedford Place, Kensington on 8 February 1861, aged 88, and is buried in Kensal Green Cemetery. He was responsible for a small number of buildings on a private basis, although his official work was largely concerned with the arrangement of public ceremonies, such as the funerals of William Pitt and of Lord Nelson and the coronation of George IV. His patent for special chimney bricks was taken out on 8 November 1825 (patent number 5284), accompanied by explanatory drawings, some of which have been published by Maurice Exwood (Exwood 1984, 10–11). In 1826 he promoted his new system in a *Practical Treatise on the Construction of Chimneys, etc.*

Four bricks together formed a circular flue 10 inches (254mm) in diameter, octagonal on the outside; this was embedded within an 18-inch (458-mm) wall, using a combination of standard bricks and special bricks of normal length and thickness (depth) but of only half-width. The mortar-keying enabled joints to be kept to a minimum size, while the glaze on the curved faces gave a smooth face to the interior of the flue. The taper on the bricks was provided so that by laying them alternately (thick end above thin end) a straight stretch of flue could be constructed, while by laying them in the same direction (thick end above thick end, thin end above thin end) a gentle curve could be achieved. By combining these methods of laying the bricks the flues could be made to snake up within the wall in whatever was the most convenient manner (Fig 4). This was particularly important where

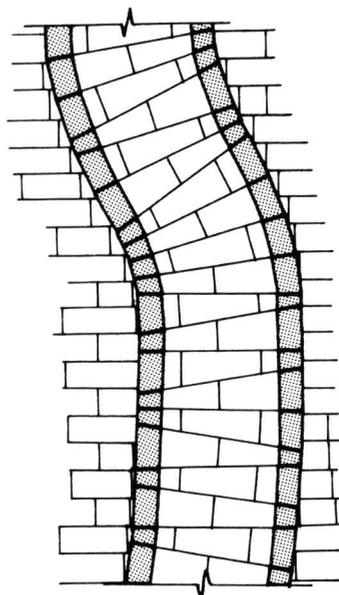


Fig 4. The arrangement of Hiort's bricks in a flue, based on Hiort's own drawing which accompanied his patent application, showing how the bricks could be used to form both straight and curved sections of flue

there were several fireplaces and several storeys, so that a number of flues had to rise in close proximity (just how complex flue arrangements could be in 19th-century London terraced houses is well shown in Muthesius 1982, 52, pl.17). In mansions and public offices flues were even more complex and included horizontal stretches along which 'climbing boys' had to crawl and which were not able to be cleaned using 'mechanical' means. It was the owners of the mansions who, in the House of Lords, were most frequently and vigorously opposed to abolition of the climbing boys (see below for more information on the climbing boys).

The half-width bricks and standard bricks surrounding the flues formed little cavities around the octagonal form and these, Hiort believed, improved the draught. The thin 'filler' bricks were also stamped 'HIORT PATENT'; one was found during the demolition of the Hope Maltings at Ware, Herts (measuring 228 by 70 by 54mm: Storey 1971, 26; Smith 1986, 14); and their presence in the end wall of a house near Weston Green, Thames Ditton, Surrey indicates the use of Hiort's Patent Bricks in the chimneys there (Exwood 1984, 10).

The flues thus formed, Hiort urged, had yet another advantage – and it is a warmly humane

one: the gentle curves of the flues and their smooth, glazed inner surfaces made them suitable for cleaning by mechanical means, thus obviating the need for sweep-boys. 'Mechanical' cleaning meant no more than the use of the once-familiar sweeps' brushes, with long rods in sections, either pushed up the chimney or lowered down it behind a weight. This was an innovation of the early 19th century, when there was some concern about the lot of the 'climbing boys'.

This form of exploitation of small boys (or, very occasionally, small girls) was peculiar to Britain and had begun in the early 18th century. Legislation of 1778 to regulate the practice was without powers of enforcement and was almost wholly ignored. A Society for Superseding Climbing Boys was formed in 1803 in London (Hammond 1917, 176–92, 184; Strange 1982). In 1817 the matter was considered by a parliamentary Select Committee (Wright 1964, 108). A sneering speech by the Earl of Lauderdale determined the outcome, and the bill in favour of reform was defeated by 37 votes to 20. A good thing too, opined Sydney Smith in the *Edinburgh Review*: the abolition of sweep-boys would be 'a great injury to property' and would increase the risk of fire; besides, he commented, 'humanity is a modern invention'. (Wright 1964, 10–11). This consideration, it should be said, had not prevented Smith (in 1810) from criticising bullying and other abuses at the public schools he had attended (Chandos 1985, 36–7); presumably it was only humanity to the 'lower orders' which was to be so summarily dismissed.

The chimney-boys continued to climb. William Blake had drawn attention to the sweep-boys '... your chimneys I sweep, & in soot I sleep' in *Songs of Innocence* (1789) and *Songs of Experience* (1794); Blake's London was one where '... the Chimney-sweeper's cry/Every black'ning Church appalls [*sic*] ...'; in both his poems Blake adroitly uses the small boys' thin, unformed voices to create a bitter pun on the word 'sweep' as the boys cry 'weep!' 'weep!'. Charles Kingsley's 1863 fairy tale of Tom the sweep-boy had an effect on heightening public awareness (Kingsley 1863). But it was not until Lord Shaftesbury's bill of 1875 passed through both Houses of Parliament that this shameful abuse was ended (Wright 1964, 111).

THE DISTRIBUTION OF THE BRICKS

For all his worthy intentions, however, Hiort's invention seems to have made little difference.

The bricks were manufactured by a company set up by Hiort himself: the London, Surrey and Kent Safety Brick Works, established at Stangate Old Wharf, Westminster Bridge, Lambeth, not so very far from where the Coronation Buildings bricks were found (Colvin 1978, 422; Exwood 1984, 10). The bricks were used in a few royal or governmental buildings in the years after their first manufacture. Doubtless this was helped by Hiort's employment in the Office of Works, although he himself was aware of possible questions of protocol in a government department using the private products of one of its officers: he took the trouble to seek Treasury sanction for his bricks to be used in John Nash's Buckingham Palace, completed by Edward Blore in 1837. Permission was readily granted (Crook & Port 1973, 107). Hiort's bricks were also used in Nash's Clarence House, St James's (1825–7), in Robert Smirke's General Post Office (1824–9, demolished 1913), and in Ambrose Poynter's St Katherine's Hospital, Regent's Park (1826) (Crook & Port 1973, 107, n.5, 325, 434).

But Hiort's products do not seem to have been taken up widely, and in 1847 Hiort came out of retirement and returned to London to further promote his ideas. This he did in his *Report to the Aeronomic Association* of 1852 (Colvin 1978, 422; Exwood 1984, 11). In a privately printed memoir of 1861, the year of his death, he had to admit that his bricks were no longer used (Exwood 1984, 11; Colvin 1978, 424). They were used, therefore, for a period of only three decades or so.

It is not difficult to understand why they failed to find general acceptance. From the early 19th century onwards there has been a plethora of ingenious new brick types, all purporting to improve upon the traditional brick (Butterworth and Foster 1956, 457–80 strongly advocate such an approach). Best known from 19th-century Britain are those of Caleb Hitch, patented in 1828 (Storey 1964, 231–2; Storey 1970, 319–24), and Henry Roberts, patented in 1849 (Curl 1983, 43, 102–4, 182; Roberts's Model Houses for the Working Classes, designed for the Great Exhibition of 1851 and built with his special bricks, are now re-erected in Kennington Park).

Whatever advantages these various innovations had, most lost by abandoning the obvious characteristic of the traditional brick – its simplicity and consequent versatility. Both Hitch's and Roberts's bricks, for example, required several 'specials' (specially designed bricks) just to turn a right-angled corner! Such bricks also

involved difficulties in manufacture and of handling, both at the brickyard and, by the bricklayers, on site. In this respect Hiort's bricks were no different. In the first place, they would have been expensive to manufacture, being made of material much finer than that normally encountered in 19th-century London bricks (including the familiar London Stocks) which usually contain numerous inclusions and/or voids. This better fabric was only achieved by very careful preparation, which was time-consuming and thus costly. They were well-moulded with sharp arrises which would also have increased costs. The application of glaze to the inner curves would have added yet more to the expense of manufacture. The 'scar' on the complete example from Coronation Buildings shows how the bricks were set in the kiln, and it is clear that a good deal of space was wasted. Moreover, the tapering shape would have necessitated setting the green (unfired) bricks thick end to thin end in the kiln (and, at an earlier stage, for drying): setting the kiln, in fine would have been a time-consuming task.

Secondly, handling and transport of the finished products at the yard as well as distribution to building sites would have been seriously hampered by the awkward, and varied, shapes of the bricks. In advocating new designs, Butterworth and Foster (1956, 461-2) urged that a principal requirement is 'a simple external shape that lends itself to easy stacking and packaging'. Clearly, Hiort's bricks failed in this respect.

Thirdly, they would have been laborious to sort and, above all, to lay in the building. Clearly, four bricks like the complete example from Coronation Buildings could not be used for a single course, because of the taper. Two such bricks could be used, one with the stamped face upwards, the other with the stamped face downwards, to make a half-octagon, but two bricks of a different form (presumably stamped '1') would be necessary to complete the octagon; again, they would have to be laid alternate ways up. If the perpend (vertical joints) of a course were placed in line with those of the courses above and below then no further bricks would be required to complete a flue. But the drawings accompanying Hiort's patent application are clear that this was not the case - the courses were properly bonded, with the perpend of one course placed above and below the centres of the bricks in the alternate courses. A further two

bricks (presumably stamped '3' and '4'), each different from the other and each different from those in the course below (or above), would therefore be required. Once more, they would have to be laid alternate ways up. Bricks of four different types, each placed in its correct position, were thus needed to build a flue. In addition, the half-width bricks and the standard bricks would need to be properly placed around the externally octagonal flues. It would not be essential to use the special shafts that Hiort advocated (for improved draught) above the flues, although if they *were* used then yet further special bricks would have been required (see illustration in Exwood 1984, 11). The amount of sorting of the several components and their correct laying would have added significantly to the costs of building a Hiort Patent Brick chimney.

Doubtless it is for this reason that Hiort's bricks are so seldom found in the course of archaeological work. Because of the distribution costs it is probable that they were used mostly in London itself. The extent of their wider use is not known, but it is not at all unlikely that the examples recorded from Weston Green, Surrey and from Ware, Herts represent, more or less, the outer limits of their use. Further work is needed to establish a firm distribution pattern, but it is not likely to be extensive. The Weston Green and Ware examples almost certainly indicate the use of water transport, using the Thames in the first case and the Thames (as far as Limehouse) and the Lee Navigation in the second. It is probable, indeed, that a more complete distribution pattern would continue to reflect the use of the Thames and its navigable tributaries.

POSTSCRIPT

Further work is required to establish a distribution pattern of this intriguing building material. As stated above, such bricks are typically hidden from view in surviving buildings but they sometimes come to light during repair work or archaeological excavation. Sometimes, too, as at Weston Green there may be an external clue to their presence. The writer would be glad to hear of any further examples.

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